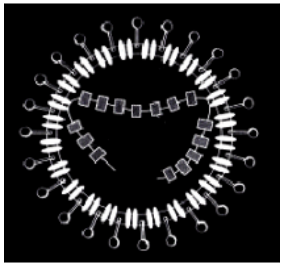
Infectious Bronchitis Virus: Practical experience from broiler breeders in Ontario



CAHLN 2017

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Maple Lodge Hatcheries Ltd.

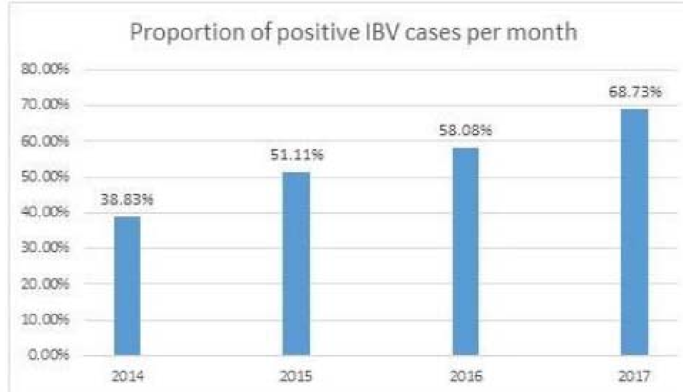
Background

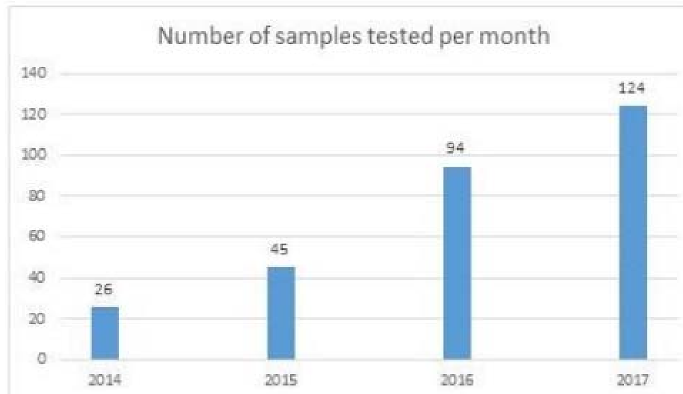
Prevalence and Transmission

Prevalence: 2014 to Present

Based From the OAHN Q2017 Report (Nov 16 to Jan 17):

- Overall, the number of cases have continued to increase
- From 2014 to 2017 the average number of samples tested per month have increased steadily (26 to 124)
- From 2014 to 2017 the proportion +'ve per month have increased steadily (38.83% to 68.73%)





