Cure rates during dry period with or without antibiotic treatment at dry off

A non-inferiority randomized clinical trial

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STØTTET AF
Mælkeafgiftsfonden

Background

Antibiotic resistance – global health problem

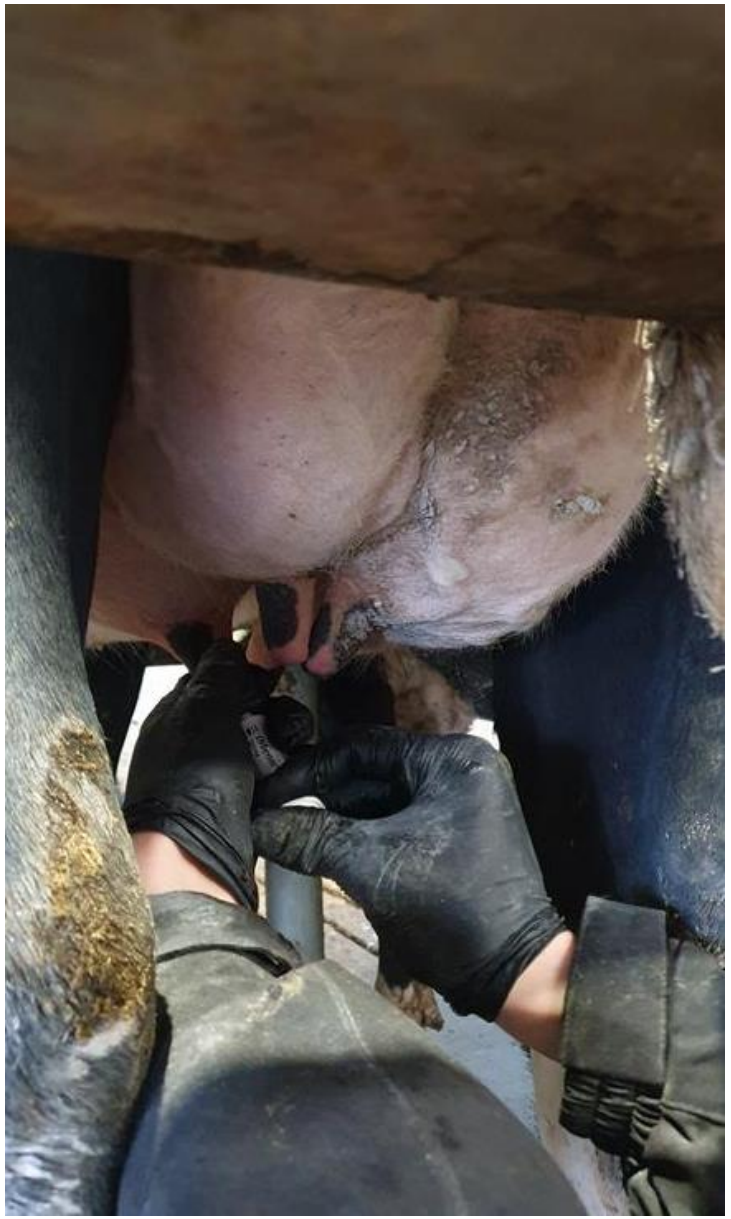
Antibiotic usage → Udder health

Dry cow treatment (DCT)

Danish legislation

- > 200,000 cells/mL
- Pathogen detected

Does it still make sense?



Purpose and objectives

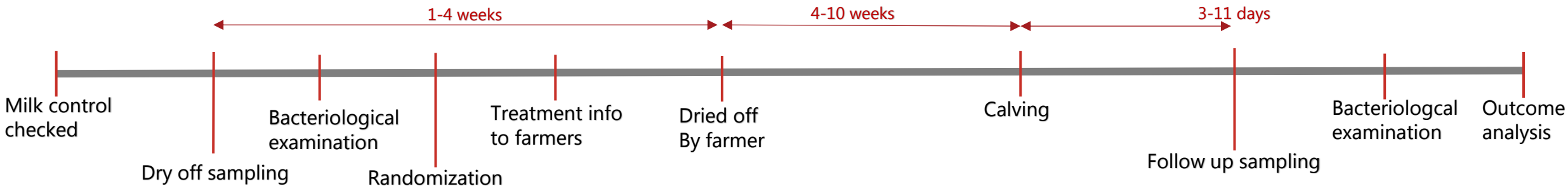
Reduce antibiotic usage for dry off without decreasing udder health

