

BIOSECURITY FOR THE POULTRY PRODUCER

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Master of Public Health Field Experience Presentation

Kansas State University

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OVERVIEW

- Introduction
 - Field Experience
 - Influenza
 - Avian Influenza
- Biosecurity
 - Challenges
- Learning Objectives
 - Elective Coursework
- Conclusions



FIELD EXPERIENCE

- USDA APHIS

- Field Office Topeka, KS

- KDA

- Manhattan, KS



United States Department of Agriculture
Animal and Plant Health Inspection Service



FIELD EXPERIENCE

- May-July 2018
- Dr. LewAnn Schneider
- Field Service Veterinarian
- Trainings and Certifications

CERTIFICATIONS

- FEMA PER-333 Course
 - Emergency preparedness training on isolation and quarantine strategies in Tribal Nations
 - Donning and doffing PPE





FEEDLOT VISIT





ROLLING HILLS ZOO



MARYSVILLE LIVESTOCK MARKET



POULTRY TESTING





OTHER OPPORTUNITIES

- Slaughterhouses
 - Beef and swine
 - Pregnant cow
 - Disposition exams
 - Scrapies surveillance
- Cervidae farm
- Veterinarian accreditation
- Field office import/exports
- Worked sheep/goat sale
applying official ID
- Orf observation in goats
- AI and pullorum testing
 - Chickens, quail, pheasant, chukar
 - County fair testing
 - PCR AI testing in lab
- Pack goat farm visit
- KDA/USDA APHIS summer work conference

INFLUENZA

- Orthomyxoviridae
- Single-stranded
- RNA virus
- enveloped
- Four primary genera
 - Influenza A
 - All flu pandemics
 - Humans, birds, mammals
 - Influenza B
 - humans
 - Influenza C
 - Humans, pigs, dogs
 - Influenza D
 - Cattle, pigs

INFLUENZA A TYPE VIRUSES

- Subtypes
 - Hemagglutinin (H)
 - Neuraminidase (N)
 - 18 H, 11 N
- All found in birds
 - Except H17N10 and H18N11 (bats)
- Hemagglutinin
 - Virus entry into cells
 - High rates of mutation
 - Vaccination target
- Neuraminidase
 - Virus release from host cells
 - Tamiflu target

INFLUENZA PANDEMICS

- Result of antigenic shift
 - Rapid exchange of gene segments
 - Subtype changes
- Seasonal flu changes
 - Result from antigenic drift
 - Gradual point mutations
 - Driven by host immunity

AVIAN INFLUENZA

- Influenza A type virus
 - Poultry, pet birds, zoo and wildlife birds
- Reservoir: waterfowl
- 16 different Hemagglutinin
- 9 different Neuraminidase
- Most commercial poultry free
- Low pathogenicity (LPAI)
 - Most AI
 - Subclinical, mild respiratory
- Highly pathogenic (HPAI)
 - Mutations in some H5 and H7 LPAI
 - High mortality, sudden death
 - epidemics

AVIAN INFLUENZA IN HUMANS

- Rare, but possible
- Inhalation/ ingestion of infected saliva, mucous, feces
- Clinical signs
 - Conjunctivitis
 - Influenza-like illness
 - Nausea
 - Neurologic changes
- Strains implicated
 - Asian lineage H7N9 (LPAI)
 - Asian lineage H5N1 (HPAI)
- H7N9 outbreaks in China
- Diagnosis
 - Swab upper respiratory tract, PCR
- Treatment
 - Neuraminidase inhibitor
 - Resistance becoming common

AI TRANSMISSION

- Inhalation or ingestion
- Direct or indirect contact
 - Feces
 - Respiratory
- Between farms
 - Breach in biosecurity practices
 - Movement of sick birds
 - Sharing farm equipment

