# Robots & Mastitis Control

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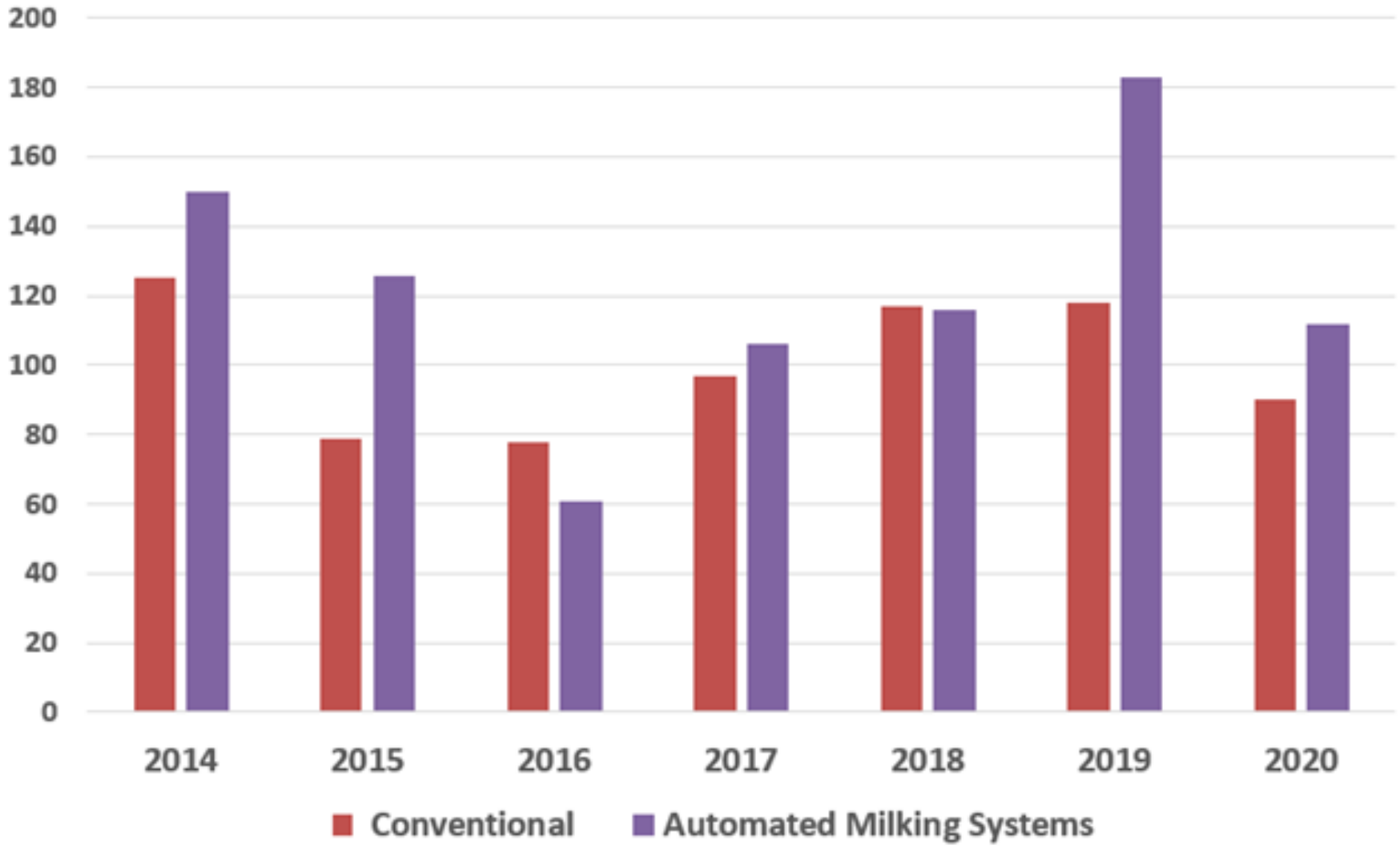
UdderWise

# New Milking Systems 2014-2020



# What is a Robot?

- Robot = TOOL and food factory
- Doesn’t solve management or staff problems
- Milk quality should not reduce*
- Welfare should be improved
- Disease should not increase, but there can be challenges, such as lameness.

