Understanding Mastitis Economics

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Costs of Mastitis

- Milk production losses
- Drugs
- Discarded milk
- Veterinary services
- Bonuses
- Labor
- Culling
- Other diseases
National Mastitis Council Estimated Annual Losses Due to Mastitis

Losses per cow in herd
- Reduced production, $121, 65%
- Discarded milk, $10.45, 6%
- Extra Labor, $1.14, 1%
- Treatment, $7.36, 4%
- Veterinary Services, $2.72, 1%
- Replacement cost, $41.73, 23%

Total = $184.40 (2010 = $259)

Industry Level Costs

• Mastitis costs the U.S. dairy industry about $1.7 to 2 billion annually

• SO WHAT!?!?!
Historic View

• “Cost of disease”
• Used for policy decisions to support importance of disease for research
• Limited to direct costs (i.e. production)
• Ignore global economic effects of disease reduction
• Generally over-predictions
• Reduce credibility in the minds of farmers
Definitions

\[ C = L + E \]

- **Costs** \((C)\): represent all economic effects of disease
- **Loss** \((L)\): benefit is taken away (discarded or unrealized milk, feelings/stress from death)
- **Expenditure** \((E)\): extra inputs into production (drug costs, preventative measures)

The Loss Expenditure Frontier

Loss-Expenditure Frontier Example

• Subclinical mastitis costs (£172.7 million annually in 1988)

• If everyone operated at the economic optimum, costs would be £159.6 million

• Thus, disease cost could be reduced by £23.1 million by using most efficient procedures

Challenges in Estimating Mastitis Economics

• Variation by country or region
  – Milk quota vs. Free market
  – Varying pricing strategies
  – Costs of drugs/veterinary services
• Changes in milk quality premiums
• Time value of money
• Difficult to obtain estimates for models
• Pathogen variation
• Farm variation
Cost of Culling

- Oversimplified methodology: difference between slaughter value and cost of replacement

- Correct methodology: retention pay-off

- Retention pay-off is the difference between:
  - The predicted future income of the animal in question
  - The predicted future income of her potential replacement

- Requires the use of simulation and/or dynamic programming
Treatment Economics Factors

- Drug Costs
- Withdrawal period
- Treatment duration
- Pathogen
- Antibiotic susceptibility
- Losses if left untreated
- Cow age
- Production level
- Immune status
- Pregnancy status
- Genetic potential
- Previous infections
Staph aureus

Chronic subclinical S. aureus mastitis

No treatment

Antibiotic treatment

No cure
(3-d: 65%)
(8-d: 40%)

Cure
(3-d: 35%)
(8-d: 60%)

Spontaneous cure (3%)

Persistently subclinical (78%)

Clinical flare-up (19%)

No new infection caused

New infection(s) caused low risk R = 0.32
high risk R = 5.3

Subclinical onset, spontaneous cure (21%)

Subclinical onset, persistent (62%)

Clinical onset (17%)
Treatment of Chronic Subclinical Intramammary Infections

- Compared 3-day versus 8-day lactation treatment to no treatment
  - 3 day-Net profit of €11.62 ($15.13)
  - 8 day-Net profit of €-21.83 ($-28.42)

Swinkels et al., 2005, *Journal of Dairy Research, 72:*75-85
Conclusions

• Mastitis has a major impact on dairy farm profitability

• Impact varies by mastitis pathogen

• Most of the impact of mastitis is “invisible”

• We need to move to farm-specific estimates
Any Questions?