BIOSECURITY IN POULTRY

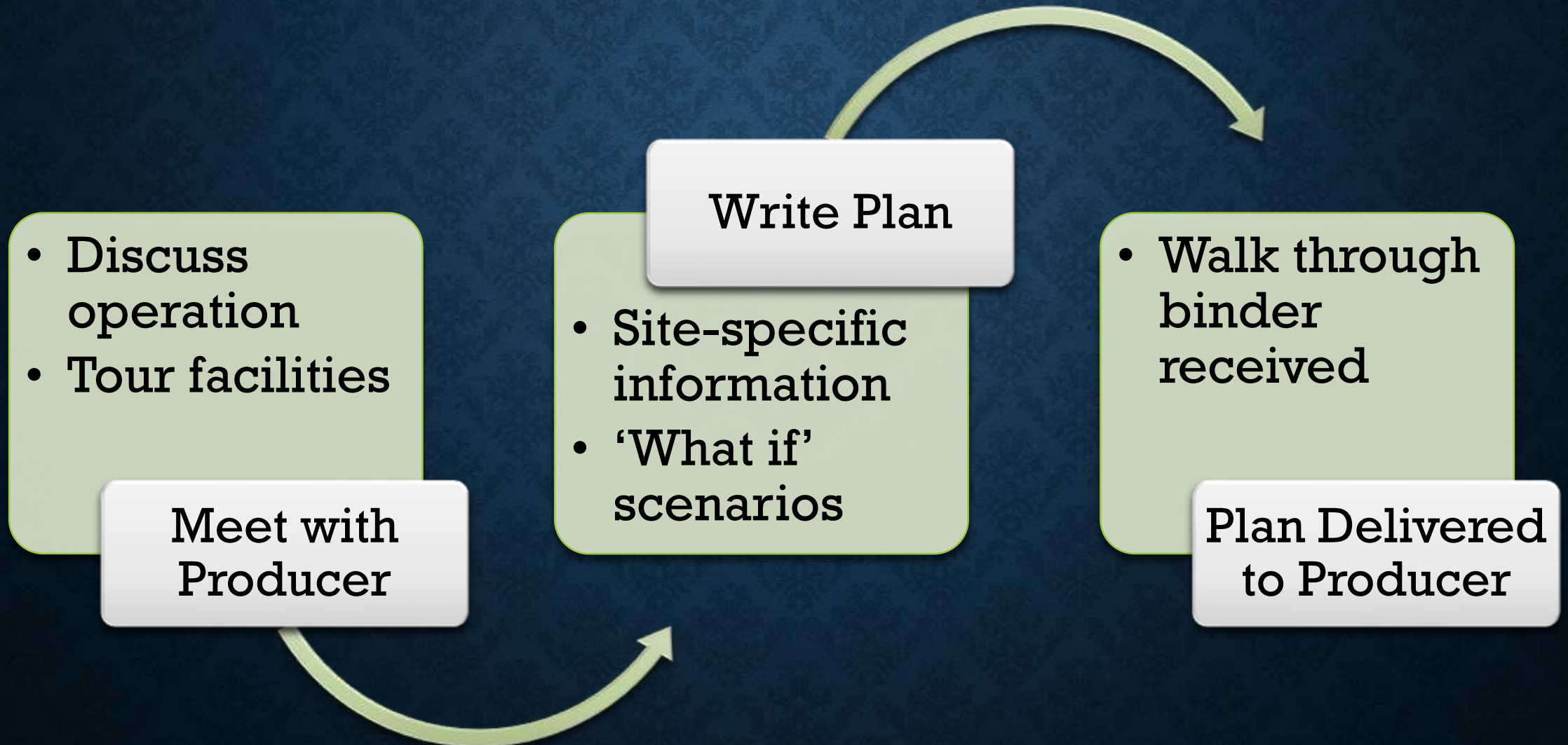
- National Poultry Improvement Plan (NPIP)
 - Established in 1930's to eliminate Pullorum disease
 - Expanded to include *Mycoplasma* and Avian Influenza
 - 14 principles for evaluating poultry biosecurity
 - “Table-top” audits every 2 years
- Parts of a biosecurity plan
 - Conceptual
 - Planning
 - Structural
 - Infrastructure and equipment
 - Operational
 - Training
 - SOPs
- Must consider host/environment/pathogen interactions and modes of transmission

14 Biosecurity Principles

1. Biosecurity Responsibility
2. Training
3. Line of Separation
4. Perimeter Buffer Area
5. Personnel
6. Wild Birds, Rodents, Insects
7. Equipment & Vehicles
8. Mortality Disposal
9. Manure & Litter Management
10. Replacement Poultry
11. Water Supply
12. Feed & Replacement Litter
13. Reporting Morbidity & Mortality
- 14. Auditing**