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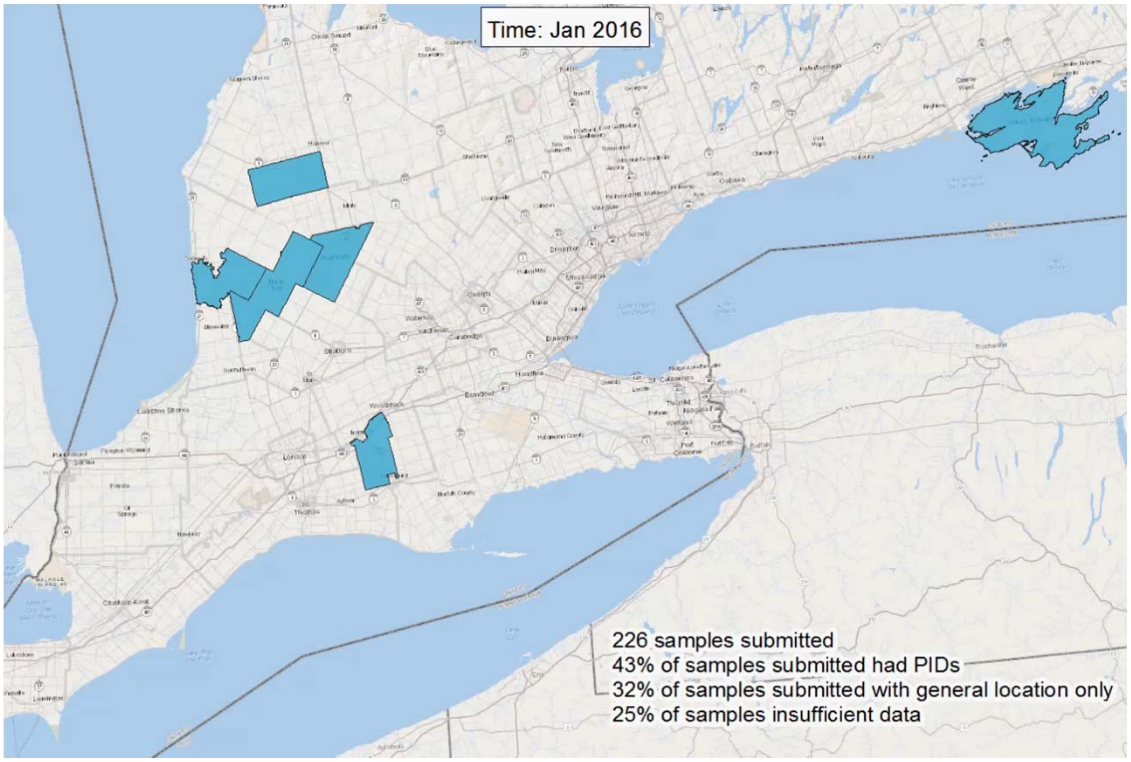
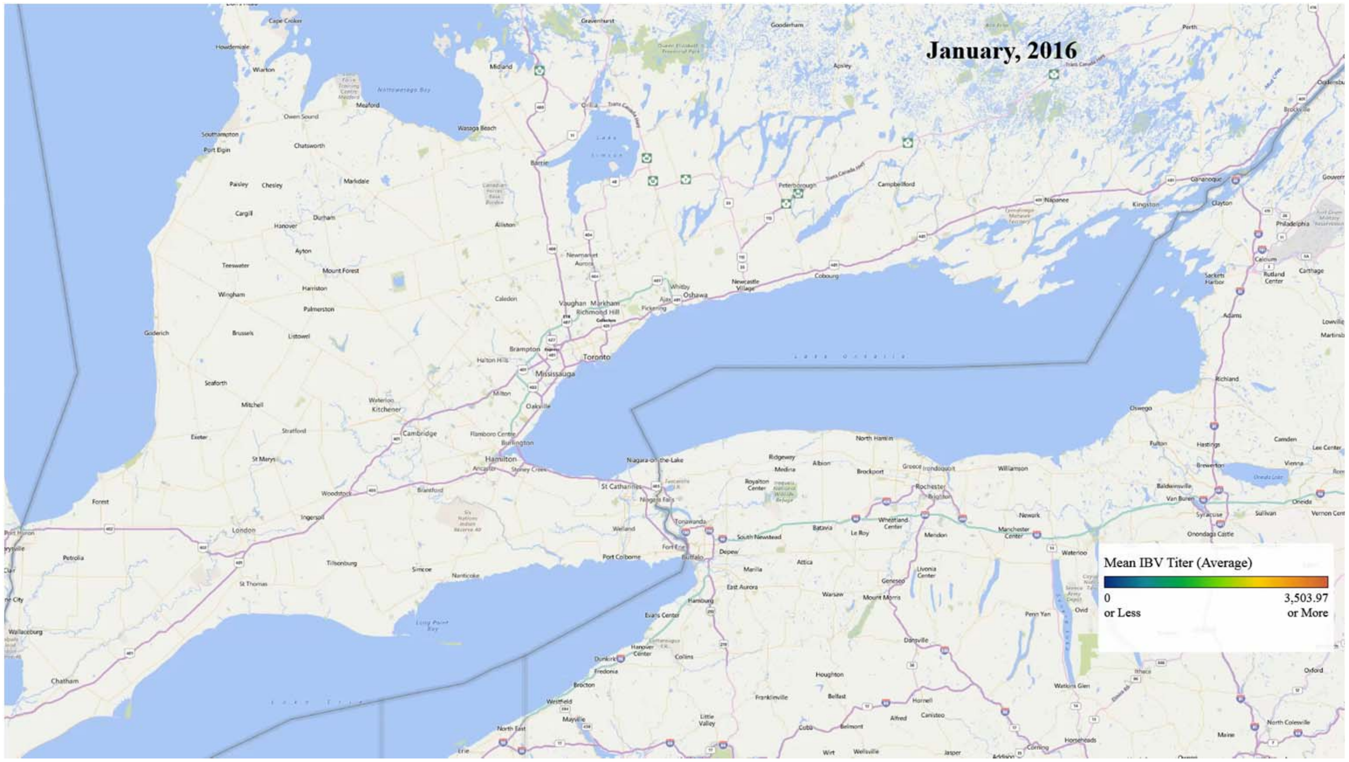
2016 Provincial Spread of IBV Based on AHL PCR +'ve Submission Analyzed by OAHN



