Johne's Disease Education Program for Beef Cattle

Dr. Kris Clothier

Iowa State University

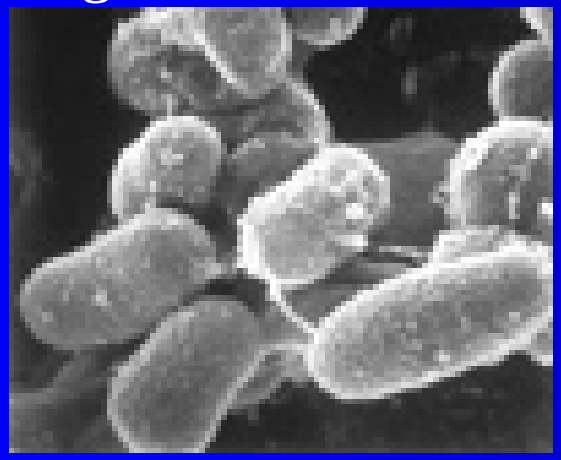
Adapted from USDA guidelines and johnes.org

Johne's Highlights

- Johne's Disease is caused by *Mycobacterium avium var paratuberculosis* (MAP)
- Causes chronic thickening of intestinal lining resulting in decreased absorption of nutrients, diarrhea, and severe weight loss despite a good appetite in the animal
- Bacteria can survive for long periods in the environment: 8 months in dry feces, 18 months in water, years in freezing temperatures
- Affects multiple ruminant species: cows, sheep, goats, elk, bison, wildlife

What Causes Johne's Disease ?

- *MAP* are usually ingested by the calf early in life (< 6months)
- MAP invade the lining of the intestine where they are absorbed into intestinal cells. They are picked up by white blood cells but avoid being killed by the immune system
- Bacteria that are not absorbed into cells are passed out in feces and this further disperses MAP ("pass-through")
- Absorbed bacteria thrive and multiply in cells; these infected cells cause chronic inflammation and intestinal wall thickening
- The abnormally-thickened wall can not absorb nutrients and eventually protein begins leaking into the gut and out in the feces, leading to diarrhea



Johne's Bacteria

Cow Gut

Recognizing the Problem
Chronic Wasting Disease of Ruminants

Clinical animals

- Usually easy to ID
- Thin body condition with muscle wasting
- Severe, watery diarrhea, poor production, and weight loss
- Animal maintains a good appetite
- Can shed 1 billion bacteria/day
- One dose of 1 million bacteria is enough to infect a calf
- More bacteria in environment means greater chance for more calves to get infected

Recognizing the Problem

Subclinical animals

- Can look like anyone else
- Are usually between 3-7 years of age (these should be a cows most productive years)
- Can shed 200 million Johne's organisms/day
- Are contagious to their own calves and others in their environment
- Can act as "Typhoid Marys" spreading disease

How Does An Animal Become Infected?

1. In the Uterus 10-20%

- Cows shed more MAP when under stress-usually shed most MAP in weeks before & after calving; bacteria in the blood cross over the placenta to the calf
- A calf can be infected on the way out—feces are often ingested just after birth

2. Young Calves by Colostrum & Milk 5-10%

- Clinical and sub-clinical cows shed the bacteria into colostrum and milk; having frozen colostrum on hand is a good idea
- Don't feed colostrum from untested cows; this increases the chance of spreading MAP
- With 1,000 bacteria/ml, 1 quart of infected milk or colostrum→ infected calf

How Does An Animal Become Infected?

3. Fecal - Oral Infection of Young Calves - >70% Most Important Route of Infection

- Infected cows shed the organism in manure
- One MAP-shedding cow can infect many calves
- Manure from infected cows can contaminate:
  - Teats, milk
  - Feed
  - Pasture, pens and bedding
  - Water
  - Hay feeding areas

Calving Johne's positive cows perpetuates the disease!

How Long After Infection Will I See The Disease?

Incubation Period:

2-7 years

(Shedding bacteria) much of that time

Calf infected shortly after birth

Clinical cow with wasting and diarrhea

Why is Johne's so hard to diagnose and prevent?

MAP in cattle is similar to a cross between HIV and Influenza

HIV:

- Infection is forever
- Disease progresses and eventually will lead to death
- Agent hides in the immune system so body can't attack it
- May be years until clinical disease is present

Flu:

- Easily Spread
- Infects susceptible population (young, immune-stressed)
- Many different strains with many different genotypes
- Vaccines can help but are not always effective and must be given early in life

Why should we care?

Economics—Money out of your pocket!