CREATING A BIOSECURITY PLAN



1. BIOSECURITY RESPONSIBILITY

- Who is in charge?
 - Biosecurity Coordinator
- Development, implementation, maintenance, effectiveness of biosecurity program
- Document meetings, trainings, emails, etc.
- Yearly review of biosecurity program
 - Revisions made as necessary
 - Documentation of revisions
 - Appendix C
- Reviewed when circumstances change (new threats)

Appendix C: Biosecurity Plan Changes and Review

Record all changes and dates of review of the biosecurity plan here.

[illegible]

2. TRAINING

- Farm-specific training
- All employees regularly entering property/ PBA
- At least once yearly
- Documented in program
 - Kept for at least 3 years

I, _____, have received biosecurity training for Facility Name on this date, __/__/__, by
_____. Signature: _____

I, _____, have received biosecurity training for Facility Name on this date, __/__/__, by
_____. Signature: _____

I, _____, have received biosecurity training for Facility Name on this date, __/__/__, by
_____. Signature: _____

3. LINE OF SEPARATION

- Physical separation of inside from outside
- Separation of poultry from potential disease sources
- Walls of buildings, perimeter fencing of flight pens
- Red line on maps

4. PERIMETER BUFFER AREA

- Functional zone surrounding poultry
 - Excludes areas unrelated to production
- Defined by nearest road, area of unkempt brush, buildings not related to poultry operation
- Includes feed bins, manure sheds, egg rooms, brooder houses, flight pens, composting areas
- Yellow line on maps



1. Hatchery
2. Gray Brooder Building
3. Silver Grower Building
4. NFE4 Grower Building
5. Tan Grower Building
6. Mill Grower Building
7. Open Sided Shed
8. Shop
9. Storage Barn
10. Burn Pit

5. PERSONNEL

- PPE for employees and visitors
 - Clothing worn to work
 - PPE provided on farm
- Poultry and pet birds at home
- Waterfowl hunting
- Permissible areas specific to duties







6. WILD BIRDS, RODENTS, INSECTS

- Prevent contact with and protect poultry from wild birds, their feces, rodents, and insects
- Flight pen netting repairs
- Documentation of live traps and bait stations
- Hunting to control waterfowl
- Bait stations around feed in flight pens
- Fogging hatchery and egg rooms
- Electric bug zappers
- Live animal traps

Appendix E: Logs

PEST CONTROL LOG

[illegible]





7. EQUIPMENT AND VEHICLES

- Cleaning, disinfection, restriction of vehicles and equipment
- Shared vehicles
- Vehicle access and traffic patterns
- Flight pen netting repairs
- Documentation









8. MORTALITY DISPOSAL

- Routine collection and disposal of mortality
- Documentation
- Composting
- Incineration
- Burial
- Rendering



9. MANURE AND LITTER MANAGEMENT

- Should be removed and disposed of routinely
- Limit attraction of wild birds, rodents, insects, and other animals
- Wear appropriate PPE
- Wash and sanitize equipment after
- Documentation
 - Appendix E: Manure spreading log
- Spread on fields
- Composting

10. REPLACEMENT POULTRY

- Definition
 - Birds raised to be used for egg laying and breeding
- From NPIP certified flocks
 - VS 9-2 form
 - VS 9-3 form
 - NPIP hatchery production records
- Transported in clean equipment and vehicles
- Clean and sanitize equipment and vehicles after use
- Transportation documentation

REPORT NO. **O 0001**

UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
NATIONAL POULTRY IMPROVEMENT PLAN

FLOCK SELECTING AND TESTING REPORT

SUBPART

- ☐ B - Egg Type Chickens
☐ C - Meat Type Chickens
☐ D - Turkeys
☐ E - Waterfowl, Exhibition Poultry, and Game Birds
☐ F - Ostrich
☐ Other

CLASSIFICATION - U. S.