# AMS expectations

- Farmers have high expectations
- Not always achieved
- Yield increases for most AMS herds, but not all

# Management considerations

1. Like computers and technology
2. Remove contact between cow & human
3. Large reliance on technology
4. Not all alerts or warnings mean trouble
5. Observe cows closely
6. Cows enter the AMS for food
7. Good cow flow essential

# Management skills

- Massive change from conventional milking
- Management and staff training
  - Daily routine and checks
  - How to deal with warning signals
  - How to diagnose disease
  - Cow observation etc
  - Variation between manufacturers
- Not all staff have the same skill levels
- We all are still learning with AMS!!

# AMS changes

- Very good reliability
- Algorithms very good
- Better attachment & AMS performance
- Understanding how the cow uses AMS
- Optimising AMS output (litres/day)

# Is an AMS suitable for your farm?

- Do you like milking cows?
- Have you got good management and feeding skills?
- Is your barn well designed and comfortable?
- Are you good at managing?

# Are robots suitable for your business?

- Will you get good service from your AMS dealer?
- Do the economics stack up?
- Do you like technology?
- Have you strong management skills?

# Robot capacity

- Milk yield per AMS ~ about 2,000 litres
  - Highly variable
  - 1,600 – 2,400 L/day
  - Need good cow throughput

# Effect of automatic pushing of forage versus manual

| Item | Milk per robot | Milk per cow |
|---|---|---|
| **Automatic feed push up** | **4,580 lbs** [a]<br>2,078 kg | **80.2 lbs** [a]<br>36.4 kg |
| Manual feed push up | **3,804 lbs** [b]<br>1,726 kg | **69.4 lbs** [b]<br>31.5 kg |

# Robot capacity

- Milk yield per robot ~ about 2,000 litres
- Cows per robot
  - Yield
  - Stage of lactation
  - Cow or heifers groups
  - Average is between 50 – 60
  - Likely to increase in future with better technology

# Robot capacity

- Milk yield per robot ~ about 2,000 litres
- Between 45-70 cows** *(yield/SOL dependent). Most have between 50 – 55*
- Idle time ~ 15% is the target

# Idle time ~ what is it

- Time when the robot is not in use
- 24 hours in the day
- Say 2 hours for washing the robot
- Leaves 22 hours for milking
- If the parlour is milking for 20 hours

- Idle time = (22-20)/22 = 9%

# Robot capacity

- Milk yield per robot ~ about 2,000 litres
- Between 45-70 cows *(yield/SOL dependent). Most have between 50 - 55*
- Idle time ~ 15% is the target
- Robot performance ~ *pulsation etc*
- Mastitis ~ slows everything down
- Cow flow ~ poor flow slows down system

# How many cows per robot?

- Slow milkers
- Cow efficiency *~ some cows are robot efficient*
- Number & length of wash cycles per day
- Number of treatments
- Peak and quiet times (midnight – 4 am)

# Frequency of milking

- Maximise visits in early lactation. Why?
- *More frequent visits in early lactation = more development of udder tissue*
- *Long term benefits throughout lactation*
- *Feed to get animals into AMS*

# Frequency of milking

- Maximise early lactation visits
- Aim is 3X by day 21 [critical time]
- Early lactation animals milked 3 – 5X
- Heifers have increased frequency
- Low yielding cows reduce average number of visits

# Cow flow & behaviour

- Aim is 2.8 – 3 milkings/day **
  - *Consider effect of variables*
  - *Grazing*
  - *Cow flow*
  - *Barn design*
  - *New build dairy*

# Cow flow & behaviour

- Aim is 2.8 – 3 milkings/day **
- Some cows are bullies
- Heifers more likely to be bullied
- If little idle time, bullied cows may only get milked 2x day

# Free access

- Cows can enter whenever they choose
- Ideally 15% idle time
- Bullying can be a problem
- Need good physical access to the robots
- Helps avoid queuing
- 5 metre space around 1 robot, 7 metres around 2 robots to avoid congestion

