

# Practical Johne's Disease Prevention

A photograph of a farm scene. In the foreground, a person wearing a green hat and a dark jacket is herding a group of black and white cows in a lush green field. In the background, there is a large red barn with several windows, a tall white silo, and a smaller blue structure. The sky is overcast and grey.

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# Introduction

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- Paratuberculosis or **Johne's Disease (JD)** is a chronic bacterial disease of the gut of ruminants
- Causative Bacterium: *Mycobacterium avium* subspecies *paratuberculosis* (**MAP**) – cousin of tuberculosis or leprosy
- Calves have highest susceptibility (age and dose dependent)
- Infection progresses very slowly
- Most MAP infected cows look healthy





# Introduction

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- Visibly diseased around 3-6 yrs of age
- Signs of disease: scours, chronic weight loss despite normal feed intake



Picture: Keith Cutler



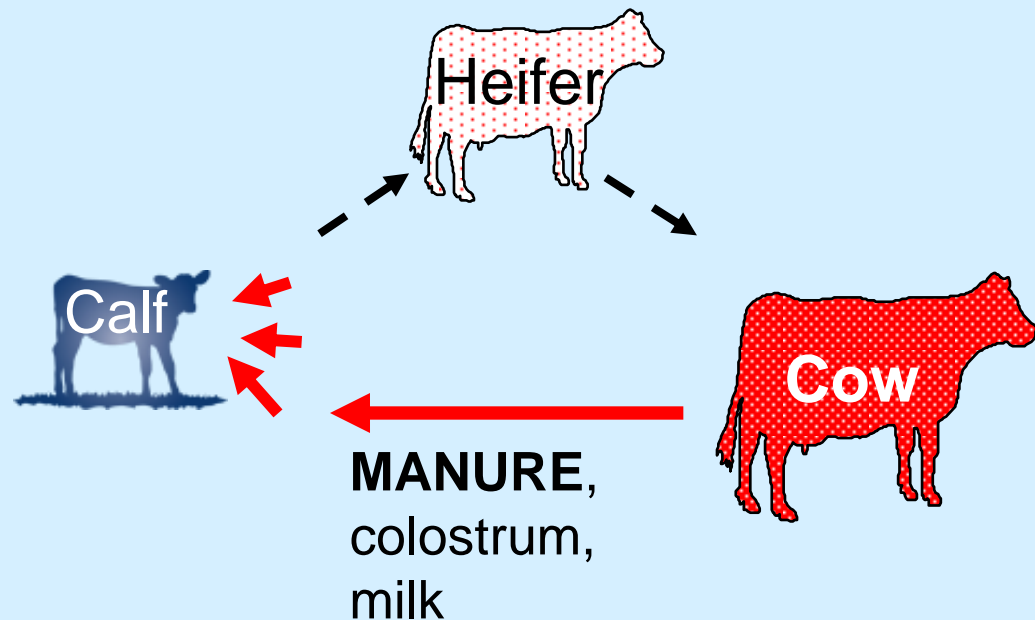
# Disease Transmission

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- Infected, yet healthy looking cows can shed MAP in manure, colostrum and milk (& saliva)
  - 10,000 bacteria /g feces  $\Rightarrow$  > 227,000,000 bacteria / cow / day
- **Fecal-oral** and vertical transmission



manure



# Prevalence

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- Worldwide occurring disease
- Roughly 70% of US dairy farms have JD on their farm (NAHMS, 2007)
  - In Minnesota 40-90% of dairy herds had MAP in environment (Sorge, 2012, unpublished)
- Roughly 3-5% of cows on infected farms are test-positive

# Prevalence

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- Cows positive for MAP at slaughter: 16-30% (McKenna 2006, Koehler et al., 2009)
- Some breeds more likely to be positive for Johne's disease than others



# Economic Importance: On Farm

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- Reduced milk production (7-10% reduction/ lactation)
- Premature Culling (3x as likely)
- Reduced slaughter weight and value (~30%)
- Decreased fertility
- Higher SCC/Mastitis
- Other Diseases
  
- - **\$11,540** for a conventional 100 cow dairy herd (Ireland) with 1 cows visibly sick and 15 healthy looking = **15.2% loss of income / yr**