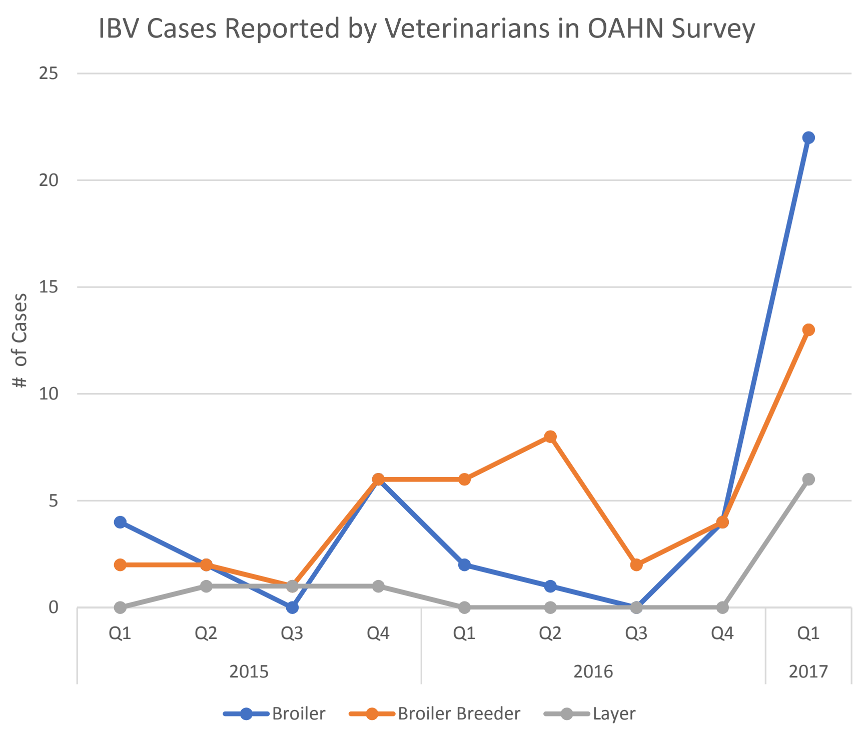
Dec16 to April17 Provincial Spread of IBV Based on MLF Broiler Serology on Suspect Condemns



Transmission of IBV

- Shed in feces and respiratory secretions
- Can travel on dust and dirt
  - Carried by wind, people, equipment etc.
  - Viable PEDV (another coronavirus) found in air samples 16km from infected barn
- Highly infectious and can spread quickly in a susceptible flock
- Local mucosal immunity key to fending off initial challenge
- Occasional odd findings of positive flocks with no current clinical signs or history of any issue
- More common during cool damp weather

