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# Milk Quality Systems, Management & Troubleshooting Part 1

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# Outline

- QMPS diagnostics
- Testing protocol options (Herd survey vs surveillance)
- Result interpretation (Pending, negative, quantitatives)
- Pathogen-based therapy

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# Commonly Used QMPS Tests


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# Aerobic culture

- Identify common mastitis-causing pathogens
- No quantification
- What does “negative” result mean?

# Mycoplasma

- High risk farms:
  - History of myco (or signs consistent with mycoplasma)
    - Feeding waste milk to calves
  - Buying animals
  - Heifers raised off-site
- Speciation

# Bacteria Quantification

- Bulk tank
- Pasteurizer efficacy (pre- and post-pasteurization)
- Water
- Bedding
- Towels

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# What does this mean?

**Sample ID: Bed Stalls 3.4 - Bedding Material**

| Organism Category | Species | Result |
|---|---|---|
| **Bedding Composition** | % Dry Matter | 60 % |
| | pH Level | 9.7 |
| **Streptococcus** | Streptococcus agalactiae | Not Detected |
| | Total Streptococcus spp. | 11,670,557 cfu/g |
| **Staphylococcus** | Staphylococcus aureus | Not Detected |
| | Total Staphylococcus spp. | 0 cfu/g |
| **Coliform Bacteria** | E. coli | **DETECTED** |
| | Klebsiella spp. | Not Detected |
| | Other Coliforms | Not Detected |
| | Serratia spp. | Not Detected |
| | Total Coliforms | 5,002 cfu/g |
| **Other Bacteria** | Pasteurella spp. | Not Detected |
| | Pseudomonas spp. | Not Detected |
| | Trueperella pyogenes | Not Detected |
| **Other Organisms** | Fungus | Not Detected |
| | Other | Acinetobacter indicus, Aerococcus viridans, Ochrobactrum anthropi |
| | Prototheca spp. | Not Detected |
| | Yeast | Not Detected |
| **Totals** | Total Count | 83,361,120 cfu/g |
| | Total Non-Coliforms | 400,133 cfu/g |

Remarks:

Non-coliform count is predominately Ochrobactrum anthropi.
Streps are heavily mixed.
Total count is made up primarily of streps.
Total count is greater than reported.