# Teat preparation

- **Should NOT compromise on conventional milking**
- There can be problems
- 4 – 8% attachment failures*
- Teat cleaning ~ 67% success
- Poor post dipping not uncommon *
  *Article based on 'older' technologies*

*J. Dairy. Sc Feb 2011*

# Teat prepration

- Robots can’s differentiate between clean and dirty teats
- Lely and Fullwood use rotating brushes to wash teats. Teats are not dried
- DeLaval, Boumatic & GEA** use a wash and dry system. Predipping**

# Assessing teat preparation

- Wipe teats before attachment
- Examine milk sock (different robots)
- Look inside liners
- Coliform count
- Tails and hairy udders

# Mastitis detection

1. Rely on AMS
2. Quarter conductivity change
3. Light emission through milk
4. Milk yield
5. Activity ~ milking frequency
6. Temperature
7. Future improvements

# Auto mastitis identification

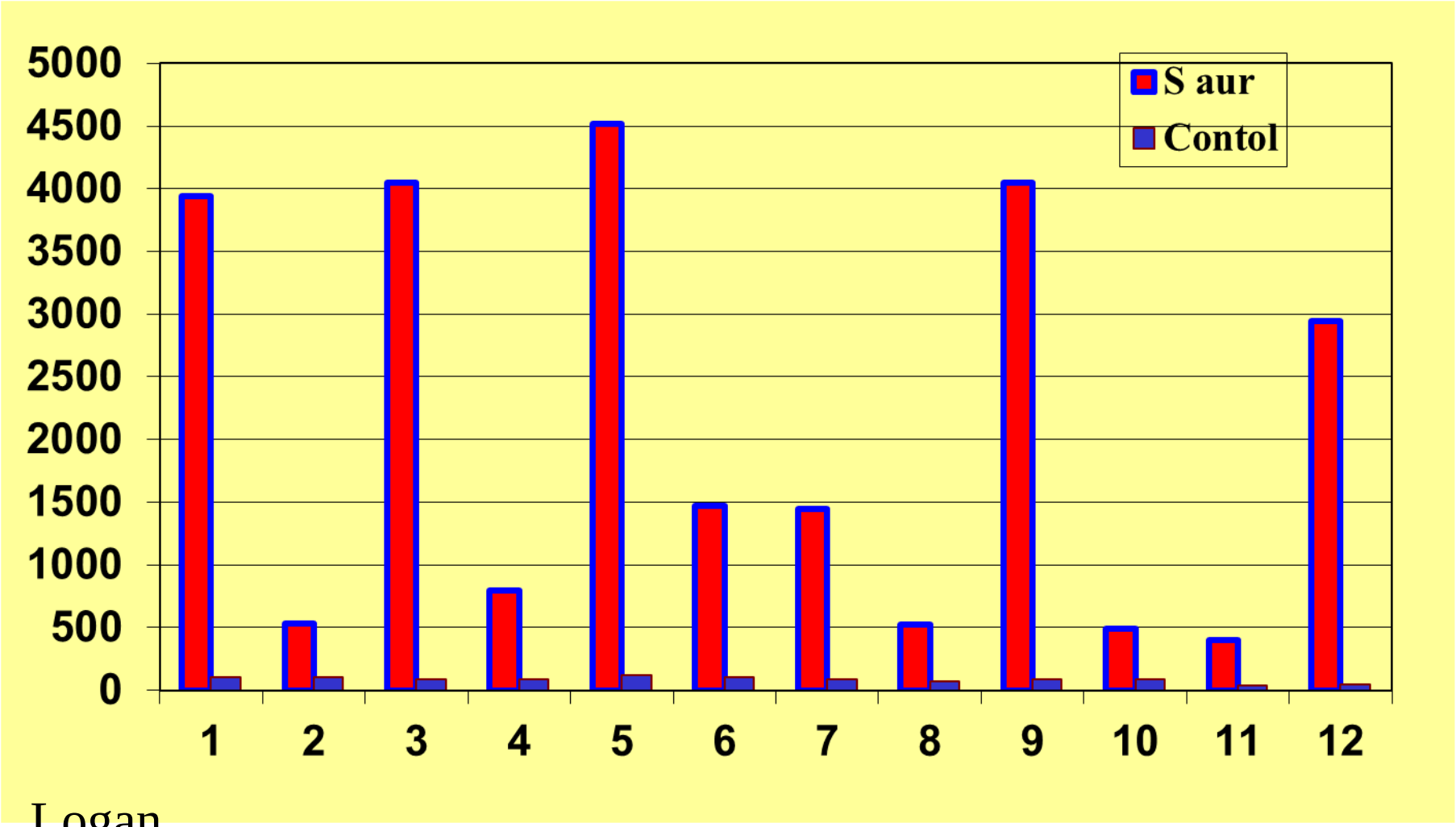
- International standards (ISO 20966)
  - **Sensitivity 70%** ~ must accurately detect 7 out of 10 cases
  - **Specificity 99%** ~ allowed 1% false positives
- Most robot herds say 4 - 6 on average
- **Potential for overtreatment**