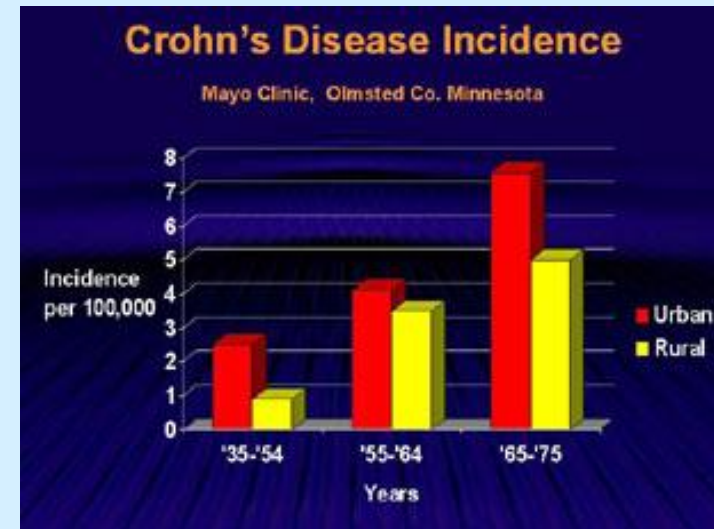
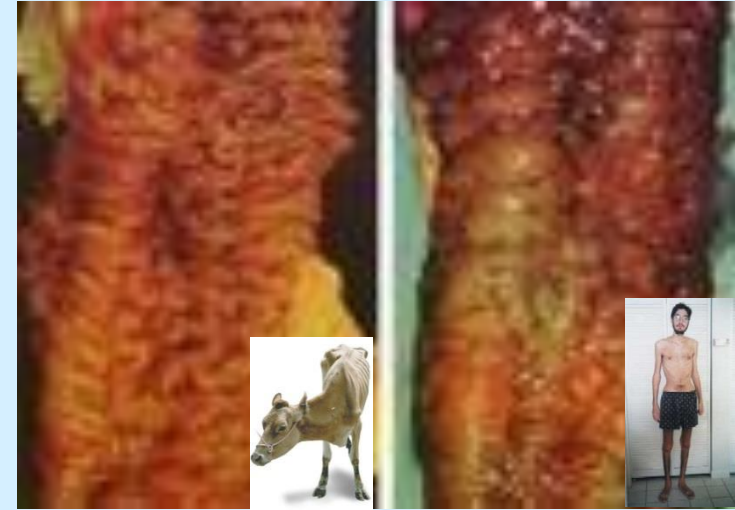
# Economic Importance: Industry

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- MAP is associated with Crohn's disease in humans
- Cause ?

## Prevalence of CD

- Canada - 1:428 people
- USA - 1:694 people
- Increasing incidence if CD
  - variant Creutzfeldt-Jakob disease (from BSE) is classified 'rare disease' (1:1,400 to 1:1,000,000 people)





# Economic Importance: Industry

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Viable MAP is found in:

- pasteurized milk in the supermarket (Millar et al., 1996)
  - cheese & raw cheese (Ikonomopoulos et al., 2005; Klanicova et al., 2012)
  - meat (Alonso-Hear et al., 2009)
  - environment (Whittington et al, 2003)
  - water, drinking water (Pickup et al, 2006; Aboayge & Rowe, 2011)
  - infant formula
  - ...
  - **Consumer perception?!**
- ➔ Dairy & Beef Industry need effective control programs

# Available Tests

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**Necropsy:** Best – unfortunately too late

**Direct Tests for MAP** on feces, milk, tissue

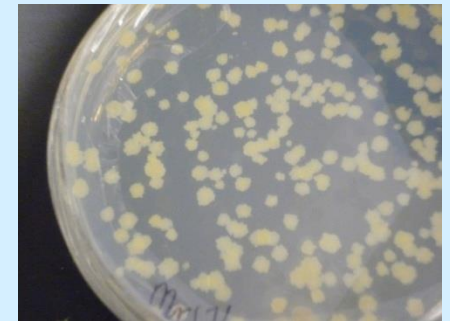
- Culture
  - weeks to months
  - mediocre detection rate
- PCR
  - fast
  - mediocre detection rate (~60% of infected)

**Expensive**

**Detecting Antibodies for MAP**

- Serum or milk ELISA tests
  - fast
  - poor detection (<50% of infected)

**cheap  
& fast**



# JD Control Programs

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## **1. Pure Test-and-Cull Programs**

- Cost-prohibitive, eradication unlikely

## **2. Vaccination**

- only reduces number of visually sick animals
- reduces shedding but
- does not protect from infection