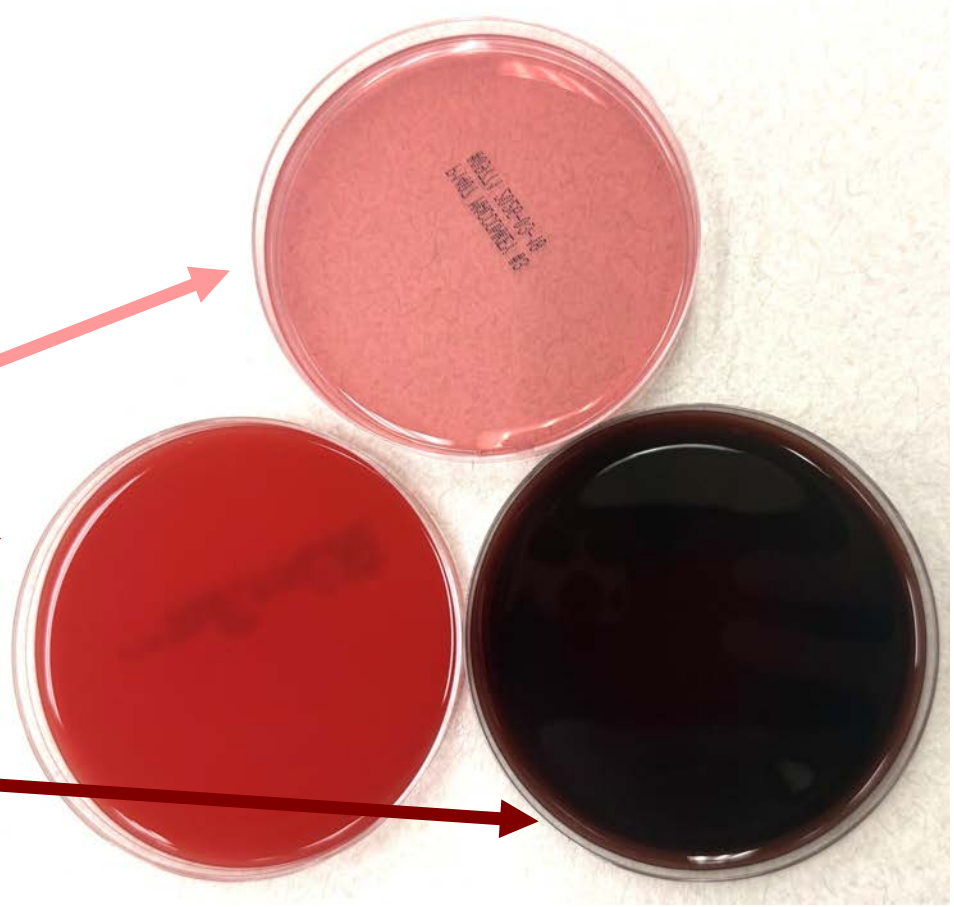
# Setup

All samples plated on:

Blood agar
- Staph count
- Total count

MacConkey agar
- Coliforms
- Non-coliforms

Edwards media
- Strep count



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# Clean

Staph: 0 cfu/mL

Strep: 40 cfu/mL

Coliform: 0 cfu/mL

Non-coliform: 60 cfu/mL

Total count: 100 cfu/mL

# Mild/moderate pathogen load

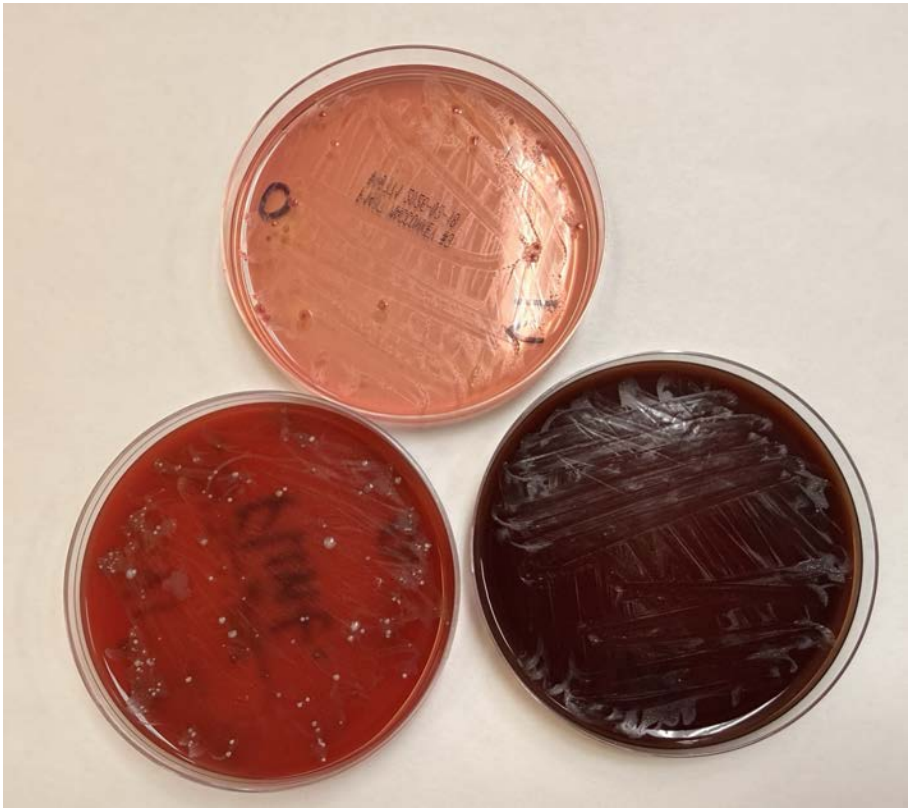
Staph: 480 cfu/mL

Strep: 440 cfu/mL

Coliform: 300 cfu/mL

Non-coliform: 60 cfu/mL

Total count: 3,460 cfu/mL



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# Heavy pathogen load

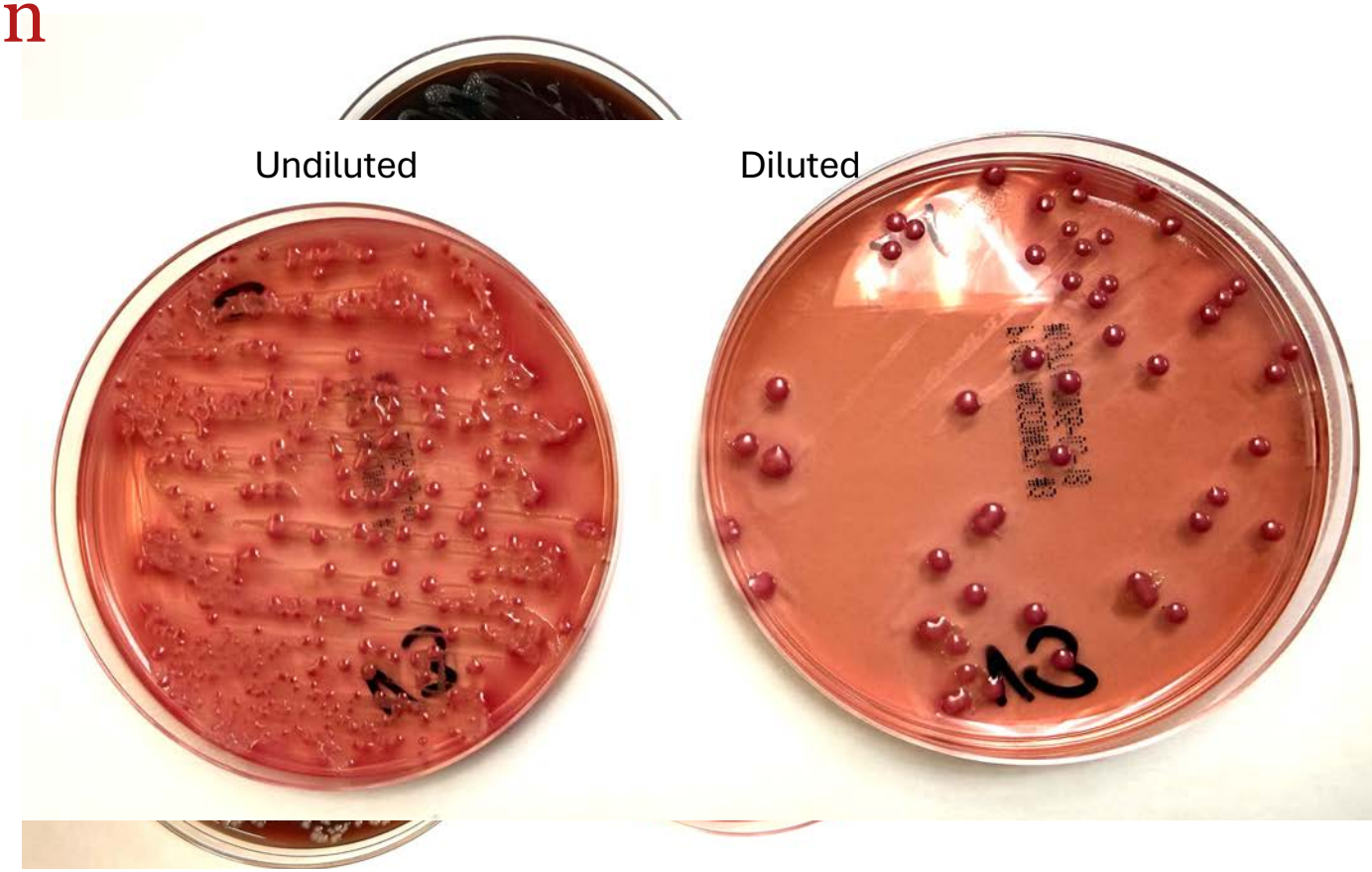
Staph: 40 cfu/mL

Strep: 1,340 cfu/mL

Coliform: 10,000 cfu/mL

Non-coliform: 0 cfu/mL

Total count: 18,800 cfu/mL



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# When in doubt, give us a call!