# Mastitis alerts

- Unaware about false positives
- Concern. Cow may get ill if not treated
- Variety of tests used to try and identify the 'problem' quarter
- Many treat cows don't have clinical mastitis but subclinical infection.

- Overtreatment / Education opportunity

# Cell count variation in a heifer with Staph aureus over 12 milkings




E. Logan

# Mastitis detection

1. Check cows with warning signs
2. Strip out and examine cow
3. If milk is normal, leave
4. There is no need for further tests
5. *Training opportunity ~ mastitis detection and false alerts*

# Mastitis detection in one robotic herd

9 mastitis decision makers on the farm

- Milkers were set a simple quiz
- 25% staff treated cows that did not have clinical mastitis
- 20% staff did NOT treat cows that did have clinical signs
- **Mastitis identification & treatment protocol**

# Mastitis detection

1. Check cows with warning signs
   - Not always easy
   - You need to find the cow
   - She may be resting or feeding
   - Check the milk and udder
   - Post dip after checking
   - Risk of leaking milk

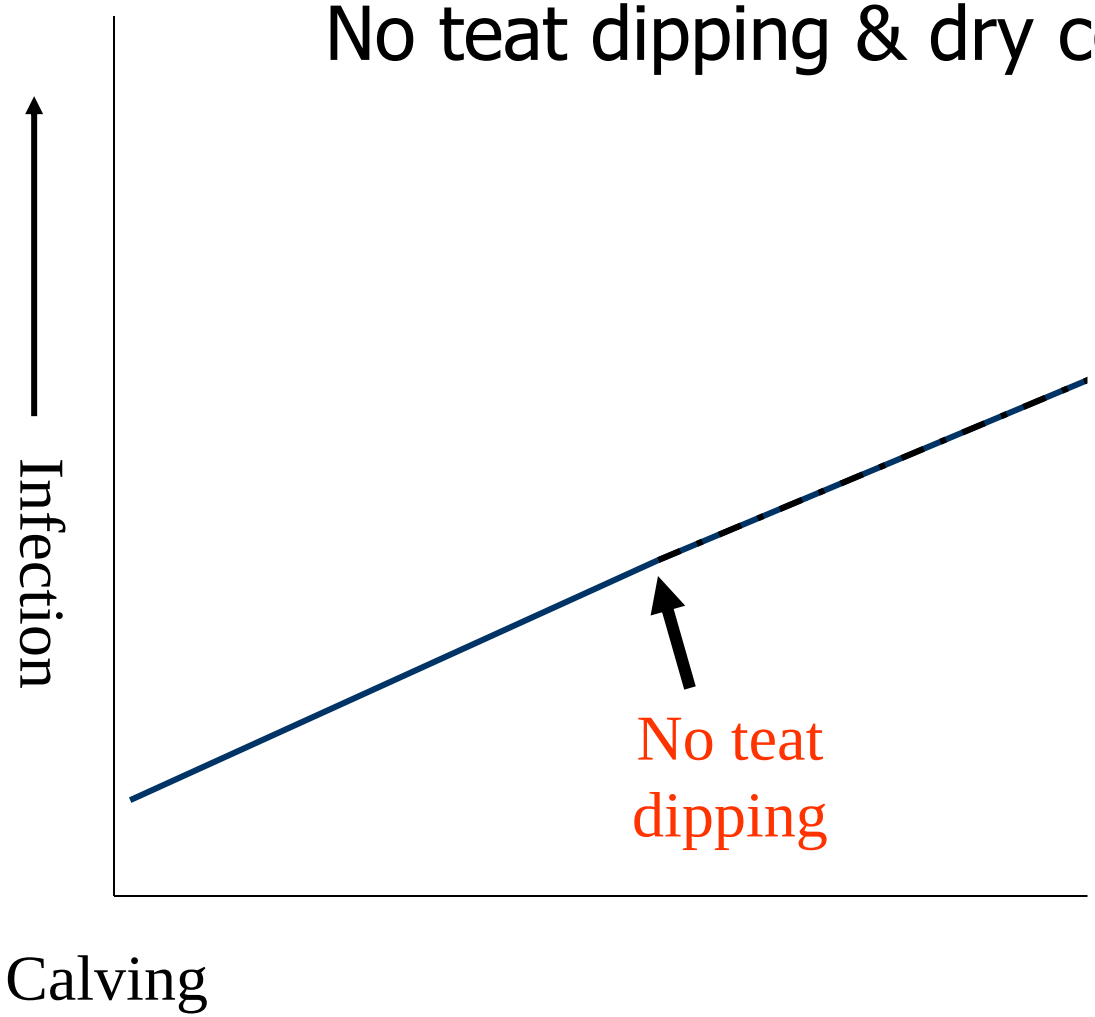
**This takes time**

# Mastitis practicalities

- Milk from suspect case can be discarded
- Find mastitis alert cow. Examine and decide if she has clinical mastitis
- Does the cow stay with her group or moved for treatment?
- Rinsing the robot after milking treated cow = 4 - 12 mins per milking!!