- ☐ Pullorum - Typhoid Clean
☐ M. Gallisepticum Clean
☐ M. Synoviae Clean
☐ Sanitation Monitored
☐ M. Meleagridis Clean

- ☐ Salmonella Enteritidis Clean
☐ Salmonella Monitored
☐ M.G. Monitored
☐ M.S. Monitored
☐ Avian Influenza Clean
☐ H5/H7 Avian Influenza Monitored
☐ Other

TYPE

- ☐ Primary
☐ Multiplier

1. Name and Address of Flock Owner (Include ZIP Code)

2. Location of Flock

3. Date of Preceding Test - This Location

4. Supply Flock for: (Name and Address of Hatchery or Dealer - include ZIP Code)

Approval Number

5. Breed, Variety, Strain, or Trade Name of Stock

Age of Birds

Code Identification

6. Males (Source and Number)

Date of Hatch

7. Females (Source and Number)

Date of Hatch

8. Total Birds in Flock

Blood Testing	a. Number of Males Tested	b. Number of Females Tested	c. TOTAL Number Tested	d. Number of Reactors	e. Number Sent to Laboratory	f. Laboratory Findings
9. PULLORUM TYPHOID						
10. M. GALLISEPTICUM						
11. M. SYNOVIAE						
12. OTHER (Specify)						

AGREEMENT OF FLOCK OWNER

I agree to keep my poultry breeding stock segregated from other poultry and in accordance with the provisions of the Plan and regulations of the official State Agency. I further agree to flock inspection by a representative of the official State Agency as prescribed by the provisions and regulations.

Signature of Inspector or Authorized Agent

Date

Signature of Flock Owner

Date

11. WATER SUPPLY

- Recommended from well or municipal system
- Treat surface water to reduce disease agents
 - Disinfect after use in cleaning
 - Document risk analysis of not treating

12. FEED AND REPLACEMENT LITTER

- Delivered and stored to limit access from wild birds, rodents, insects, and other animals
- Spills promptly cleaned up
- Feed concerns
 - Contamination
 - Formulation
 - Toxicity
 - Infectious disease



13. REPORTING MORBIDITY AND MORTALITY

- Report morbidity and mortality above expected levels
- Describe procedure in biosecurity plan
- Document death loss
- What is normal?
- Report to who?
 - Two contacts
- Biosecurity actions in interim

j. Elevated Morbidity or Mortality

- i. In the case of elevated morbidity or mortality, notify the Biosecurity Coordinator immediately.
- ii. In the event of illness in a pen, only employees assigned to that pen will be allowed into the pen to limit the spread of disease.
- iii. Outside Resources:

14. AUDITING

- Based on flock size
- At least every two years
- Official state agency
 - KDA
- Requirements
 - Training materials
 - Documentation of implementation
 - Corrective actions taken
 - Biosecurity Coordinator's annual review
- First year
 - Soft audit
 - Goal- site visit
 - No repercussions
- Second year
 - Hard audit
 - Table-top
- Exemptions
 - <25,000 gamebirds raised for release
 - <50,000 gamebirds slaughtered

NPIP Program Standards

Biosecurity Principles Audit Form



1. Biosecurity responsibility

	Y or N	COMMENTS
Is there a Biosecurity Coordinator? If so, please provide their name.		
Is there a site-specific biosecurity plan?		
Is the Biosecurity Coordinator knowledgeable in the principles of biosecurity?		
Does the Biosecurity Coordinator review the biosecurity program at least once during each calendar year and make revisions as necessary?		
Does the biosecurity plan indicate there will be a review by the Biosecurity Coordinator in periods of heightened risk of disease transmission?		

2. Training

	Y or N	COMMENTS
Does the biosecurity program include training materials that cover both farm site-specific		

OTHER ASPECTS OF BIOSECURITY

- Signs
- Age segregation
- Limit contact with birds
- All aspects of the biosecurity program manage parts of the host-environment-pathogen interactions



WHOA!!!!
DO NOT ENTER
THIS ROOM. WALK

AROUND





CHALLENGES

- Level of commitment
 - Types of crates
- Waterfowl
 - Flight pens
- Brush and grass around flight pens
 - Rodent and pest management
- Educating producers, human behavior
 - Avian Influenza
- Visitors
- Zoonosis
- Shared equipment and vehicles
- Communication