Field Cases Reported by Vets



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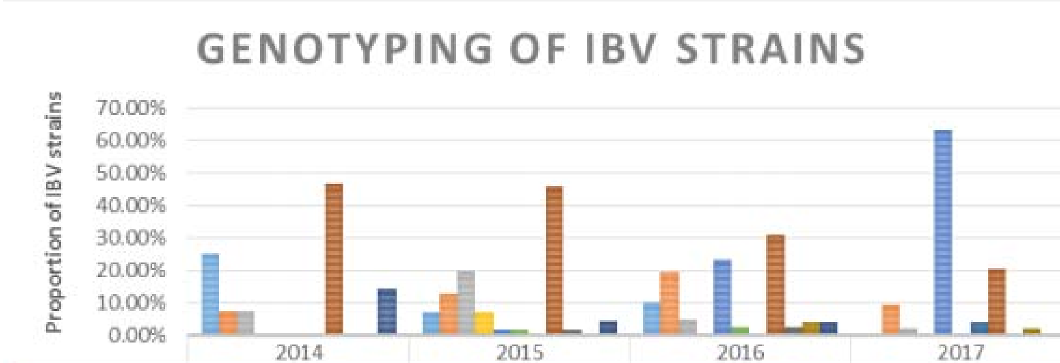
- Number of cases appear to be increasing
- Clinical impressions match diagnostic lab finding
- Occasional odd findings of DMV positive flocks with no current clinical signs or history of any issue
- More common during cool damp weather

Good News?

- We are seeing a decrease in overall IBV rates reported in our broiler and breeder flocks since April
- Must wait to be seen if this trend will continue

Strain Variation

- Many different strains over the years
- Fluctuation in dominant strain between years
- Co-infection with 2 strains occurs
    - Makes genotyping difficult
- Currently DMV strains are predominant, but others still persist



	2014	2015	2016	2017
4/91	25.00%	6.94%	9.92%	0.00%
CA 1737	7.14%	12.50%	19.08%	9.26%
Conn	7.14%	19.44%	4.58%	1.85%
CU82792	0.00%	6.94%	0.76%	0.00%
DMV	0.00%	1.39%	22.90%	62.96%
GA 2012	0.00%	1.39%	2.29%	0.00%
GA 13384 2013	0.00%	0.00%	0.00%	3.70%
Mass	46.43%	45.83%	30.53%	20.37%
PA Wolg 98	0.00%	1.39%	2.29%	0.00%
QU mv	0.00%	0.00%	3.82%	1.85%
Ungrouped	14.29%	4.17%	3.82%	0.00%

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Clinical Signs: Traditional

- Respiratory signs, huddling, depression
- Decreased feed consumption and gains
- Wet droppings/wet litter and increased drinking
- Egg production drop up to 70%
- Mortality 5%+
- Increased condemns at plant

Clinical Signs: Newer

- Small increase in mortality for a short period of time (~1wk) or sudden spikes in mortality
- Drop in egg production for ~1 wk
- High broiler titres at slaughter
- 2ndary infection (E. coli)
- Cystic oviducts
  - In our flocks with Mass & CA
  - Reported with 4/91 and QX strains

Broiler Breeder Cases

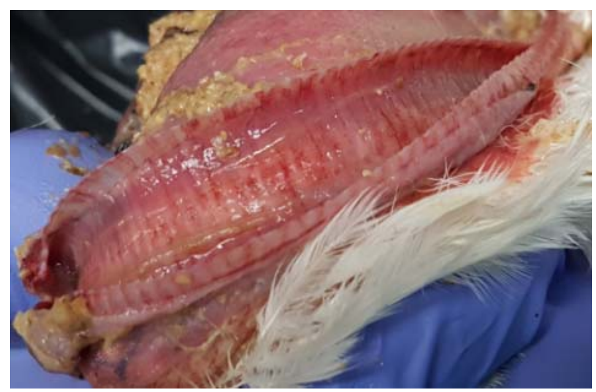
Case 1 & Case 2

Interpreting PCR Results

- Often PCR will be positive
- Is it live vaccine or wild virus?
  - Vaccine
    - Mix of negative, inconclusive, and weak positive (CT>32 – just a field observation, good research needed)
    - Little associated pathology, unless rolling vaccine reaction
    - Another evident cause of the issue
  - Actual infection
    - Majority strong positive
    - Associated pathology
    - Obvious clinical signs
- Often have to also do phylogenetic testing