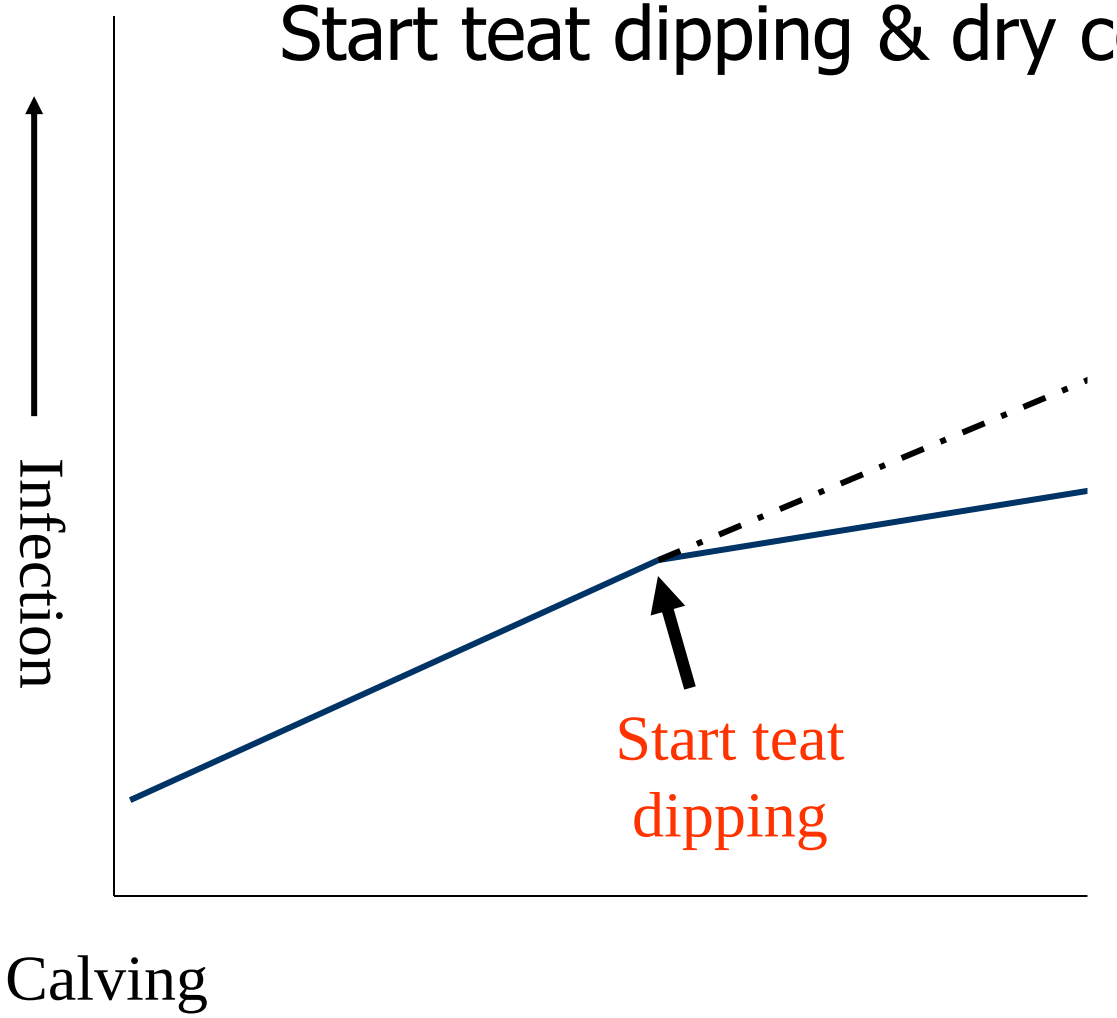
# Teat dipping & infection

## No teat dipping & dry cow therapy

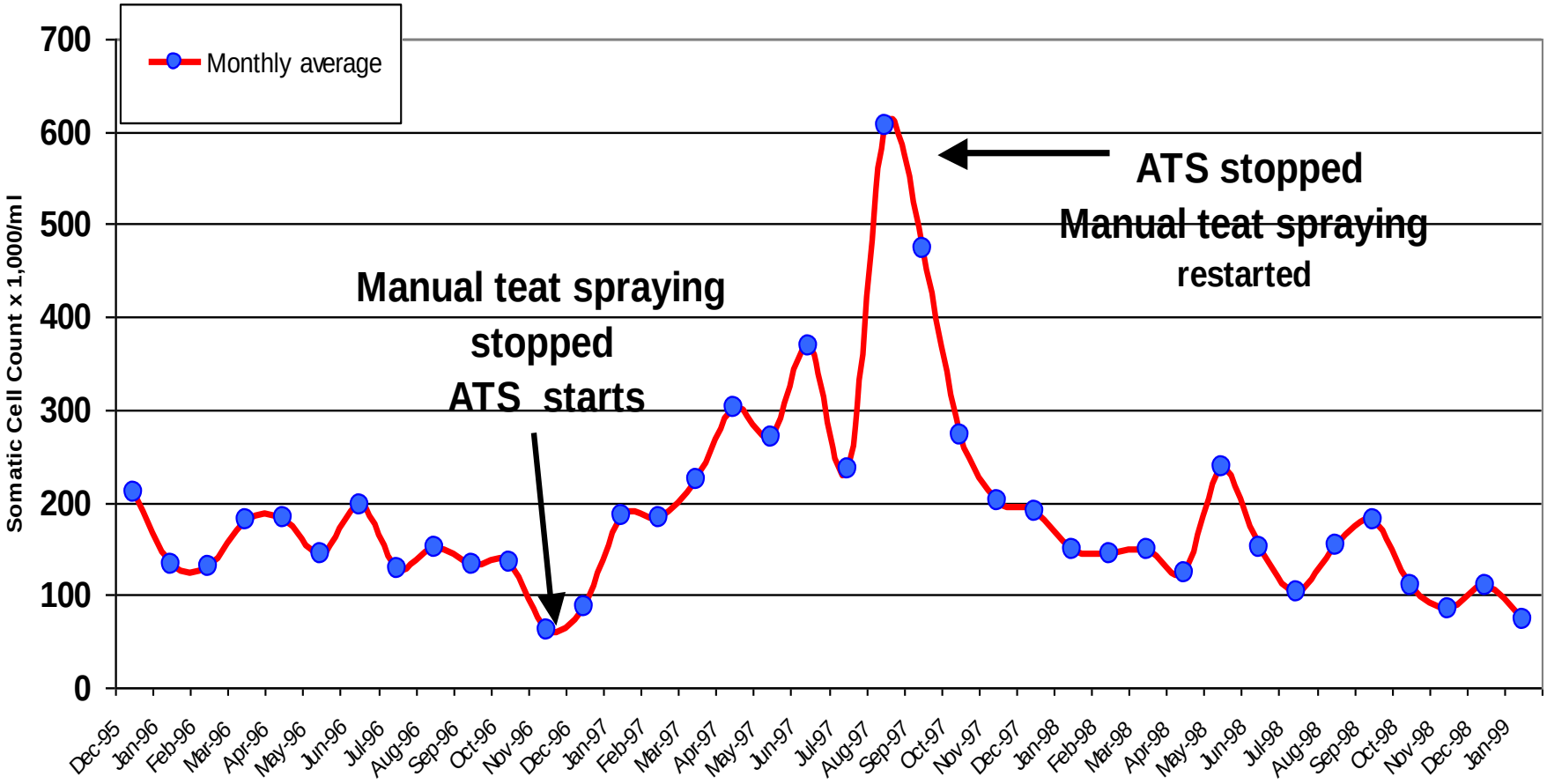


# Teat dipping & infection

## Start teat dipping & dry cow therapy



# Monthly Average Cell Counts
# December 1995 to January 1999



# Mastitis treatment

- Who makes the treatment choice?
- Where will the treatment take place?
- What regime will we use?
- Restrict number of milkings ~ flushing effect
- Risk of residues if not entered in the system

# Bullying and treatment groups

- 10 aggressive or confrontentional interactions every hour
- 240 per day
- A consideration for any treatment group

# Mastitis rates?
(Cases/100 cows/year)

- Targets for conventional herds
  - 25 cases/100 cows/year

- What about robot herds?

# SCC

- Robotic herds can have higher cell counts
- Cross contamination risk
- Post dip teat dip cover can be variable
- Infrequent milkings
- High SCC cows

# Cows and replacements

- Good teat placement important
- Heifers adapt very quickly ~ 72 hours
- Young animals easy to train
- Animals may need reminding after calving
