Poultry Diseases Associated with the NPIP Program

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Recognize the Signs of Illness in Poultry

- They all look alike ?
- Typical ADR

Photo courtesy of B. Rings

Physiological Parameters

- Temperature
  - Chicken 102-107 degrees Fahrenheit
- Heart rate
  - Chicken 200-250+ beats per minute (smaller the bird the higher the rate)
- Respiration
  - Chicken 15-30 per minute
-

Signs of Disease in Avians

- Depression
- Nasal/Eye/Mouth Discharge
- Diarrhea
  - fecal staining of feathers
- Coughing , Sneezing
  - wet areas on head or shoulders
- Inability to stand or walk
- Feather loss
- Thick scabs on or around leg scales
- No appetite
- Feathers
  - loss, broken accumulations
- Parasites on bird or in feces
- Swollen joints
- Blisters or scabs on skin
- Swollen footpads
- Swelling of face, comb, or wattles

Systematically check all anatomic systems for variance from normal

1. Discharges
2. Accumulations
3. Use
4. Abnormal sounds, odors, colors
5. Swellings
6. Soiling of feathers
7. Loss

1. Skeletal
2. Respiratory
3. Plumage
4. Circulatory
5. Eyes, ears, nostrils
6. Gastrointestinal
7. Feces

FIRST DISEASES IN THE NPIP

Salmonella pullorum

- One reason for development of NPIP program
- **Bacillary White Diarrhea, BWD**
- Pullorum
- **Mostly a historical disease**

- Egg transmitted and is adapted to poultry
- Mortality is most often seen in young chicks less than 2 months of age
- Can infect multiple species of birds such as quail, chickens, guineas, turkeys, etc.
- Very rare in commercial poultry (NPIP)
- Number of affected young birds is low 10-12 % up to almost 100%.
- Mortality can reach 100%
- In addition to being egg transmitted the disease can spread via infected navels and/or orally
- Signs
  - Depressed, untrhifty , chirp, huddle, white diarrhea and pasty vents
  - Mild – moderate respiratory signs
  - Blind chicks
  - Lameness

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- Lesions
  - Grey/White spots in organs (Heart, lungs, ventriculus , liver
  - Cecal cores (cheesy)
  - Dehydration
  - Enlarged spleen, congested liver
  - Pericarditis
  - Blighted ova

- Diagnosis
  - Isolation of bacteria
  - Blood Test agglutination
- Treatment
  - Antibiotics
  - sulfas and tetracyclines
- Prevention
  - Rapid Whole Blood testing **of Breeders with removal of Positives**
  - **Biosecurity**
  - **Testing**

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Salmonella gallinarum

- Fowl typhoid
- Also disease that was reason for NPIP
- Salmonella gallinarum
- Also a poultry adapted Salmonella
- Very similar to S. pullorum
- Historical disease in commercial industry
- Occasionally seen in Hobby flocks

- Can be seen in chickens, turkeys, gamebirds, etc.
- Similar to Pullorum in number of affected birds (up to 100% sick or dead)
- Egg transmitted and horizontal transmission
- Signs
  - Lack of appetite, unthrifty, decreased egg production, ruffled, yellow diarrhea
- Lesions
  - Enlarged bronze colored liver, , enteritis, enlarged spleen, anemia
- Diagnosis
  - Isolation of bacteria
  - Rapid Whole Blood Agglutination Test

- Treatment
  - Sulfas, tetracyclines
  - Not done routinely
- Prevention
- Isolation and Testing of Breeders
- Destruction of Blood Test Positives
- Biosecurity
- Vaccines?

