What is the problem?
Farm Specific Strategies to Control Mastitis

Dr. Frank Welcome
Quality Milk Promotion Services
Dr. David Galton
Pro-Dairy
What is the problem?

Do you know which mastitis pathogens are in your herd? Do you know what their prevalence is?

If not, why not?
Quality Milk - Definition

Factors defining quality milk

- Somatic Cell Count (BTSCC) (milk quality)
- Bacteria Count (SPC)
  - usually an indication of udder prep
  - cleaning and cooling
  - possibly mastitis
- Drug residues
- Milk components

All are affected by or influence the level of mastitis in the herd
Producer’s Definition

The level of milk quality that provides the greatest value for your milk and provides a high quality product for the consumer.
New York Mean Monthly SCC

Mean Monthly SCC

Month

SCC ('000)
Tank SCC $\geq$ 350,000 Cells

- LS (linear score) is approaching 5
  - herd LS is a better indicator of herd infection status
  - impact on milk production (4.5 -5 lbs/cow/day)
  - negative impact on milk components - True Protein

- Product yield and shelf life are negatively affected

- NO QUALITY PREMIUMS!!!
Tank SCC < 200,000 Cells

- Suitable and realistic goal
- Little to no impact on production per cow
- Little to no negative effect on milk components
- Producer can consistently collect milk quality premiums.
Where do you start?

-you need a true picture of the situation.

-Somatic cell counts
  - Bulk Tank SCC - indicator of milk quality
  - Individual SCC LS - indicator of udder health
    - who is infected
    - level of infection
    - when - DIM, season
    - new vs.... chronic
Where do you start?

**Cultures**

- Bulk Tank - signals the presence of contagious mastitis
- Bacteria counts can be valuable tools
  - PI count - indicator of udder prep hygiene
  - Coliform count
- Clinical Infections
- Subclinical Infections (chronic infections)
- Dry Off
- Herd survey
  - provides you with an inventory of mastitis and the pathogen.
Frequency of bulk tank testing will depend on herd circumstances.

- **Closed herd, BTSCC < 200,000, high level of milking hygiene**
  - every 2 to 3 months

- **Open herd, expansion mode, BTSCC >300,000 cells, varying level of milking hygiene, etc.**
  - Monthly
Mastitis Control Program

Combining herd SCC data with culture information provides the producer with a wealth of knowledge to develop a Farm Specific Mastitis Control Program.
Manage mastitis by pathogen

Each has its own characteristics and critical control points that can be used to control or eliminate infection.
Major Contagious Pathogens

- *Streptococcus agalactiae*
- *Staphylococcus aureus*
- *Mycoplasma spp.*
Major Environmental Pathogens

- *Streptococcus* spp.
- CNS Staph spp. - more common in warmer weather
- Coliforms (E. coli, Klebsiella)
- *A. pyogenes* - often associated with teat injuries
- Pseudomonas - contaminated water
- Yeast - poor treatment technique, contaminated antibiotic treatment mix
Streptococcus agalactiae

- Should not exist in today’s modern, well managed dairy farm
- Appears to be a reemerging disease in well managed herds
- Associated with aggressive herd expansion
  - new cattle
  - change in milking techniques
  - lack of biosecurity
Streptococcus agalactiae

- Lives only in udder tissue
- Highly contagious
- Low grade, persistent infection
- Low self-cure rate
Prevalence Studies - **Strep ag**

- 1985 - Vermont 45% of herds infected (2931 herds)
- 1990 - Vermont 32% of herds infected (1971 herds)
- California 44% of herds infected (1985)
- NY – PA, 71% of all herds surveyed by QMPS that sold out 1997-1998 had at least one cow infected with Strep ag.

*It is a problem that most producers buy*
Milk Quality - *Strep ag.*

- Average SCC for *Strep ag.* infected cows is 900,000 cells. Can reach >20 million SCC
- Level of inflammation affects total milk as well as milk components
- Herds infected with *Strep ag.* often have a much higher level of drug residue violations
- *Strep ag.* infections can and often do have a negative effect on bulk tank bacteria counts
Risk Factors for *Strep ag.*

- Existing infection in the herd
- Many dairy producers purchase it
  - 8% of all heifers may be infected prior to calving
  - Many purchased replacement animals are infected
Risk Factors for *Strep ag.*

- Lack of Hygienic Milking Practices
  - Common wash cloth
  - Lack of post milking teat dipping
  - Contaminated milking equipment
    - *Shows & Fairs*
    - Milkers that also milk at other facilities
  - Lack of segregation of infected animals
Risk Factors for *Strep ag.*

- cleanliness of cows
- cleanliness of facilities
- inadequate treatment
- larger herd size
Eradication of *Strep ag.*

- IT IS HIGHLY TREATABLE
- Very sensitive to Penicillin and related products.
- Special mixes are not necessary and should be avoided
- Preferably treat all infected cows at the same time (blitz therapy)
Strep ag. mastitis can consistently be treated economically during lactation!!

