Know the Environmental Enemies That Cause Mastitis

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MQ-IQ Consulting
Intelligence for a Quality Milk Harvest
Contagious vs. Environmental

No longer do these definitions fit all bacteria

Strain differences as important as Species differences

Critical to define Major Herd Pathogen(s)
Bulk Tank Cultures Answer 2 Questions

Questions 1:
Are contagious pathogens present in the herd?

Questions 2:
Source of bacteria – Inside or Outside the Cow?

Contagious Pathogens
Environmental Streps

Coliforms (water)
Environmental Streps (feces)
Staph species (skin)
Bulk Tank Culture Frequency

Large dairies = weekly    Small dairies = monthly

Improve quality of BT Cultures

1. Milk fat has higher bacteria counts – agitate tank
2. Pooling multiple days – finds intermittent shedders
Identify Major Herd Pathogens

Must have individual cow cultures
Set “TRAPS” to find the predominant herd organisms

1. Clinical mastitis cases
2. High SCC quarters
3. Fresh cows & heifers
4. Dry off cows
5. Cows leaving treated pen
6. All purchased animals
Environmental Mastitis Herd Profile

Predominate cow cultures = Environmental pathogens

Elevated clinical mastitis rate = > 2% new clinicals/month

Elevated new infection rate = > 7% NIR all lactations

Moderate elevation in BTSCC = 250,000 – 350,000
Pathogen reservoir = Environment

Major Pathogens

CNS Staph spp.

Streptococcus spp. (uberis; dysgalactia) & Lactococcus

E. coli

Klebsiella

Minor pathogens
Environmental Mastitis Herd

When is the mastitis happening?

Dry period

66% of mastitis occurring 60 DIM started pre-calving

Lactation

DIM / Lactation #/ Pen #/ Month

Now Perform a “Targeted Risk Assessment”
Environmental Staph (Gram +)

Coagulase-negative Staphylococcus (CNS) “Skin Flora Opportunists”

1. Infection Rate
   Normal skin flora organisms
   Higher in heifers
   Highest in fresh animals.....7-14 DIM

2. Duration
   Rare contagious spread
   Transient
   Repeated culturing increases diagnostic confidence
Environmental Staph (Gram +)

Coagulase-negative Staphylococcus (CNS) “Skin Flora Opportunists”

3. Prevalence

Most frequently isolated pathogen from bovine milk samples

Usually subclinical; low pathogenicity

Often a sample contaminate

4. Treatment

No IMM treatment due to transient infection pattern
Environmental Streps: (Gram +)

Strep uberis / Strep dysgalactia / Lactococcus / Enterococcus / Aerococcus

GPCN – Gram positive, catalase negative organisms

1. Infection Rate

Strep dysgalactia / Strep uberis

Fecal Contamination

Average DIM @ culture diagnosis (S. digs = 162d; S. uberis = 96d)
Average linear SCC @ diagnosis = 7.1 - 7.24 (2 million – 4 million SCC)
5.5x higher during dry period
Highest in summer and fall / predominate in cold weather
Dirty prep towels
Environmental Streps: (Gram +)

Strep uberis / Strep dysgalactia / Lactococcus / Enterococcus / Aerococcus

GPCN – Gram positive, catalase negative organisms

2. Duration

Strep dysgalactia / Strep uberis

Increases with lactations

Subclinical cases very common

Chronic cases very by strain (farm to farm difference)
Environmental Streps: (Gram +)

Strep uberis / Strep dysgalactia / Lactococcus / Enterococcus / Aerococcus

3. Prevalence

Strep dysgalactia / Strep uberis

(97 farms; 480 positive Strep spp. (from 8,361 samples submitted to QMPS)
35 farms........155 positive Strep dysgalactia
76 farms........150 positive Strep uberis
19 farms........112 positive Lacto lactis
11 farms........16 positive Lacto garvieae
13 farms........22 positive Entero saccharolyticus

Previously identified as “other Streptococcal species”, including Lactococcus. QMPS; Cornell University

GPCN – Gram positive, catalase negative organisms
Environmental Streps: (Gram +)

Strep uberis / Strep dysgalactia / Lactococcus / Enterococcus / Aerococcus

GPCN – Gram positive, catalase negative organisms

4. Treatment

Strep dysgalactia / Strep uberis

% SCC returning below 200,000 after Rx (15d-45d after sampling)

Strep digs. = 70%
Strep uberis = 76%
Lacto lactis = 34%

Tracking cure rates with specific protocols and farm data is critical
Great variation in cure rates among all the varies Env. Strep organisms

J.Scillieri Smith, et.al. “Longitudinal Characterization of Mastitis Causing Pathogens
Previoulsy identified as “other Streptococcal species”, including Lactococcus: QMPS; Cornell University
Environmental Streps: (Gram +)

Strep uberis / Strep dysgalactia / Lactococcus / Enterococcus / Aerococcus

1. Infection Rate

Lactococcus lactis / Lactococcus garvieae / Enterococcus

Fecal Contamination

Missed diagnosed as a Strep spp.