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NEXT ROUND OF DISEASE ADDITIONS

Mycoplasma Infections

- Mycoplasma are small bacteria that lack a cell wall (important in antibiotic treatment)
- These bacteria can be egg transmitted and via other ways (fomites)
- Chronic types of infections

Mycoplasma Gallisepticum

- Also called MG, CRD (Chronic respiratory Infection)
- Other more colorful names
- Slow chronic respiratory infection
- Can be seen in many avian species (chickens, quail, turkeys, etc)
- Wild bird species can carry (house finches)
- Large numbers of birds in a flock can become infected and may show few signs (carriers)
- Mortality is usually very low (uncomplicated)
- Sets up birds for secondary E. coli infections
- Birds become infected via inhalation, oral, eye,
- Infected birds shed bacteria in exudates and egg transmission
- Incubation is about 1 week
- Young birds are usually more severely affected than adults
- Organism is short-lived outside of bird (hours to days)
- Carrier birds shed organism when stressed
- Bacteria can be carried on clothing, supplies, etc. (fomites)

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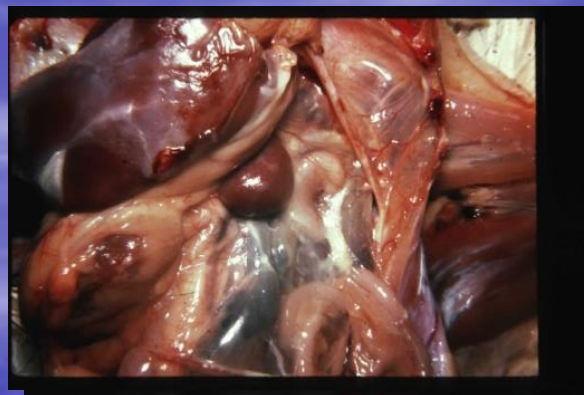
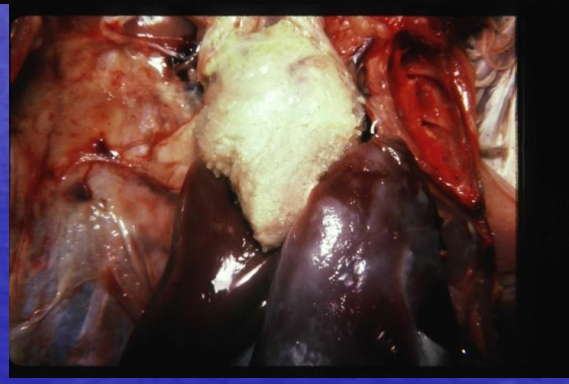
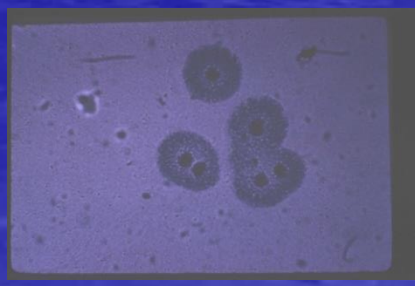




- Signs
  - None
  - Slight cough
  - Poor performance
  - Slow growth and weight gain
  - No appetite
- **Lesions**
  - **Swollen face and sinuses**
  - **Stunted birds**
  - **Leg problems**
  - **Poor feathering**
  - **Lesions of exudate on heart, liver, etc (E. coli)**
  - **Inflamed respiratory tissues (increased mucus)**
  - **Thick mucus in sinuses**
  - **Foamy air sacculitis**
  - **Infected oviduct and tendons**



- Diagnosis
  - Signs and lesions
  - Isolation of bacteria (specialized medias)
  - Serology
    - ELISA
    - Agglutination
    - HI test
  - PCR tests
  - Differentiate from other diseases such as Coryza, MS, etc.
- **Treatment**
  - **Many antibiotics help relieve signs (carrier)**
  - Bird comfort (reduce stress, dust, secondary bacterial infections
- **Prevention**
  - **Test and destroy**
  - **Biosecurity**
  - **All in all out**
  - **No other flocks on premises**
  - **Monitoring**
  - **NPIP**

- Vaccination

Mycoplasma Synoviae

- **MS**
- **Can be very similar to MG**
- **Variable (low mortality, high morbidity, etc)**
- **Can be complicated with secondary bacterial infections**
- **Transmitted similar to MG**
  - **Egg, respiratory, fomites**
  - **Spread can be slow to rapid**
  - **Incubation period is 2-3 weeks**
  - **As with MG the organism does not survive long outside bird**
  - Stress and other infections complicate