$$$$
Control Methods

- Post milking Teat dipping
- Adequate application. (dip vs. spray)
Control Methods

- Dry Cow treatment (100%)
- Segregation of infected animals at milking time
  - milk last
- Use of single service towels to clean and dry teats
- Use of gloves by milkers
  - rinse & disinfect whenever contaminated with milk
Biosecurity

- Do not share milking equipment
- Train milkers - personal hygiene prior to milking
- Screen cows or herds prior to purchase or addition to the herd
- Quarantine herd additions after arrival
Monitor Bulk Tank Milk routinely (monthly)

- Plate loop count
- Coliform count
- Lab-Pasteurized count
- Preliminary incubation count
- Speciation of bacteria
Staphylococcus aureus

- Often resistant to treatment
  - invades the glandular tissues
  - multiple strains
  - produces microabcesses
  - drug resistance is common, 30 – 40% NY strains (penicillinase)
Staphylococcus aureus

- Can cause a variety of clinical pictures
  - Acute Mastitis
  - Gangrene Mastitis
  - Subclinical Mastitis
    - most common form
    - high SCC
**Staph aureus** - Risk Factors

- Introduction by a new additions
  - do not assume bred heifers are free of infection
- Faulty milking equipment
- Improper use of milking equipment (machine stripping)
- Over-used inflations
- Lack of hygienic milking practices that limit exposure to susceptible animals
Staph aureus - Control Procedures

- Proper post milking teat dipping
- Appropriate dry cow therapy
- Consistent application of best milking practices
Mycoplasma spp.

- Appears to be becoming more prevalent
- Associated with herd expansion
- Outbreaks often associated with recent purchases of animals
- Appears to be a connection between mycoplasma mastitis and respiratory disease in calves and heifers
- Herds can become free of infection
Mycoplasma spp.

- Mycoplasma are associated with other disease syndromes
- Housing may be a contributing cause
  - old, inadequately ventilated barns
- Infected animals shed huge numbers of organisms initially. As infections become chronic shedding becomes more intermittent
- MASTITIS UNRESPONSIVE TO TREATMENT
Mycoplasma - Risk Factors

- Exists in the herd or is introduced with a newly purchased animal
- Contaminated milking equipment, outside surfaces & milkers hands
- Housing adult cattle with youngstock
- Inadequate ventilation
- Lack of hygienic milking procedures
- Bred heifers can be a major source of infection
Prevention & Control of Contagious Mastitis

- Identification & segregation or culling of infected individuals
- Culture new additions
- Consistency in application of effective milking procedures
  - develop and teach SOP’s
  - use of latex or nitrile gloves
  - forestripping
Prevention & Control of Contagious Mastitis

- Predipping
- Proper milking technique
  - avoid machine stripping
  - shut off the vacuum prior to removing the unit
- Post milking teat dipping
  - not all dips are created equal
- Clean and dry the exterior of inflations when soiled
Environmental Streps and Coliforms

Goal is to keep teats clean with a minimum of contamination with manure, dirt, and septic water at, between and after milkings.

- premilking teat dipping
- clean, dry and comfortable facilities
- dry cow and maternity facility facilities are particularly important
- housing for bred heifers
Environmental mastitis - Risk Factors

- Vary from farm to farm
- Vary with the existing level of milk quality on the farm
- Facilities
- Level of management
- Quality & training of the labor force
- Dry period is key to success
Clean, Dry & Comfortable
Teats should come into contact with clean dry bedding each time a cow lies down.

Proper bedding requires a sufficient amount initially that is regularly groomed with fresh material added as needed.

Bedding cultures (clean & used) can be very helpful in evaluating procedures.
Inadequate Bedding
Teats must be clean & dry
Equipment must be clean & dry
Time to stand

Cows should be encouraged to stand for a period of time after milking
Dry lots and exercise areas clean & dry
Treatment technique - aseptic

- wash & dry teats
- dip and dry (allow dip to remain 20 to 30 sec prior to removal)
- swab with alcohol & cotton and let dry
- dip again
- treat the quarter (insert only 3 mm of the syringe)
- dip teat
To Fine Tune Your Milk Quality Program

- You need to have a real understanding of the nature of mastitis in your herd
- You need to have an understanding of the ecology of the major mastitis pathogens
- You need to have an understanding of the potential mastitis threats facing your herd under current and future management conditions
- You MUST establish a biosecurity program
Many of the less common mastitis pathogens will clue you as to their origin

- Yeast - Poor treatment technique or use of “home made” mixes
- Pseudomonas - water quality problems, contaminated water heaters
- A. pyogenes - teat injuries
- Serratia spp. - contaminated teat dips or applicators
Work with your veterinarian or consult with QMPS veterinarians in your region

- Set realistic goals for milk quality
- Monitor critical issues
  - BTSCC, New Infection Rate
  - Chronic Infection Rate, Culture results
- Establish and incorporate Standard Operating Procedures for the control and treatment of mastitis in your herd
- Intervene early and evaluate the effectiveness of your treatments