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# Antimicrobial Susceptibility

- Is it useful for mastitis pathogens?
  - CLSI Vet09: " Practitioners should exercise caution when performing AST on individual clinical cases of mastitis. AST data may be useful to monitor the herd mastitis pathogens over time."
- Do we have breakpoints for mastitis pathogens?
  - Penicillin-novobiocin: *Staph. aureus, Strep. agalactiae, Strep. dysgalactiae, Strep. uberis*
  - Ceftiofur: *E. coli*
  - No breakpoints for amoxicillin, cephapirin, cloxacillin, erythromycin, hetacillin, or novobiocin alone (these are included in commercial mastitis AST plates)

**Bottom line: AST should not be used to guide individual treatment decisions and is of limited use for resistance surveillance**

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# Somatic Cell Counts

USEFUL FOR TRACKING TRENDS OVER TIME

NOT A SUBSTITUTE FOR CULTURE

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# Testing Protocol Options


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# All-In

- Herd survey
- Fresh cows
- New additions
- Clinicals
- High SCC (new infections)

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# Heavy Surveillance

- Clinicals
- Fresh cows
- New additions
- Target specific pens/groups

# Minimalist monitoring

- Bulk Tank Monitoring Program
  - Quantitative + mycoplasma
  - 6 samples/year with follow-up report from QMPS DVM
- String samples
- Only clinicals

# Other services

- Extension survey
- Parlor audits
- Equipment evaluations
- Dry-off evaluation
- Pulsator checks
- Spanish labor training
  - Can be tailored to our findings from audit or survey

# Tests QMPS does NOT do

- Antimicrobial residue testing
- Components
- Lab pasteurized count (LPC)
- Milk urea nitrogen (MUN)
- Pre-incubation count (PIN)
- Standard plate count (SPC)
- Total coliform count (TCC)
- SCC* (not at Ithaca lab)

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# Pathogen-Based Therapy Programs


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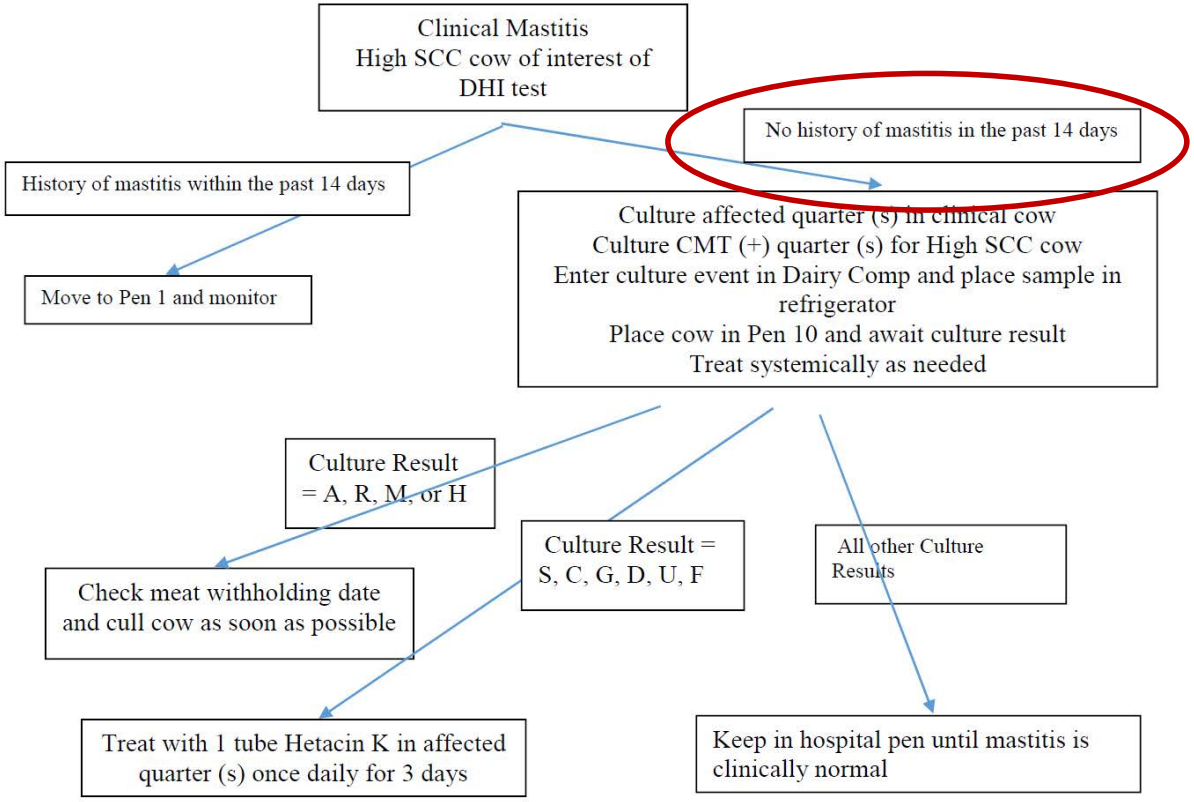
# Treatment decision tree