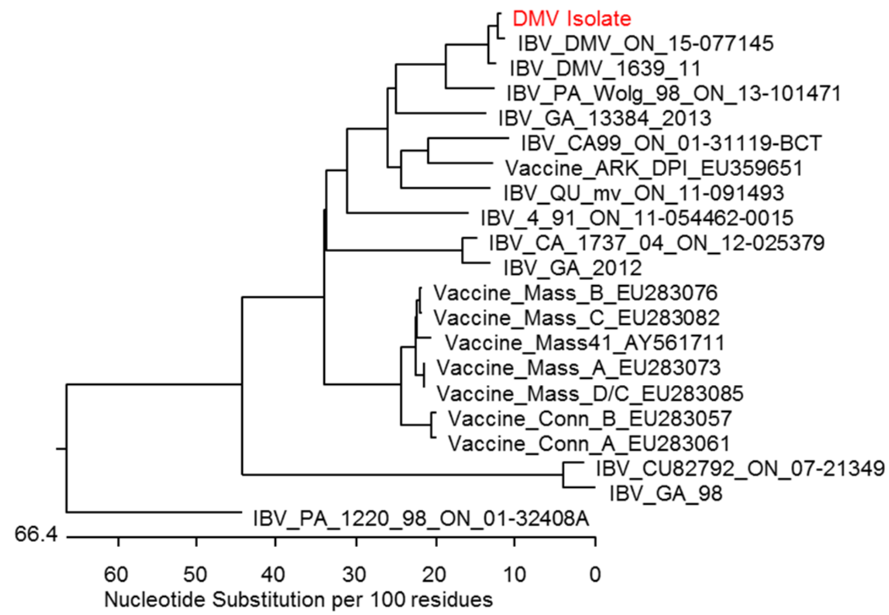
Case 1: History and Gross Findings

- 25wk old flock
- Sudden Death over 3 days: Died right in front of personnel (cyanotic, gasped, died)
  - Day 1- 80
  - Day 2- 68
  - Day 3- 8
- PM Findings: Systemic edema around muscles, congestion in lungs and ovaries, subcapsular splenic hemorrhage, large active intestinal lymph nodes



Case 1: Further Diagnostics

- PCR
  - Negative to AI
  - Strong positive to IBV – typed as DMV
- Bacteriology
  - E. coli (3+ to 4+ in lung, and none to 3+ in liver)
- Histology
  - Significant tracheitis



Case 1: Few weeks after initial incident

- Mortality resolved quickly
- % Production is normal
- Cull eggs are high
  - Wrinkles and Thin Shells
  - Higher % cracks seen at hatchery than usual

- Observation: when flocks are affected when coming into production, there may be prolonged effects on egg shell quality
- Observation: when flocks are affected after peak, there are just mortality issues and egg quality is ok