Appears to be the primary organism in some herds

Highest in summer and fall

Dirty prep towels

Previously identified as “other Streptococcal species”, including Lactococcus; QMPS: Cornell University
Environmental Streps: (Gram +)

Strep uberis / Strep dysgalactia / Lactococcus / Enterococcus / Aerococcus

GPCN – Gram positive, catalase negative organisms

2. Duration

Lactococcus lactis / Lactococcus garvieae / Enterococcus

Average DIM @ sampling Dx = 140 DIM – 170 DIM

Clinical / Subclinical / Chronic cases reported

Subclinical cases very common

Higher average SCC in clinical mastitis quarters than Strep dys. & uberis

Previously identified as “other Streptococcal species”, including Lactococcus: QMPS; Cornell University
Environmental Streps: (Gram +)

Strep uberis / Strep dysgalactia / Lactococcus / Enterococcus / Aerococcus

3. Prevalence

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4. Treatment

Lactococcus lactis / Lactococcus garvieae / Enterococcus

Bacterial cure rates statistically lower than for Strep dysg. & uberis

Strep dysg. = 70%
Strep uberis = 76%
Lacto lactis = 34%

Risk of repeat clinical mastitis statistically higher for Lacto lactis infected cows

J.Scillieri Smith, et.al. “Longitudinal Characterization of Mastitis Causing Pathogens
Previously identified as “other Streptococcal species”, including Lactococcus: QMPS; Cornell University
1. Infection Rate

E. coli (feces) & Klebsiella (feces; wood-digesting bacteria)

4x greater risk during dry period / During lactation….highest just fresh

Majority Do Not become chronic

Significant seasonal variation (Hot Weather)

Significant increase based on bedding material

Significant increase based on humidity (outdoors & indoors)

Dirty prep towels
1. Infection Rate

**Klebsiella Point Source** (New York, USA study; % positives)

- 66% alley manure / 100% rumen contents / 30% TMR’s
- 80% fresh corn silage / 68% bedding samples / 67% feces
- 89% water troughs / 59% teat and leg swabs

Zadoks, et. al., JDS, 2011 and Munoz, et.al., JDS 2008
2. Duration

50% < 10 days

70% < 30 days

10% persist > 100 days (chronic coliforms)

Multiple strains create varied clinical histories
3. Prevalence

Generally low

Typically < 1% of all quarters infected @ one time

Herd outbreaks correspond to significant changes in exposure/resistance

4. Treatment

Systemic therapy with fluids & NSAIDS & G- antimicrobial

IMM therapy only for mild cases
Reducing Env. Mastitis Risk

Decrease Exposure

1. Keep Cows - Clean, Dry, Cool, Comfortable
   Especially dry, close up & maternity
   Alleys, crossovers & holding pen; prevent manure splash

2. Keep teat ends and teat skin clean
   Minimize manure on teat ends / Maximize prep routine to clean teat ends

3. Keep Alternative Bedding material dry
   Low organics / low moisture / Routinely culture bedding/ clean stalls

3. Keep Milking Units Clean
   Prevent liner slips; strive for good unit alignment
# Teat Cleanliness Scorecard

<table>
<thead>
<tr>
<th></th>
<th>Clean: No manure, dirt, or dip</th>
<th>Dip Present: No manure or dirt</th>
<th>Small amount of dirt and manure present</th>
<th>Larger amount of dirt and manure present</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><img src="image1" alt="Image" /></td>
<td><img src="image2" alt="Image" /></td>
<td><img src="image3" alt="Image" /></td>
<td><img src="image4" alt="Image" /></td>
</tr>
</tbody>
</table>

|   | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10|   | 6 | 7 | 8 | 9 | 10|   | 6 | 7 | 8 | 9 | 10|   | 6 | 7 | 8 | 9 | 10|
| 11| 12| 13| 14| 15|   | 11| 12| 13| 14| 15|   | 11| 12| 13| 14| 15|   | 11| 12| 13| 14| 15|
| 16| 17| 18| 19| 20|   | 16| 17| 18| 19| 20|   | 16| 17| 18| 19| 20|   | 16| 17| 18| 19| 20|
Reducing Env. Mastitis Risk

Depth of IMM tube insertions can cause new infections

<table>
<thead>
<tr>
<th>Insertion Depth (mm)</th>
<th>% New Infections</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>31</td>
</tr>
<tr>
<td>5</td>
<td>92</td>
</tr>
</tbody>
</table>

(Newbold, 1964)
## UDDER HYGIENE SCORING CHART

Score udder hygiene on a scale of 1 to 4 using the criteria below.
Place an X in the appropriate box of the table below the pictures.
Count the number of marked boxes under each picture.

<table>
<thead>
<tr>
<th>SCORE 1</th>
<th>SCORE 2</th>
<th>SCORE 3</th>
<th>SCORE 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free of dirt</td>
<td>Slightly dirty</td>
<td>Moderately covered with dirt</td>
<td>Covered with caked on dirt</td>
</tr>
<tr>
<td>2 – 10% of surface area</td>
<td>10 – 30% of surface area</td>
<td>&gt;30% of surface area</td>
<td></td>
</tr>
</tbody>
</table>

![Udder Hygiene Pictures]

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DATE:
FARM:
GROUP:
Reducing Env. Mastitis Risk

Increase Resistance

1. Maintain healthy teat ends and teat skin
   Routinely score teat ends & teat skin (Goal = 80% smooth)

   Post dip emollient package is critical

2. Vaccinations (J-5 core antigen)

3. Excellent nutrition (produces strong immune function)

4. Teat dip choice (germicide system is critical / especially pre dip)
Questions