| Alpha Code | Pathogen Name | Alpha Code | Pathogen Name |
|---|---|---|---|
| A | *Streptococcus agalactiae* | O | Fungus |
| B | *Corynebacterium bovis* | O | Gram (-) *bacillus* spp. |
| C | *Staphylococcus* spp. | O | Mold |
| D | *Streptococcus dysgalactiae* | O | *Nocardia* spp. |
| E | *Escherichia coli* | O | Other |
| F | *Enterococcus* spp. | O | *Proteus* spp. |
| G | *Lactococcus* spp. | O | *Streptococcus* group "G" spp |
| H | *Prototheca* spp. | P | *Pseudomonas* spp. |
| I | *Serratia* spp. | R | *Staphylococcus aureus* |
| K | *Klebsiella* spp. | S | *Streptococcus* spp. |
| L | Lab Pending | T | *Trueperella pyogenes* |
| M | *Mycoplasma* spp. | U | *Streptococcus uberis* |
| N | No Growth | W | *Pasteurella* spp. |
| N | No Important Growth @ 48 hours | X | Contamination |
| O | *Citrobacter* spp. | Y | Yeast |
| O | *Corynebacterium* spp. | Z | Gram (+) *bacillus* spp. |
| O | *Enterobacter* spp. | | *Mycoplasma* spp. Negative |




Courtesy of Dr. Matthias Wieland

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# Pathogens to treat

- Strep. species
- Staph. species
- *Lactococcus*
- *Strep. dysgalactiae*
- *Strep. uberis*
- *Enterococcus*

# Pathogens to cull/manage

- *Staph. aureus*
- *Strep. agalactiae*
- *Mycoplasma*
- *Prototheca*

Image courtesy of Shutterstock

# Automast

- Automated treatment lists based on culture results
- Call VAS to set up
- Streamlines treatment decision-making

# What about other bugs?

- Mild to moderate mastitis
  - Supportive care
  - Hospital pen until milk is normal
- Moderate to severe mastitis
  - Systemic intervention
  - Supportive care
  - Hospital pen until cow & milk are normal

# Notes on mastitis treatment

- Cure ≠ resolution of clinical signs
- Case selection is key for successful treatment
  - Mastitis detection (clinical and subclinical)
  - Culture early
- Is extended therapy warranted?
- Don’t forget about NSAIDs (except dry cows)
  - Flunixin meglumine: 36 hour milk withhold, 4 day meat withdrawal
    - Transdermal: 48 hours milk, 8 days meat
  - Extra-label options: Ketoprofen & meloxicam (contact FARAD for withdrawals)

# Selective dry-cow therapy

- Clinical mastitis ≥2 incidents in current lactation
- Clinical mastitis in past 30 days
- SCC >200,000 at last test
- High producing cow
- Other farm-specific risk factors

# Summary

- Assess risks/needs of clients
- Select the correct test for your client's needs
- Consider evaluating factors beyond pathogen identification
  - I.e. udder hygiene, equipment maintenance, etc.
- Select appropriate candidates for treatment
  - Use assistance to create treatment lists
- Mastitis is painful, treat accordingly

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# When in doubt, give us a shout!

- Ithaca: (607) 255-8202 or (877) 645-5522
- Canton: (315) 386-7240 or (877) 645-5523
- Cobleskill: (518) 255-5681 or (877) 645-5524
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