CORE LEARNING OBJECTIVES

1. Pathogens/ pathogenic mechanisms (MPH 754, DMP 705, DMP 822)
 1. Respiratory, fecal-oral, mechanical vectors, fomites
2. Host response to pathogens/ immunology (MPH 754, DMP 705)
 1. Young animals are naïve
 2. Stressed animals more susceptible
3. Environmental/ecological influences (DMP 822, MPH 802)
 1. Hot, sunny conditions kill AI virus on surfaces
4. Disease surveillance (MPH 754)
 1. Avian Influenza swabbing and Pullorum testing
5. Disease vectors (MPH 754, DMP 705, DMP 822)
 1. Flies, fomites

FOUNDATIONAL COMPETENCIES

1. Apply epidemiological methods to the breadth of settings and situations in public health practice. (MPH 701, 754)

- Primary interventions, disease triad, disease transmission

8. Apply awareness of cultural values and practices to the design or implementation of public health policies or programs. (MPH 818)

- Level of commitment, human behavior change

11. Select methods to evaluate public health programs. (MPH 701, 720, 754)

- Surveillance, audits

19. Communicate audience-appropriate public health content, both in writing and through oral presentation. (AAI 801)

- Technical vs. non-technical language, visual aids

21. Perform effectively on interprofessional teams. (MPH 754, 802)

- producer/me/USDA/KDA, effective communication

MPH COURSES

• DMP 705	Principles of Veterinary Immunology	3	Sp17
• MPH 720	Administration of Health Care Organizations	3	Su17
• DMP 770	Emerging Diseases	3	Su17
• STAT 720	Design of Experiments	3	Su17
• MPH 754	Introduction to Epidemiology	3	F17
• MPH 802	Environmental Health	3	F17
• DMP 812	Veterinary Bacteriology and Mycology	4	F17
• DMP 816	Trade and Agricultural Health	2	F17
• MPH 701	Fundamental Methods of Biostatistics	3	Sp18
• MPH 818	Social and Behavioral Bases of Public Health	3	Sp18
• DMP 822	Veterinary Virology	3	Sp18
• MPH 840	Public Health Field Experience	6	Su18
• AAI 801	Interdisciplinary Process	3	F18

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KSVDL

KSU CVM MPH Office

Dr. Ellyn MulCahy

Barta Stevenson

Kansas Upland Gamebird Producers

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QUESTIONS?



SPRS Field Offices



A map of Iowa showing all 99 counties. A central group of 19 counties is highlighted in purple. These counties are: Lyon, Jewell, Republic, Vanmoyne, Howard, Hancock, Boone, Cherokee, Audubon, Jackson, Madison, Jasper, Wayne, Franklin, and Johnson. The map also shows the surrounding states: Minnesota to the north, Missouri to the south, Nebraska to the west, and Wisconsin and Illinois to the east.









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Concentrated broad spectrum disinfectant

KEEP OUT OF REACH OF CHILDREN
DANGER

[illegible]

