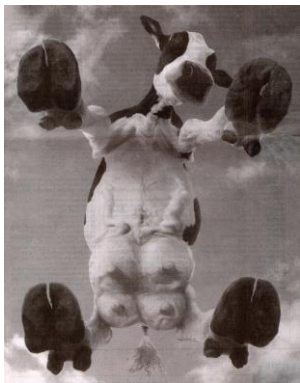


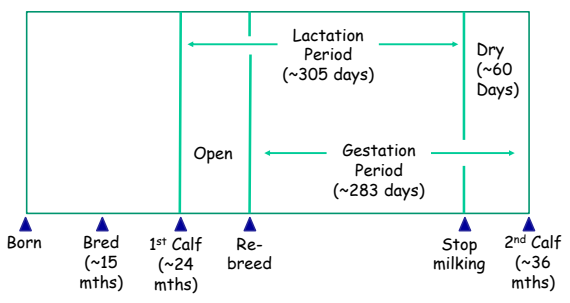
Udder Health Management



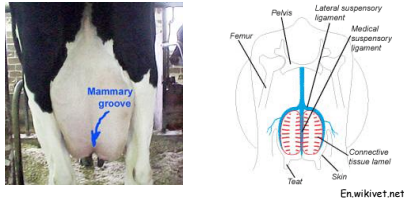
Lecture objectives

- Describe what mastitis is and the major categories of:
 - Clinical and sub-clinical
 - Contagious and environmental
- Name the major mastitis pathogens and describe their key features
- Describe key management procedures to prevent mastitis

Lactation Periods

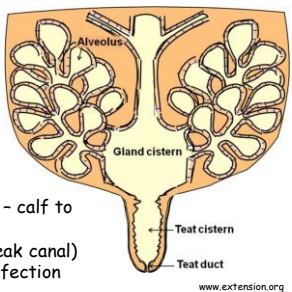


Udder Anatomy



Udder - 4 quarters or mammary glands
Each gland - associated teat

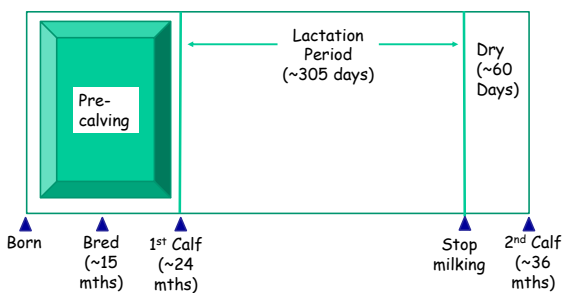
Gland Anatomy



Teat - purpose - calf to access milk
Teat duct (streak canal) - barrier for infection

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Lactation Periods



Udder Health

Heifer

- Supernumerary teats - extra teats
 - birth anomaly
 - 50% heifers
 - Most do not open into a gland (no streak canal/duct)
 - Removed before 2 months of age
- Nutrition - not overfeeding
- Clean environment - can pick up mastitis pathogens



Mastitis

- = inflammation of the mammary gland
- Frequently - associated with bacterial infections
- Typically, 1 cow in 5 has ≥ 1 case of clinical mastitis per lactation
- Often the most economically important disease on a dairy farm
- ~ \$120 - \$300 per case
- ~ \$5000 - \$12,000 per 100 cows per year
- * **The #1 reason for use of antibiotics in dairy cows**

Why does it matter?

1. Reduces milk production
 - milk from cows with clinical mastitis cannot be sold - costs to treat
 - Cows with subclinical mastitis produce less milk
2. Reduces profits

Why does it matter?

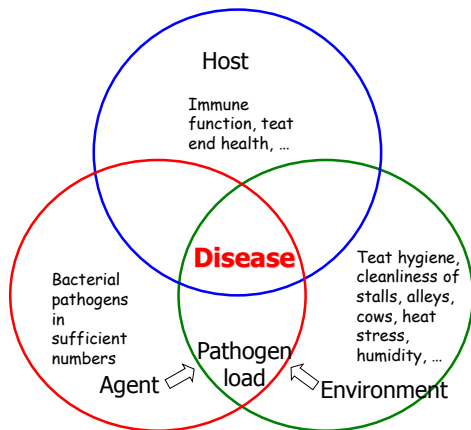
1. Reduces milk production
 - milk from cows with clinical mastitis cannot be sold - costs to treat
 - Cows with subclinical mastitis produce less milk
 2. Reduces profits
 3. **Consumers - nutritious, safe**
 - from healthy cows
- * Therefore - food safety and welfare issue *

The battleground

Why is the mammary gland so susceptible?