- Signs
  - None
  - Ruffled, unthrifty birds, slight cough
  - Lameness (variable)
  - Swollen footpad, hock
  - Production loss (slight to significant)
- Lesions
  - Exudate in joint, footpad, tendon sheath
  - Thick gray to yellow color
  - Swollen liver, spleen and kidney
  - Air sacculitis
  - Exudate (mucus to cheesy)
  - Green discoloration of liver
- Diagnosis
  - Signs, lesions
  - Isolation of MS
    - Specialized medias
  - PCR test
  - ELISA

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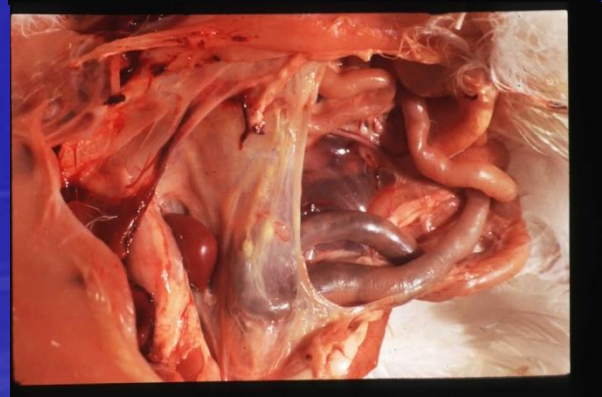


- **Treatment**
  - **Antibiotics**
  - **Carriers**

Prevention

Biosecurity, all in all out production,

Test and slaughter

No home flocks

Prevent wild bird exposure

Vaccination

Not in US, experimental use only (permits, USDA)

Other Salmonella Infections Paratyphoid

- Non- host adapted Salmonella species
- Vary by region
- Salmonella typhimurium
- Salmonella enterica
  - Enteritidis
  - Arizonae
  - Kentucky
  - Heidelberg
  - others

- Salmonella enterica enteritidis (SE) and arizonae are egg transmitted via ovarian infection
- Others transmitted via egg by shell contamination
- Horizontal transmission
- SE added to NPIP in late 1980's (88-89)

- Clinical Signs
  - None, diarrhea, depression, dehydration, weak chicks, poor growth
- Lesions
  - Enlarged liver/spleen, inflammation of intestines, cecal cores, yolk not absorbed, septicemia, none
- Diagnosis
  - Isolation and identification
- Treatment
  - Antibiotics not recommended.
- Control
  - Sanitation, Biosecurity, Vaccination, Rodent and vermin control, feed management

The Next Two Additions
One Disease and One Protocol

Slide courtesy of USDA

Avian Influenza Reservoir

- Wild aquatic birds
  - Waterfowl (ducks, geese, swans)
  - Shore birds (terns, gulls, turnestones, etc)

Slides courtesy of L. Newberry

Clinical Signs

- LPAI (Mildly Pathogenic)
  - No Signs
  - Depression Ruffled
  - Huddling Decreased egg production
  - Decreased Activity
  - Decreased Food/Water Intake
  - Respiratory Signs
    - Cough Sneeze Rales
    - Rattles Excess lacrimation

High Pathogenic Avian Influenza (HPAI)

- General:
  - Highly contagious and virulent respiratory, Orthomyxovirus type A virus in poultry
  - High path subtypes = H5 or H7
  - LPAI – reservoir in wildlife species, migratory waterfowl (dabbling ducks, geese, etc.)
  - LPAI can mutate into HPAI when introduced into gallinaceous poultry (chickens and turkeys)
  - Potentially zoonotic (only zoonotic strains in Asian subtypes at this time), precautions still necessary
  - Transmission: Direct contact, oral, conjunctiva, respiratory secretions

- Clinical Signs:
  - **Sudden death (high mortality)**
  - Lack of appetite
  - Change in water consumption
  - Egg drop
  - Quiet – cessation of vocalization
  - Depression
  - Respiratory
  - Cyanotic comb and wattles
  - GI
  - Nervous signs
  - Hemorrhages
- Diagnostics:
  - Confirm: Oropharyngeal swab (pool of 5 in 3ml BHI, OR pool of 11 in 5.5ml BHI) – AI PCR
- Prevention and Treatment:
  - Good biosecurity (ponds, waterfowl)