Noninferiority study

Compare DCT vs no DCT

- Bacteriological cure rate
- New intramammary infection rate (NIMI)
- Clinical mastitis

Design


1-4 weeks
4-10 weeks
3-11 days
Milk control checked
Dry off sampling
Bacteriological examination
Randomization
Treatment info to farmers
Dried off By farmer
Calving
Follow up sampling
Bacteriologcal examination
Outcome analysis

Bacteriological cure and NIMI rates

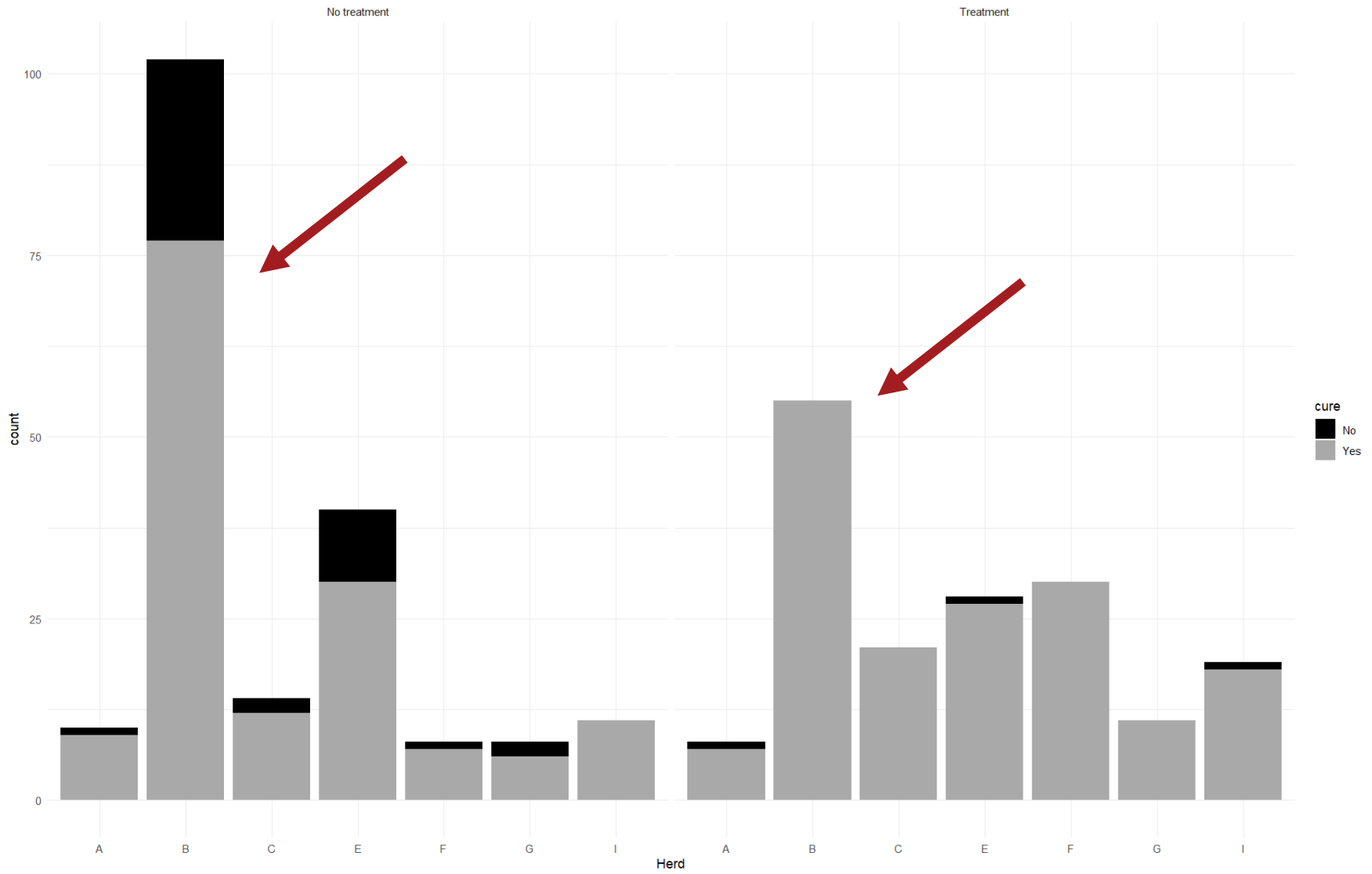
Treatment

- Bacteriological cure = 98.3%
  - 172 quarters
- NIMI = 9.3%
  - 332 quarters
- Clinical mastitis = ?