- Mastitis-causing organisms are common on the cow's skin and in her environment
- Milk is a difficult place for immune cells and antibodies to function (viscous, pH, fat content)
- Blood-milk barrier - gland also have in nervous system at time and inhibits passing of some cells into mammary gland
 - limits the help - immune system - provide
- Act of milking - at risk for picking up infection every time (cows milked before may have had infection ect)

every time cow lays down at risk for picking bacteria up



Clinical mastitis

- = visibly abnormal milk
 - Mild - flakes, clots, or watery milk; normal quarter
 - Moderate - abnormal milk + swollen or hard quarter
 - Severe = abnormal milk, quarter and systemically ill cow



looking at milk and seeing signs of infects (colour, viscosity ect)

Clinical mastitis

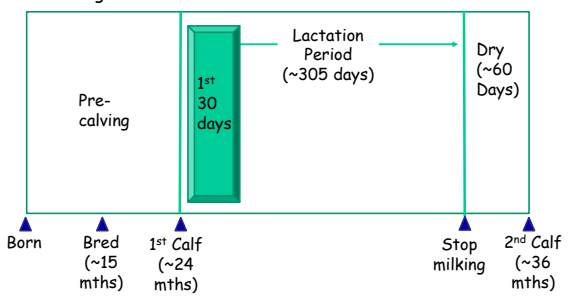
- Severity is not well correlated with the etiologic agent
- Typically 3 to 10 days of production lost (non-saleable milk) per clinical case
- Costs include:
 - milk discarded (waste milk)
 - cow treatment costs (vet visit, medication)
 - labour (hand-milking, treating)
 - risk of drug residues (penalties)
 - risk of infection to other cows



* With optimal management, the goal is < 2% clinical case rate per month

Lactation Periods

* Majority of clinical cases occur in the first month after calving



IMM



intra mammary antibiotics
 up through teat duct up into gland
 treating locally

1. Contagious

- b. *Staph. aureus***
 - Tends to establish chronic infections
 - Intermittent high SCC; periodic clinical flare-ups; progresses to chronically high SCC and scarring of udder
 - > 90% of herds have ≥ 1 infected cow
 - Very poor response to antibiotics
 - **Antimicrobial resistance - problem**
 - Often - micro-abscesses in glands
 - Can survive inside macrophages
 - IMM therapy while lactating 10-40% cure rate
 - Dry cow therapy 40-60% cure rate

Control of Contagious Mastitis

- Prevention is critical
 - Milking hygiene - washing udders - individual towels/towelletes
 - Segregation or elimination of infected quarters
 - Milking infected cows last in the milking line
 - Selective culling



2. Environmental mastitis

a. Environmental Strep's

- Group of various species of varying virulence, chronicity, and response to therapy
- Generally cause clinical mastitis

Duration of infection - days to weeks

Generally respond well to IMM antibiotics

40 - 65% cure rate

* May benefit from extra-label, extended duration therapy - what are the problems with this?

2. Environmental mastitis

b. Coliforms - E. coli

- Lives in manure
- Generally causes clinical mastitis
- Generally short duration of infection (1-3 days)
- Can be very severe (endotoxemia)
- Not responsive to antibiotics

b. Coliforms - Klebsiella

- similar to *E. coli*
- tends to establish chronic infection
- high SCC ± chronic clinical mastitis

2.b.Coliform mastitis

- Bacteria invade udder and grow rapidly
- Infection is short but nasty
- Endotoxin (gram - bacterial cell wall component) absorbed into blood - hijacks cow's immune system (excessive inflammatory response)
- Cow can go from normal to severe mastitis in 12 to 24 h
- Outcomes: recovery, loss of quarter, loss of lactation, abortion, death



short and nasty

endo toxins cause big problem

tend to see a lot with big droopy udders

sometimes entirely lose that quarter for rest of life and get so sick we have to ship them or they die on farm

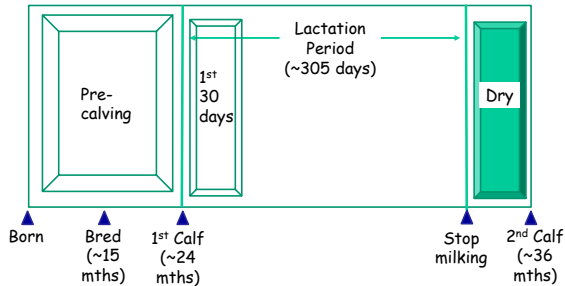
Control of environmental mastitis

- Reduce teat end contamination
 - Clean stalls
 - Sand bedding
 - Good ventilation
 - Clean floors, yards
 - Milking hygiene
 - Pre-dip
- Vaccination against coliforms
- Nutrition to support immune function



Lactation Periods

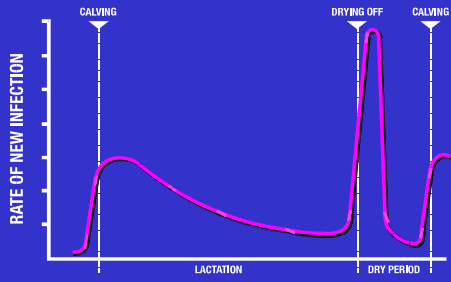
* Majority of clinical cases occur in the first month after calving



Dry period

- Within ~ 2 weeks after dry-off a keratin plug forms in the streak canal to seal the teat helps to protect teat
 - ~ 25% of teats fail to close
 - Most new infections occur in these quarters
- Once involuted, the gland is very resistant to new infection
 - But existing infections, or new IMI acquired in the early dry period frequently become clinical in early lactation

Incidence of new infections during lactation and the dry period.



Dry cow therapy

- Antibiotic
 - Long-acting formations (~ 2 weeks)
 - Objectives:
 - Eliminate existing infections
 - Prevent new IMI during involution
- Teat sealant
 - Inert physical barrier in the teat end
 - Objective: prevent new IMI throughout the dry period