- Cows are less efficient
- More feed is wasted due to decreased absorption of nutrients
- Lower milk production
- Wean smaller calves
- Less likely to breed back
- Shedding cows infect their own calves and others in the environment (pasture, calving pen, etc)
- Culled cows bring less salvage value
- Costs of diagnostics and treatment before culling (antibiotics, deworming, etc.)
- Easily spread: MAP survives for a long time in infected pastures
- Most producers that have Johne's, BOUGHT Johne's– a very expensive problem

Why else should we care?
Public Opinion

- Is there a connection with Crohn's disease?
  Equal amounts of data saying yes and no
  Some experts say proof is only a matter of time
- Will the media care about the truth?
  Sensationalism sells; vegetarian groups will use information supportive of their positions
- Consumers demand safety of their food supply—if a connection is made, the cattle industry has already been fighting this disease

What Can I Do ?

Voluntary Johne's Disease Control Program

- Designed and sponsored by USDA; implemented by Iowa Department of Agriculture & Land Stewardship (IDALS)
- Divided into 3 phases—any producer can participate in as little or as much of the program as desired

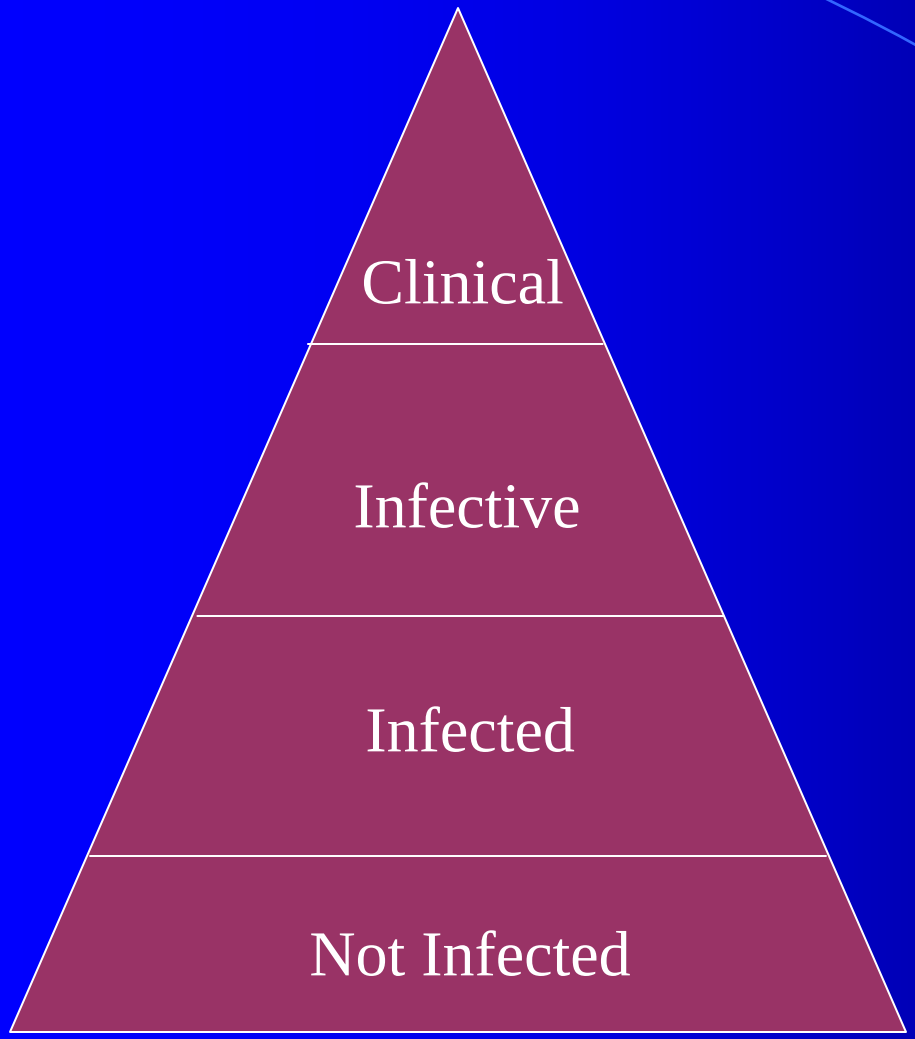
  Educational Phase: learn about the disease, cause, symptoms, how to recognize it, how to avoid it

  Management Phase: one-on-one consultation and risk assessment with the State of Iowa Johne's Coordinator or District Vet about your operation, what recommendations will work best for you to decrease risks of Johne's in your herd

  Testing Phase: program provides some funds for testing based on what you and the District Vet decide will work for you

Contact Dr. Randy Wheeler at IDALS 515-281-0866 or your District Veterinarian for more details

Johne's Disease in a Nutshell



- Clinical animals are easy to identify but are the "tip of the iceberg"
- Infective (sub-clinical) animals are quietly spreading the disease to susceptible herd mates (mostly calves)
- Infected animals have MAP in their bodies but are not yet shedding
- Goal of any testing program is to find infective and infected cows and bulls before they become clinical

All available tests are accurate at diagnosing positive animals - a positive is a positive, but a negative result may just mean that an animal is not positive yet!