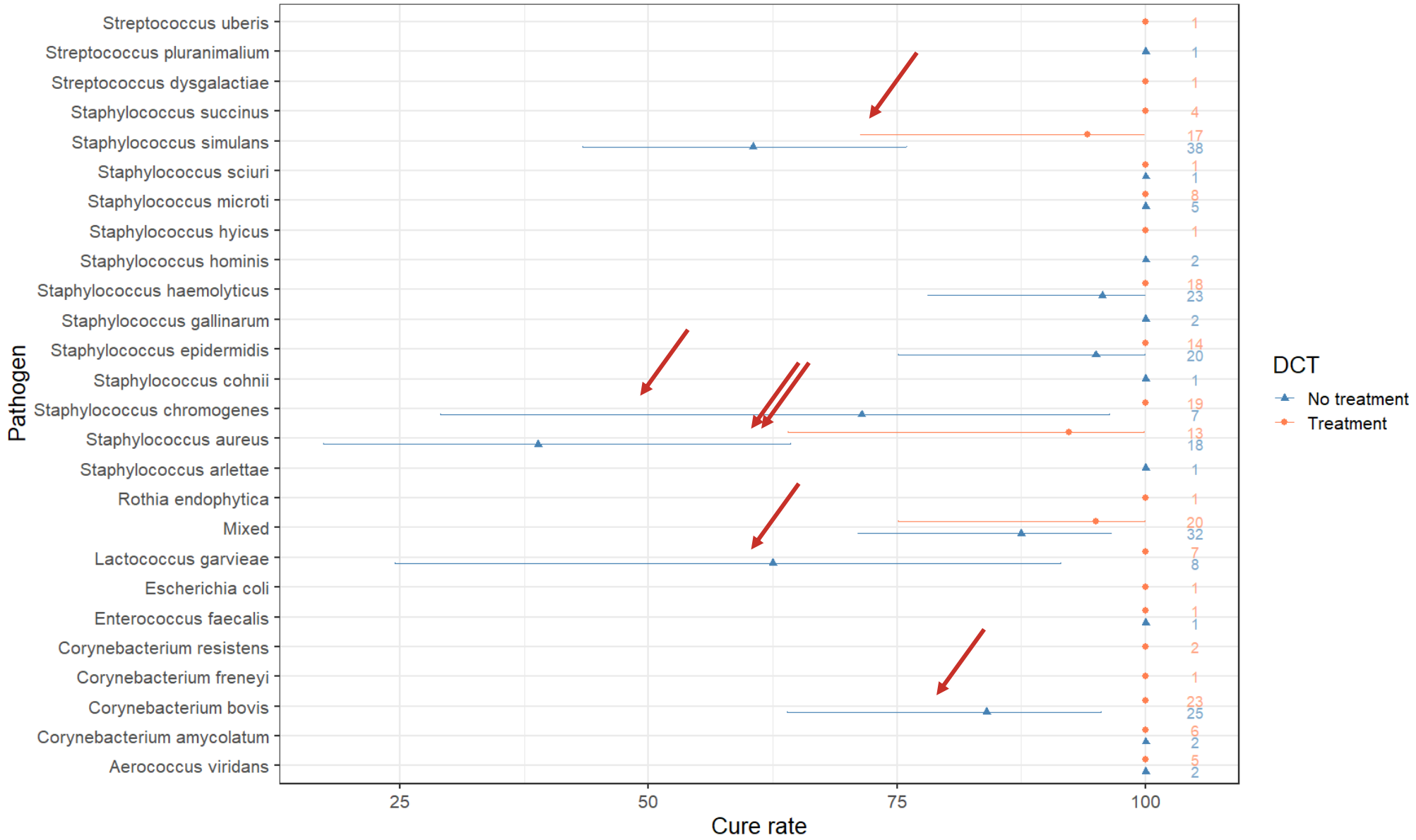
No treatment

- Bacteriological cure = 78.8%
  - 193 quarters
- NIMI = 20.9%
  - 306 quarters
- Clinical mastitis = ?