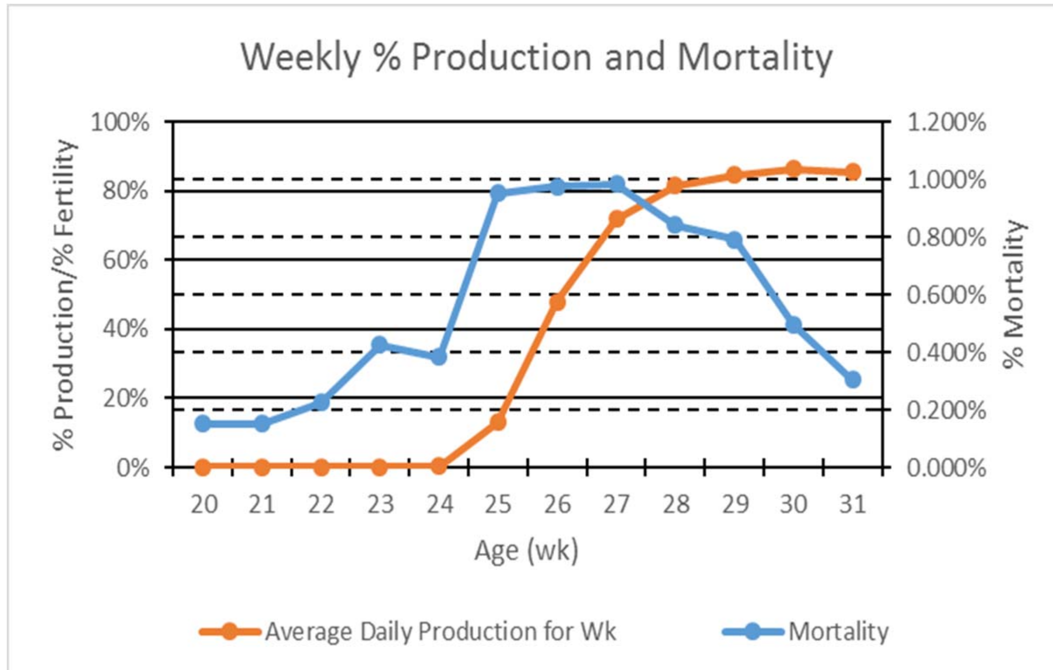
Case 1: The Saga Continues…

- Spikers were taken from the affected flock prior to diagnostic results (mortality resolved)
  - To a flock with same producer
  - To a flock with a different producer
- Neither had any clinical signs
  - Why: age, vaccines???
- Cloacal test for spikers for yet another barn 9 weeks later
  - All swabs positive (CT low 20's)

Case 2: A tale of 2 barns

First Flock:

- 28wks in September 2016
- Weekly mortality 1.0-0.8% (<0.25-0.45% ideal for coming into peak)
- Issues with fertility
  - Became chronic
- Production was normal
- Based on mortality data issue likely began 4 weeks prior to submission



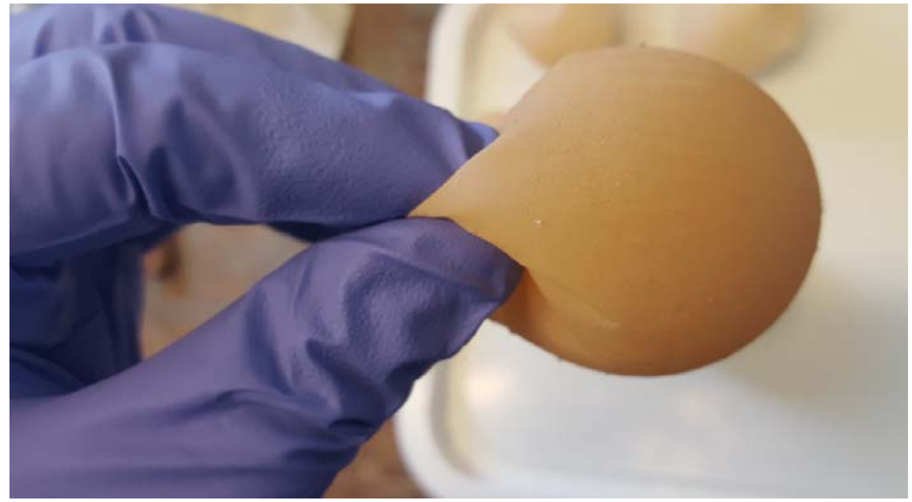
Case 2: Post Mortem and Diagnostics

Post Mortem:

- Septicemia
- Salpingitis
- Cystic oviducts

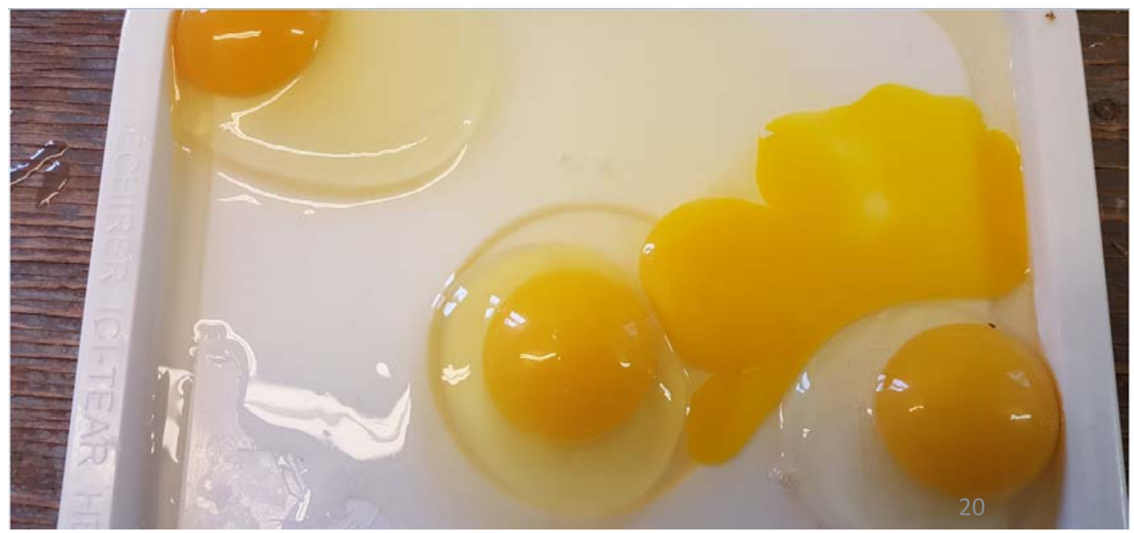
- Bacteriology
  - E. coli
- Histology
  - Septicemia
  - Lymphoid nodules and plasma cell infiltrates
- PCR & Phylogenetic Analysis
  - IBV positive
  - 97.8% similar to CA

Case 2: A tale of 2 barns



Second Flock:

- 32 weeks in Jan 17
- Had increased thin shells, cracks, and jelly eggs
- Had been an issue for a couple of weeks prior
- Production was good but may have reduced their potential peak



Case 2: Post Mortem and Diagnostics

Post Mortem:

- Some typical mortality – IBV related???
  - Yolk peritonitis and salpingitis
- Culled hen showed clear fluid accumulation in shell gland section of oviduct with fibrin flakes

- Histology
  - Lymphoid nodules in oviduct, kidney, and lung
- PCR & Phylogenetic Analysis
  - IBV positive
  - 97% similar to CA

Case 2: A cautionary tale of 2 barns

The Connection:

- Same producer for both barns
  - From history did not follow best biosecurity
- Dedicated staff for each barn
  - Otherwise poor biosecurity for entering barns
- Separate locations about 4km apart
- Issues were about 16 weeks apart
- Same IBV pulled from the both flocks
- Different clinical signs
  - Age at infection???

Prevention & Control

Vaccines & Biosecurity

Vaccines

- Currently limited to Mass and Mass/Conn
  - Present in Ontario, but not currently predominant strains
- Attempts have been made to have an emergency drug release with:
  - 4/91
  - Georgia (licensed in US)
  - Both used with Mass to provide broad protection including DMV
- These vaccines are more stable than Ark
  - Italy example 4/91
- Definitely a need for vaccines to target variants that are becoming more prevalent and/or that have a broader range of protection
- Currently frustrating for producers and vets because hands are tied
- DMV a problem for all but particularly devastating to layers
  - False Layers due to infection as pullets
  - $8mil in losses

IBV Survival: Environment

IBV

- Relatively stable between pH of 3 to 11
- Inactivated by UV light and heat
- When fermented at 20-30C survival is <24h, but at 5-10C survival us 72h.

Other Coronaviruses

- Tend to live longer on non-porous surfaces. E.g. SARS
  - 24h on wood vs 72h on stainless steel or plastic when protected in stool
- SARS can live for feces for 96 hours, PEDV up to 7 days

IBV: Disinfection & Survival

- Can be killed by most disinfectants (eg. formaldehyde, chlorine releasing, quat. ammonia, oxidizing agents)
- Some IBV virions have survived disinfectant in solution for at least 30 min in lab setting
  - Therefore, need to follow best practices to ensure actual disinfection
- Need to ensure removal of organic matter for maximum efficacy
- Inactivated by heat and UV light
- Survives in broad pH range
- Survives days in cool temperatures or when protected by organic matter

What to do with IBV positive barn?