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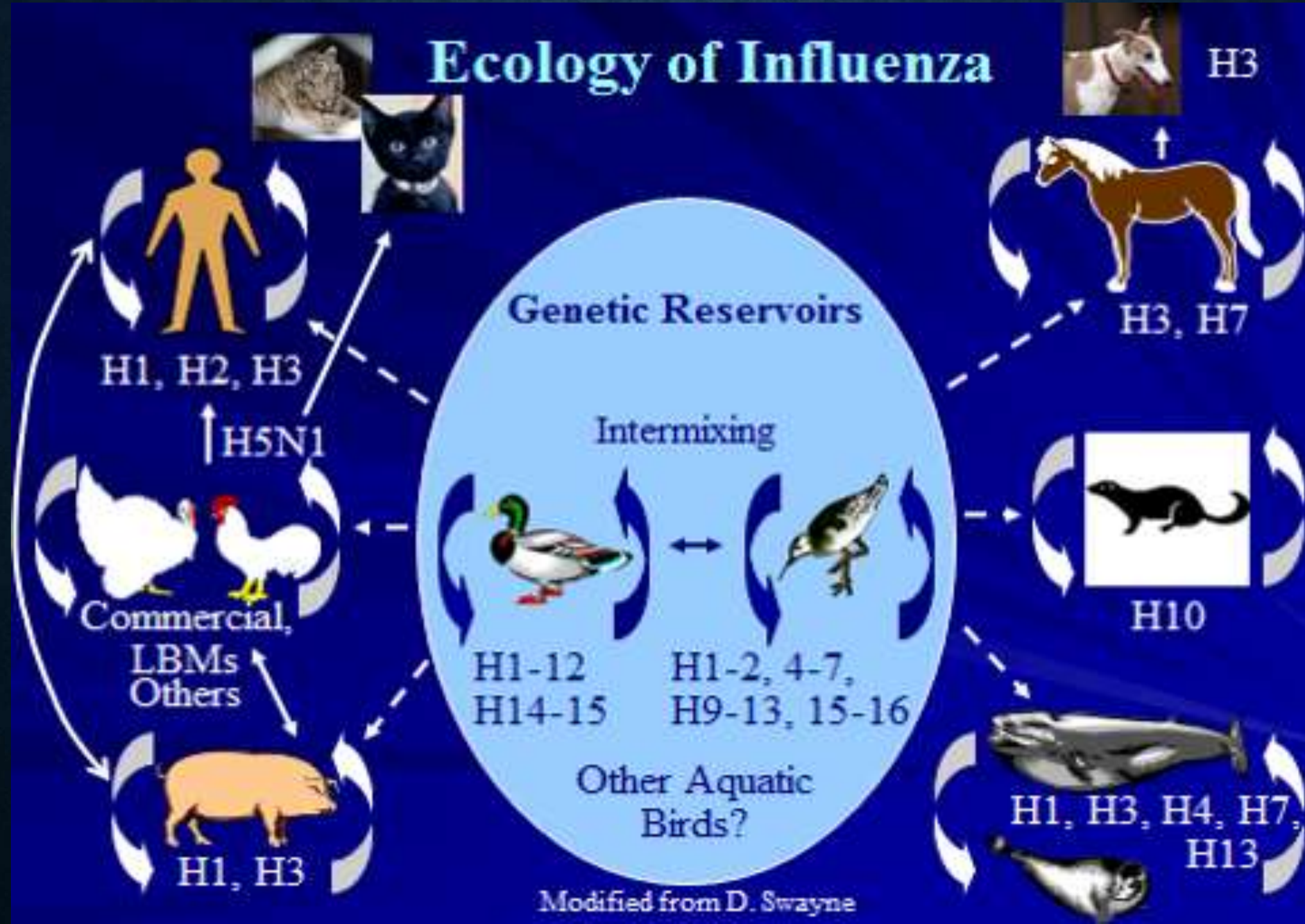
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LEGISLATION

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CID LINES

Ecology of Influenza



PUBLIC HEALTH FOUNDATIONAL OBJECTIVES

- 1. Explain public health history, philosophy and values
 - MPH 720, MPH 754, MPH 818
- 2. Identify the core functions of public health and the 10 Essential Services
 - MPH 720
- 3. Explain the role of quantitative and qualitative methods and sciences in describing and assessing a population's health
 - MPH 701, MPH 720, MPH 754
- 4. List major causes and trends of morbidity and mortality in the US or other community relevant to the school or program.
 - MPH 720, MPH 754
- 5. Discuss the science of primary, secondary and tertiary prevention in population health, including health promotion, screening, etc.
 - MPH 701, MPH 720, MPH 754

- 6. Explain the critical importance of evidence in advancing public health knowledge.
 - MPH 701, MPH 720, MPH 754
- 7. Explain effects of environmental factors on a population's health
 - MPH 701, MPH 802
- 8. Explain biological and genetic factors that affect a population's health.
 - MPH 754, MPH 802
- 9. Explain behavioral and psychological factors that affect a population's health.
 - MPH 701, MPH 720, MPH 818
- 10. Explain the social, political and economic determinants of health and how they contribute to population health and health inequities.
 - MPH 720, MPH 818
- 11. Explain how globalization affects global burdens of disease
 - MPH 754, MPH 802
- 12. Explain an ecological perspective on the connections among human health, animal health and ecosystem health (One Health).
 - MPH 802, MPH 818