Number of cured and not cured in the different herds



Bacteriological cure rate of pathogen species in the two groups



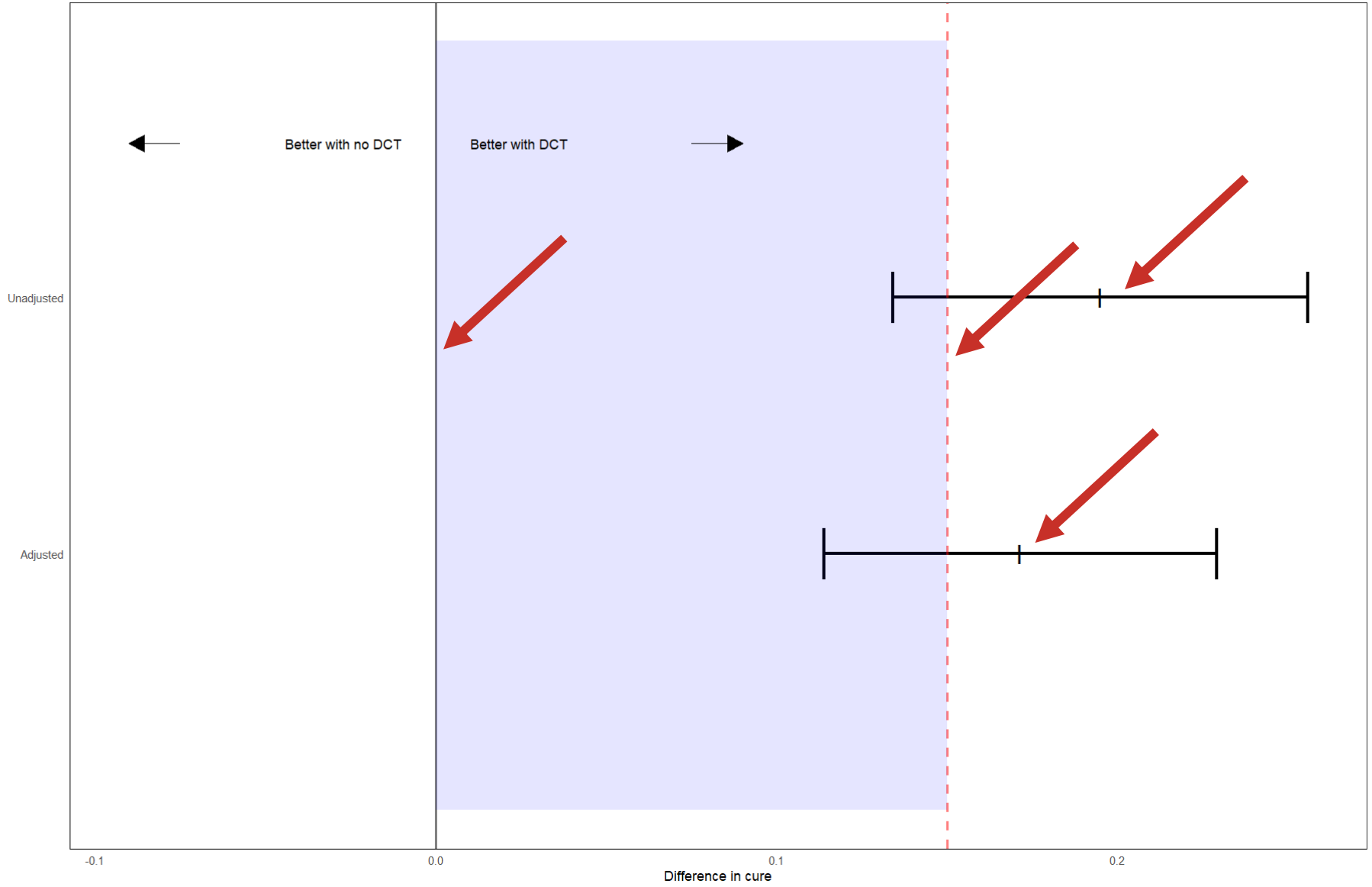
Model building – bacteriological cure

Tested variables:

- Dry cow treatment
- Country
- Herd
- Pathogen
- Parity
- Clinical mastitis in the last lactation
- Quarter
- CMT score
- Somatic cell count in latest milk control
- Somatic cell count in milk sample, tested in lab