Testing Options at ISU VDL

Necropsy

- **Diseased tissue found at necropsy is considered the most definitive test! It's hard to make money on cattle this way!**

Fecal Culture

- The most accurate way to find infected animals
- Positive cultures are confirmed by DNA testing so A POSITIVE CULTURE MEANS A POSITIVE ANIMAL
- ID's "High", "Medium", and "Low" fecal shedders
- Needs specialized equipment so more expensive, results can take 7 weeks (improved from old test which took 4 months!)
- The BEST test to get from a herd that is selling seed stock

Blood/milk test (ELISA)

- Used as a screening test but still has limitations; not all infected animals have high antibodies
- Rapid results and not very expensive

Management is Your Best Weapon

Biosecurity is the best way to keep diseases out of your herd and doesn't have to cost a lot: keep boots clean, wash hands frequently, change coveralls before working with young stock, buy low-risk herd additions, don't share or lease animals, cull problem animals and follow a good herd health program with your veterinarian

- These guidelines can also minimize risks for other diseases: Salmonella, Cryptosporidium, *E. coli*, BVD, Rota, Corona, pinkeye, respiratory diseases
- You don't want to be the source of disease spread in your herd!

Management Guidelines

- Monitor cows closely for clinical Johne's, especially before & after calving (increased stress = increased disease)
- Use "cleanest" pasture or pen for calving (calves are most susceptible to infection)
- Move pairs out of calving pasture or pen as soon as possible (less risk of contamination & MAP ingestion)
- Cull hard—animals that stand out in poorer condition than herdmates should go! "CULL LIKE A PREDATOR!"
- Don't keep sick or cull cows with or near young stock
- Rotate feeding areas to avoid manure buildup where hay/feed is supplied
- Use water troughs instead of ponds—less contamination due to runoff

Don’t Purchase the Problem-BUY SMART!

- Replacement animals can be a risk to your herd—always ask for the Johne’s status from the dam or adult animals in the herd before buying
- If they don’t have results or don’t do any testing, **don’t buy from that herd**
- Remember bulls are around calves when they are young and most susceptible to MAP—monitor and test yearly
- Don’t buy dairy colostrum or drop calves from untested herds!

Is Johne's Really a Problem in Beef Cattle?

A few People Who Learned the Hard Way

- A 250-cow herd with commercial and registered animals; sells seed-stock and herd bulls (50/year)
- Herd purchased by a New Cattle Owner (aka the "I know I can do this" guy) in 2003
- Does not know about herd health programs or diseases of concern, and does not want to learn
- Never asked about Johne's status before purchase
- Herd has had 3 clinical cases in last 6 months
- Unknown number of animals sold from this herd in the last 4 years—**DON'T YOU HOPE YOU DIDN'T BUY ONE OF THEM?**

Is Johne's Really a Problem in Beef Cattle?

- Seed-stock producer with strict biosecurity and quarantine program; insisted on Johne's and BVD testing for all herd additions
- Fellow producers often chuckled at this paranoia behind her back
- Purchased cow and bull from sale in 2001—health certificate had Johne's and BVD "negative" results
- Cow test results: MAP-positive; bull results: BVD persistently infected
- Results on Health Certificate were falsified
- Suddenly biosecurity and quarantine programs are a great idea and this producer is the smartest woman in her cattle group

Is Johne's Really a Problem in Beef Cattle?

- Mr. X purchased a registered bred heifer at a top dollar sale for $10,000; heifer had come from the ranch of a neighbor 10 miles away
- After calving, the heifer developed loose diarrhea, didn't milk well, and had a poor-doing calf
- Heifer was Johne's positive and shedding MAP; heifer and calf should be culled
- Now the courts and the lawyers are involved; Mr. X wants his money back, neighbor ranch says "not my problem"

DON'T END UP IN THIS SITUATION!

Photos have been changed to protect the innocent

Johne's – Key Points to Remember

- Slowly developing disease
- Animals usually "catch" the disease before 6 months of age but won't show symptoms for years
- Difficult to diagnose and no effective treatment!
- Clinical/subclinical animals shed many MAP
- Affects production and eventually ends in death
- Possible link to Crohn's disease in man
- Reduce risk of disease:
  - Buy low risk bulls and replacements from trusted sources
  - Use practices to reduce transmission to young calves
  - Develop a testing and management plan with your veterinarian and CULL HARD!

THE END