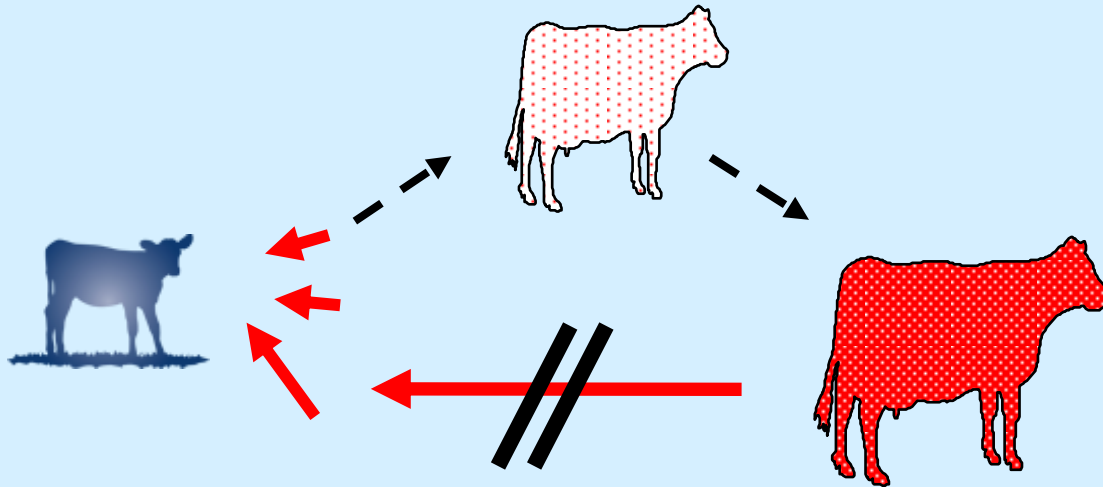
## **3. Risk Assessment (RA) - based JD Control Program**



# Risk Assessment -based JD Control Programs

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- Questionnaire to assess „high risk“ management practices
  - Prevention and Control through changed management practices
- Aim: Breaking the infectious cycle from cow to calf without having to know the Johne's status of each cow



# Best Management Practices vs. Johne's Disease

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- Use of best management practices with a test-and-cull program works best
- “High risk” management practices have been repeatedly identified in RA-based JD control programs over the world (e.g. Denmark, USA, Australia)
- Johne's disease prevalence decreased on most dairy and beef farms within a few years (Wells et al., 2009, Collins et al., 2010; Sorge, 2010; Pillars et al., 2011 *etc*)



# Best Management Practices vs. Johne's Disease

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- Participating producers and veterinarians liked the program and implemented at least one of the recommendations
- Perceived better herd health (in particular calf health) after implementing recommended best management practices





# Best Management Practices

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1. Buyer Beware
2. Test your herd
3. Cull **high** positive or fecal culture positive cows
4. Keep the calving area clean
5. Remove newborn calves as soon as possible
6. Feed low risk colostrum & milk
7. Do not use same tools for manure and feed
8. Do not pasture/house young livestock with or after bulls/mature cows

# 1. Buyer Beware!

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- Better be safe than sorry!
- **Introduction of infected, but healthy looking cattle is #1 risk factor for getting Johne's into your herd**
- Individual tests (i.e. of single animal) are not very useful, especially when they are negative

Test result of  
cow that you've  
just bought



# 1. Buyer Beware!

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## Practical Solutions

- Ask about latest herd test! (all adult cattle, incl. bulls!)
- **Herd test should not be older than 2 years**, especially if the herd is buying in animals!
- Purchase only test-negative cows or **bulls** from herds with known JD status (< 5% cows test positive)
  - MN DHIA performed ~35,000 JD tests in 2012
- If you don't have test results of the seller's herd, buy somewhere else





## 2. Test your herd

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- Establish the level of infection of your herd
  - Include first lactation cows and bulls in this test
  - If you have small ruminants talk to your vet about testing those, too
- Interpret the test primarily on a herd level:  
Is Johne's control a high (>10%), middle (6-10%) or lower (< 6%) problem/priority for your herd?
- Selection of test and timing depends on "what you are going to do with the test"

### 3. What to do with test results?

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- Visually identify test-positive cows in your herd
- Identify offspring of test-positive cows, they are more likely to be infected
- Do not calve test-positive cows with the rest of the herd
- Their colostrum and milk are 'high risk' of transmitting MAP
- **Cull *high* positive cows (i.e. ELISA score >1.0) & those that are fecal culture or fecal PCR positive**

## 4. Keep the calving area clean!

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- Calves have the highest susceptibility to get infected with MAP (Windsor & Whittington, 2010)
- Johne's is primarily transmitted through manure: make sure the calves have little exposure to cow manure!