Final model: Cure ~ DCT, Pathogen, Herd

Noninferiority – bacteriological cure



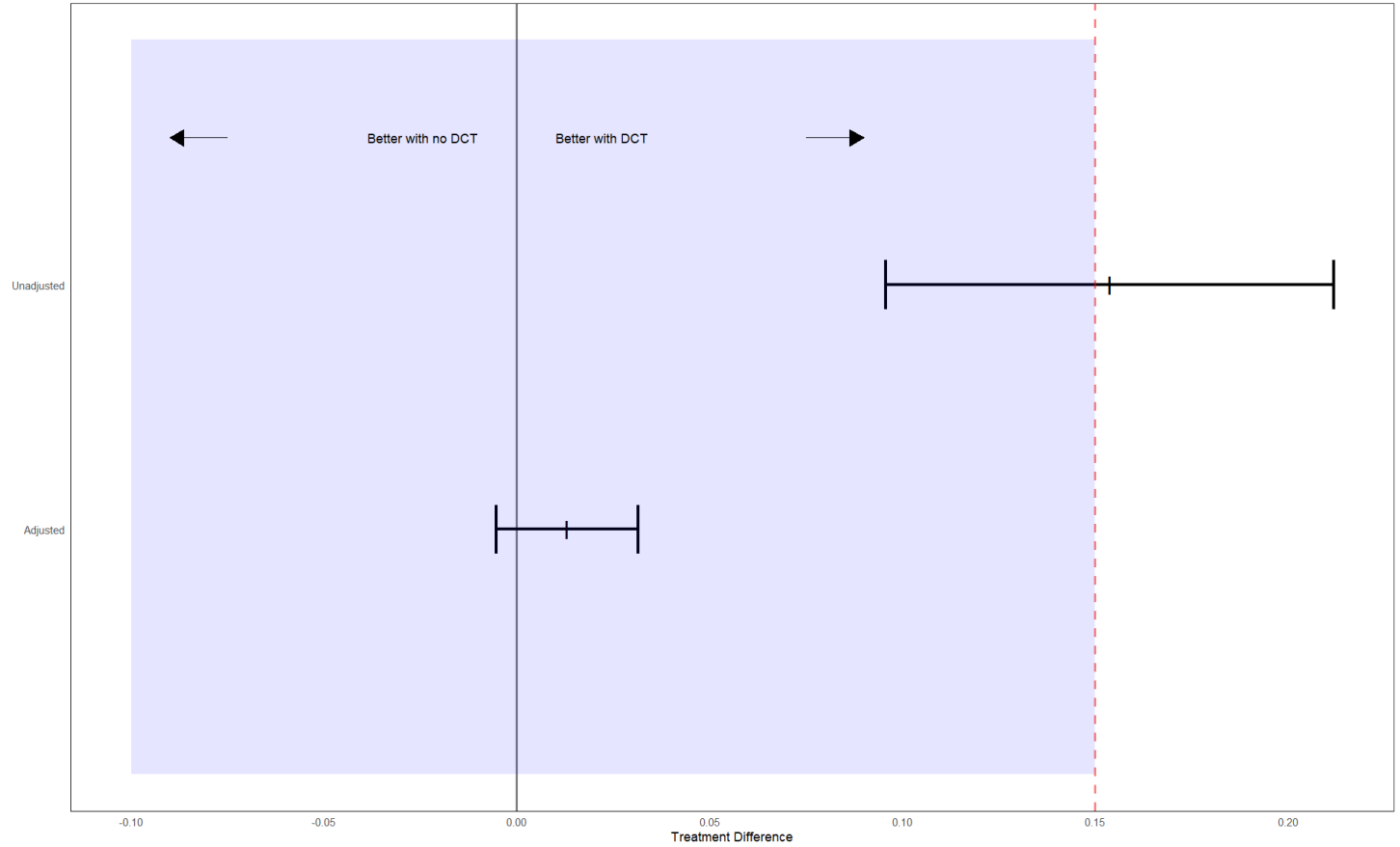
Discussion and conclusion

Bacteriological results

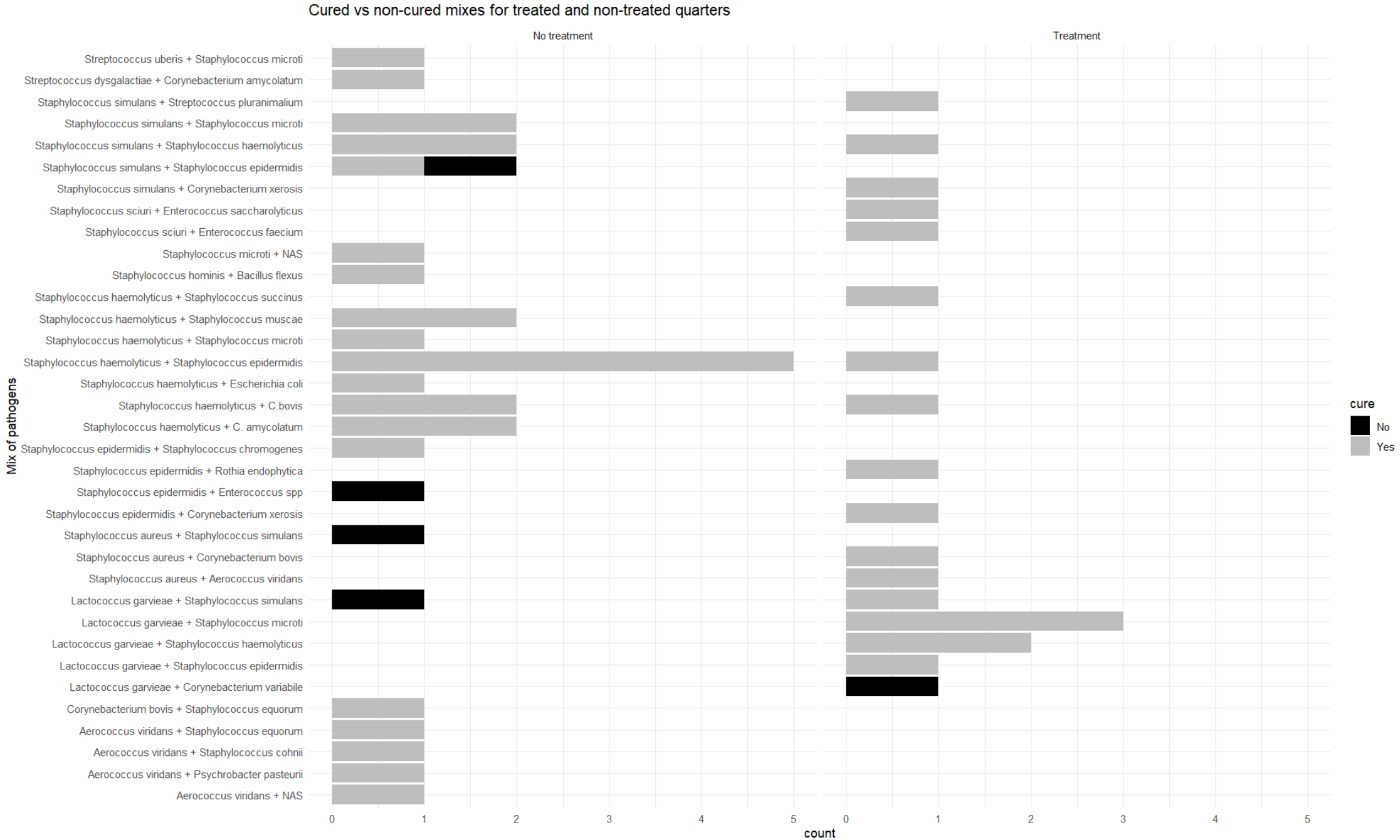
- DCT > no DCT

Udder health

- Clinical mastitis
- Transmission
- Infection duration



Which pathogens should be treated?


Cured vs non-cured mixes for treated and non-treated quarters
No treatment
Treatment
Mix of pathogens
Streptococcus uberis + Staphylococcus microti
Streptococcus dysgalactiae + Corynebacterium amycolatum
Staphylococcus simulans + Streptococcus pluranimalium
Staphylococcus simulans + Staphylococcus microti
Staphylococcus simulans + Staphylococcus haemolyticus
Staphylococcus simulans + Staphylococcus epidermidis
Staphylococcus simulans + Corynebacterium xerosis
Staphylococcus sciuri + Enterococcus saccharolyticus
Staphylococcus sciuri + Enterococcus faecium