Clinical Signs

- HPAI
  - No Signs
  - Death Prior to Onset of Signs
  - Ruffled Feathers
  - Watery Diarrhea
  - Inability To Stand
  - Lack of appetite
  - Respiratory Signs
    - Cough Sneeze
    - Rattle Rales

Severe Depression
Incoordination
Prostration
Excess Thirst

Slides courtesy of USDA/APHIS/VS

NEWCASTLE DISEASE

Virulent Newcastle Disease (vND)

- General:
  - Paramyxovirus 1 infection, highly contagious, high mortality
  - Zoonotic! (conjunctivitis)
  - 4 manifestations:
    - Exotic/ Virulent (FAD)
    - Neurotropic – neurological, resp. sxs
    - Mesogenic – Nervous sxs & mortality
    - Lentogenic – Mild diseases, strains used for vaccine development
  - Virus survives for long periods in ambient T, esp. in feces, dust,etc. for up to 12 months in poultry house
  - Susceptible to disinfectants and UV radiation

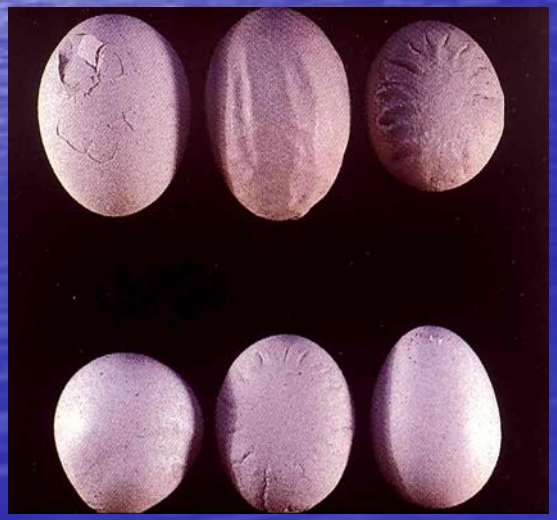
- Clinical Signs:
  - **Sudden death (high mortality)**
  - Depression
  - Lack of appetite
  - Respiratory, gastrointestinal, nervous sxs
  - Hemorrhages
- Diagnostics:
  - Confirm: Oropharyngeal swab (pool of 5 in 3ml, pool of 11 in 5.5ml – ND PCR (will pick up endemic strains!)
  - Surveillance: ND serology (monitor vaccine titers)
    - FYI many backyard hatcheries will vaccinate for ND, lots of endemic strain circulating
- Prevention and Treatment:
  - Treatment: None
  - Good biosecurity practices