**This could be manure....**



# Excuse me? Who left their manure behind???

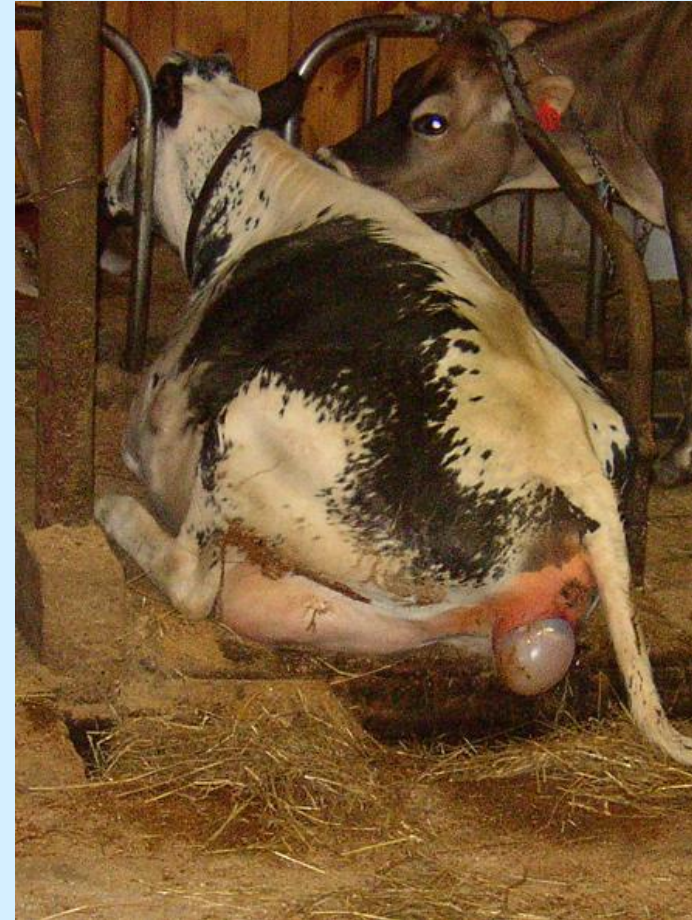


# 4. Keep the calving area clean!

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## Solutions

- Clean calving box/area after each calving
- Use fresh bedding for each cow!
  - If you are kneeling down in the bedding and get wet knees that would not be considered 'clean' bedding
- Cover gutter of tiestall with board and lots of straw
- Fence off dirty areas





## 5. Remove newborn calves as soon as possible from calving area & their dam

- Remove the calf within 30 min of birth from dam and calving environment: **no nursing!**
- Web cam of calving pen to house/TV
- But it still has to be removed!
- Also good for
  - Good colostrum management
  - Prevention of calf diarrhea & pneumonia



Photos: Ann Godkin

## 6. Feed 'low risk' colostrum & milk

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- Colostrum and milk pose a great risk for transmission of Johne's disease to your replacement animals
- **'Low risk' colostrum & milk:**
  - Collected cleanly, into a clean container, from test-negative cows or heifers
    - AVOID MANURE CONTAMINATION!!
  - Never pooled colostrum! Pooled colostrum increases the likelihood of Johne's significantly!
    - Other diseases
  - Proper pasteurization of milk and colostrum

# 7. Clean Tools

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- Do not use the same tools for manure and feed handling
- Tools include: shovel, broom, bucket, skid steer, tractor etc.
- Try to avoid to drive over feed or contaminate the feed alley with manure soiled wheels/equipment
- Clean water troughs!



# 8. Housing of young Livestock

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- Do not house/pasture young livestock with or after mature cows/bulls

## Solutions

- Custom heifer rearing
- Separate pastures
- Do not feed left over feed to your heifers



Photo: Keith Cutler

# Summary Practical Johne's Prevention

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- Not an easy fix!
- Minimize risk of purchasing infected animals & know the status of your herd and animals
- Avoid that calves gets exposed to cow manure or test-positive cows
- **Johne's disease control is the implementation of best management practices**
  - prevents infection with other fecal-orally transmitted diseases (*E. coli*, *Salmonella*, *Coccidia* etc.)
  - improves herd health

**Bottom line: KEEP IT CLEAN!**

# Thank you!



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