- Dry Clean – Remove bulk of organic material
- Wet Clean – Hot water and detergent for removal or persistent organic material
- Disinfect – chemical disinfectant *important to remove all organic matter*
  - Feeders, waterlines, anteroom, etc.
- Heat treatment to augment chemical disinfection
  - Check with equipment manufacturers for acceptable temp.
  - Various recommendations e.g.:
    - 7 days at 37.8C (100F) to 48.9C (120F) – for HPAI
    - 3 days at 30.0C (86.0F)

Secondary Challenges With IBV – Broiler Breeders

- Obtaining spiking males in a timely manner
  - Total TAT can take up to 2 weeks for phylogenetic analysis if +'ve
  - Spiking males become infected and no longer wanted
- Efficient use of labor on farm
  - Controlling employee traffic
  - Sites with multiple barns
- Scapegoat for management?
  - "A mild bit of IBV"

Maple Lodge Hatcheries Field Response

- Producer and Breeder Service Education
- Stressed importance of improved biosecurity
  - Traffic control issues in multi-barn operations
- Additions to current vaccine program:
  - Day of age
  - In lay every 6-8wks with Mass/Mass & Conn
- Recommended IBV testing prior to moving spikers
- RecommendRigorous C&D after infection +/- heat treatment

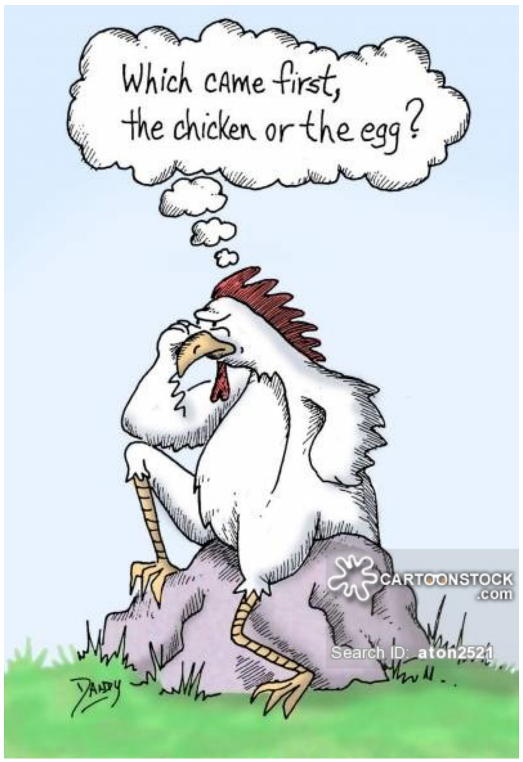
Thank you to:

Ontario Animal Health Network (OAHN)

http://oahn.ca/networks/poultry/

ONTARIO ANIMAL HEALTH NETWORK

Questions?


Which came first,
the chicken or the egg?
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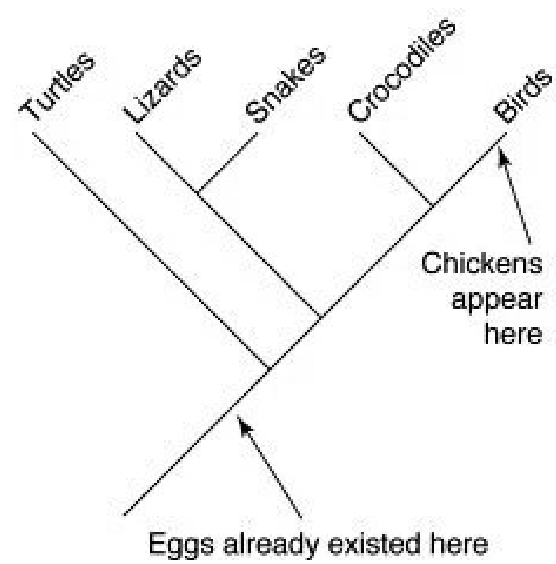
Turtles
Lizards
Snakes
Crocodiles
Birds
Chickens appear here
Eggs already existed here