NewCastle Disease Reservoir

Slides courtesy of M. Yates

Clinical Signs

- Abnormal eggs
- Diarrhea



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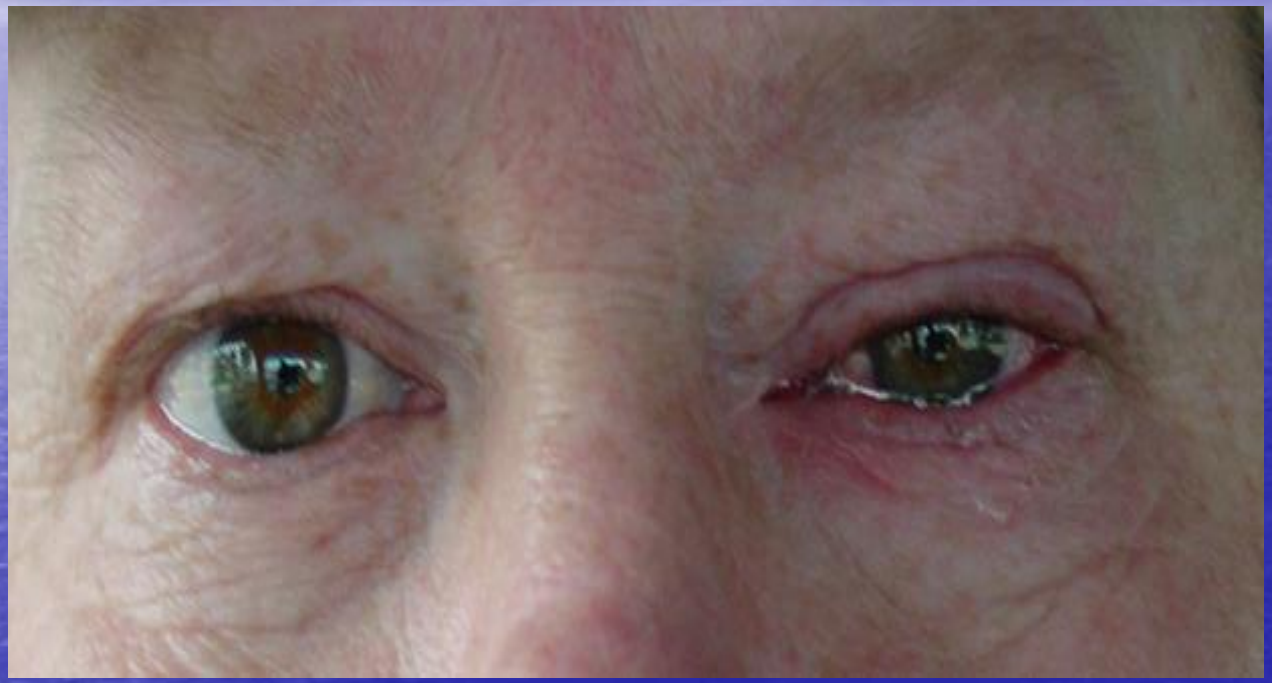


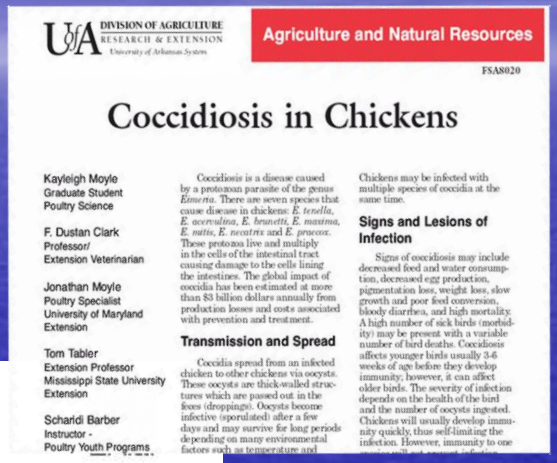
Photo courtesy of S. Breeding

Biosecurity

- https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.val-co.com%2Fprotecting-farm-biosecurity&psig=AOvVaw1o5he_f-iYxXoowQAxnVX0&ust=1591923499470000&source=images&cd=vfe&ved=0CAIQjRxqFwoTCIC2rcDH-OkCFQAAAAAdAAAAABAD

Arkansas Extension Website

- Diseases and Biosecurity
- Links to Other Websites



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Agriculture and Natural Resources

FSA8020

Coccidiosis in Chickens

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Coccidiosis is a disease caused by a protozoan parasite of the genus *Eimeria*. There are seven species that cause disease in chickens: *E. tenella*, *E. acervulina*, *E. brunetti*, *E. maxima*, *E. mitis*, *E. necatrix* and *E. praecox*. These protozoa live and multiply in the cells of the intestinal tract causing damage to the cells lining the intestines. The global impact of coccidia has been estimated at more than $3 billion dollars annually from production losses and costs associated with prevention and treatment.