Staphylococcus microti + NAS
Staphylococcus hominis + Bacillus flexus
Staphylococcus haemolyticus + Staphylococcus succinus
Staphylococcus haemolyticus + Staphylococcus muscae
Staphylococcus haemolyticus + Staphylococcus microti
Staphylococcus haemolyticus + Staphylococcus epidermidis
Staphylococcus haemolyticus + Escherichia coli
Staphylococcus haemolyticus + C.bovis
Staphylococcus haemolyticus + C. amycolatum
Staphylococcus epidermidis + Staphylococcus chromogenes
Staphylococcus epidermidis + Rothia endophytica
Staphylococcus epidermidis + Enterococcus spp
Staphylococcus epidermidis + Corynebacterium xerosis
Staphylococcus aureus + Staphylococcus simulans
Staphylococcus aureus + Corynebacterium bovis
Staphylococcus aureus + Aerococcus viridans
Lactococcus garvieae + Staphylococcus simulans
Lactococcus garvieae + Staphylococcus microti
Lactococcus garvieae + Staphylococcus haemolyticus
Lactococcus garvieae + Staphylococcus epidermidis
Lactococcus garvieae + Corynebacterium variabile
Corynebacterium bovis + Staphylococcus equorum
Aerococcus viridans + Staphylococcus equorum
Aerococcus viridans + Staphylococcus cohnii
Aerococcus viridans + Psychrobacter pasteurii
Aerococcus viridans + NAS
0
1
2
3
4
5
count
cure
No
Yes

Inclusion criteria

Farm

- Conventional
- Milking parlour
- No *Salmonella dublin*
- Herd size ≥ 200 cows
- Convenience sampling – praktisk årsag …

Cow

- SCC of 100,000-200,000 cells/mL
- No AB for 1 month before dry off sampling
- 4 functional quarters

The study

Randomized

Treatment

- AB + ITS

No treatment

- ITS

1-4 weeks before dry off

3-11 days post-calving

Exclusion

- Uninfected or contaminated in all 4 quarters
- Antibiotic
- Culled
- Lost pregnancy
- Clinical mastitis → cure + NIMI
- Contaminated quarters → cure + NIMI

Distribution of pathogens for the 7 herds and their cure