- Cull slow milkers
- Cull problem AMS cows

# Mastitis records

- Mastitis cases by robot
- Mastitis by lactation number
- Mastitis by stage of lactation
- Herd cell count
- Cell counts by stage of lactation
- Cell counts by lactation number

# Why does milk yield rise?

- Increase in milking frequency (3-5%)
- New barn better layout (6-8%)
- Robot benefit (data etc)
- Better fertility etc

# Feed costs

- Little change unless there is an increase in yield
- Herds likely to move to housing all year and stop grazing cows
- Most people see an increase in yield
- Good quality feed in the AMS important
- Can supplement in early lactation

# Key steps to reduce mastitis

- Clean udder and teats
- Avoid overcrowding
- Adequate idle time
- Good cow flow
- Straw yards & robots do not work

# Reducing mastitis in robots

- Clean dry teat before milking
- Effective post dipping
- Always have fresh forage after milking

# The nice surprises

- ✓How quickly animals adapt
- ✓How quiet the shed is
- ✓Robot reliability
- ✓Ability to get the team together
- ✓How frequently the heifers were milked

# AMS potential problems

- Poor AMS and barn design
- Works best with cows housed AYR
- You do not always reduce labour, but have a different & more flexible working life
- It's a more expensive way to milk

# Robots of the future

- Robots are still relatively new!
- Moving from smaller to larger units (Chile 64 robot farm)
- On-going learning process
- Exciting future ~ new innovations

# Robots of the future

- Algorithms and technology improving
- Disease detection getting better
- Less false alerts
- Use of in-line milk progesterone, urea, BHB etc testing will increase.
- Individual samples collected on request

# Summary

- Robotic technology is always improving
- Fitting robots into existing facilities can be a problem
- Poorly designed & managed systems do not work
- Farmers should visit lots of AMS farms and take independent advice before buying an AMS

# Key points for mastitis control

- Clean udders and teats essential
- 15% idle time
- 3 visits/day by day 21
- Litres /robot not fixed number of cows
- Start with low SCC and robot efficient cows