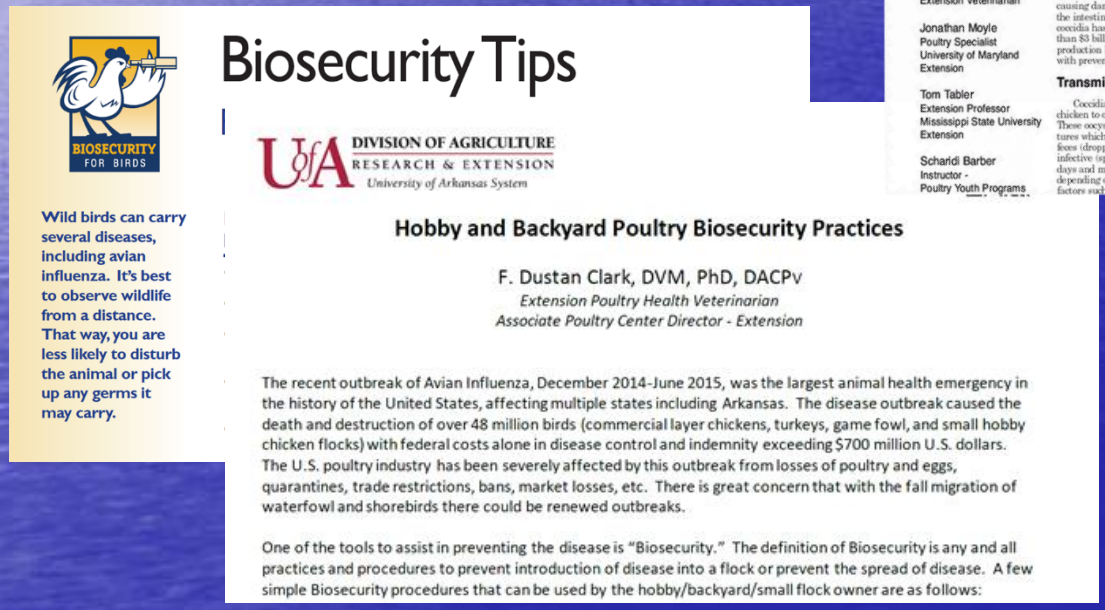
Transmission and Spread

Coccidia spread from an infected chicken to other chickens via oocysts. These oocysts are thick-walled structures which are passed out in the feces (droppings). Oocysts become infective (sporulated) after a few days and may survive for long periods depending on many environmental factors such as temperature and

Chickens may be infected with multiple species of coccidia at the same time.

Signs and Lesions of Infection

Signs of coccidiosis may include decreased feed and water consumption, decreased egg production, pigmentation loss, weight loss, slow growth and poor feed conversion, bloody diarrhea, and high mortality. A high number of sick birds (morbidity) may be present with a variable number of bird deaths. Coccidiosis affects younger birds usually 3-6 weeks of age before they develop immunity; however, it can affect older birds. The severity of infection depends on the health of the bird and the number of oocysts ingested. Chickens will usually develop immunity quickly, thus self-limiting the infection. However, immunity to one



BIOSECURITY FOR BIRDS

Wild birds can carry several diseases, including avian influenza. It's best to observe wildlife from a distance. That way, you are less likely to disturb the animal or pick up any germs it may carry.

Biosecurity Tips

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Hobby and Backyard Poultry Biosecurity Practices

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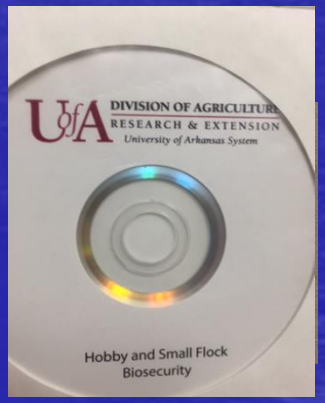
The recent outbreak of Avian Influenza, December 2014-June 2015, was the largest animal health emergency in the history of the United States, affecting multiple states including Arkansas. The disease outbreak caused the death and destruction of over 48 million birds (commercial layer chickens, turkeys, game fowl, and small hobby chicken flocks) with federal costs alone in disease control and indemnity exceeding $700 million U.S. dollars. The U.S. poultry industry has been severely affected by this outbreak from losses of poultry and eggs, quarantines, trade restrictions, bans, market losses, etc. There is great concern that with the fall migration of waterfowl and shorebirds there could be renewed outbreaks.

One of the tools to assist in preventing the disease is "Biosecurity." The definition of Biosecurity is any and all practices and procedures to prevent introduction of disease into a flock or prevent the spread of disease. A few simple Biosecurity procedures that can be used by the hobby/backyard/small flock owner are as follows:



Backyard Poultry Course