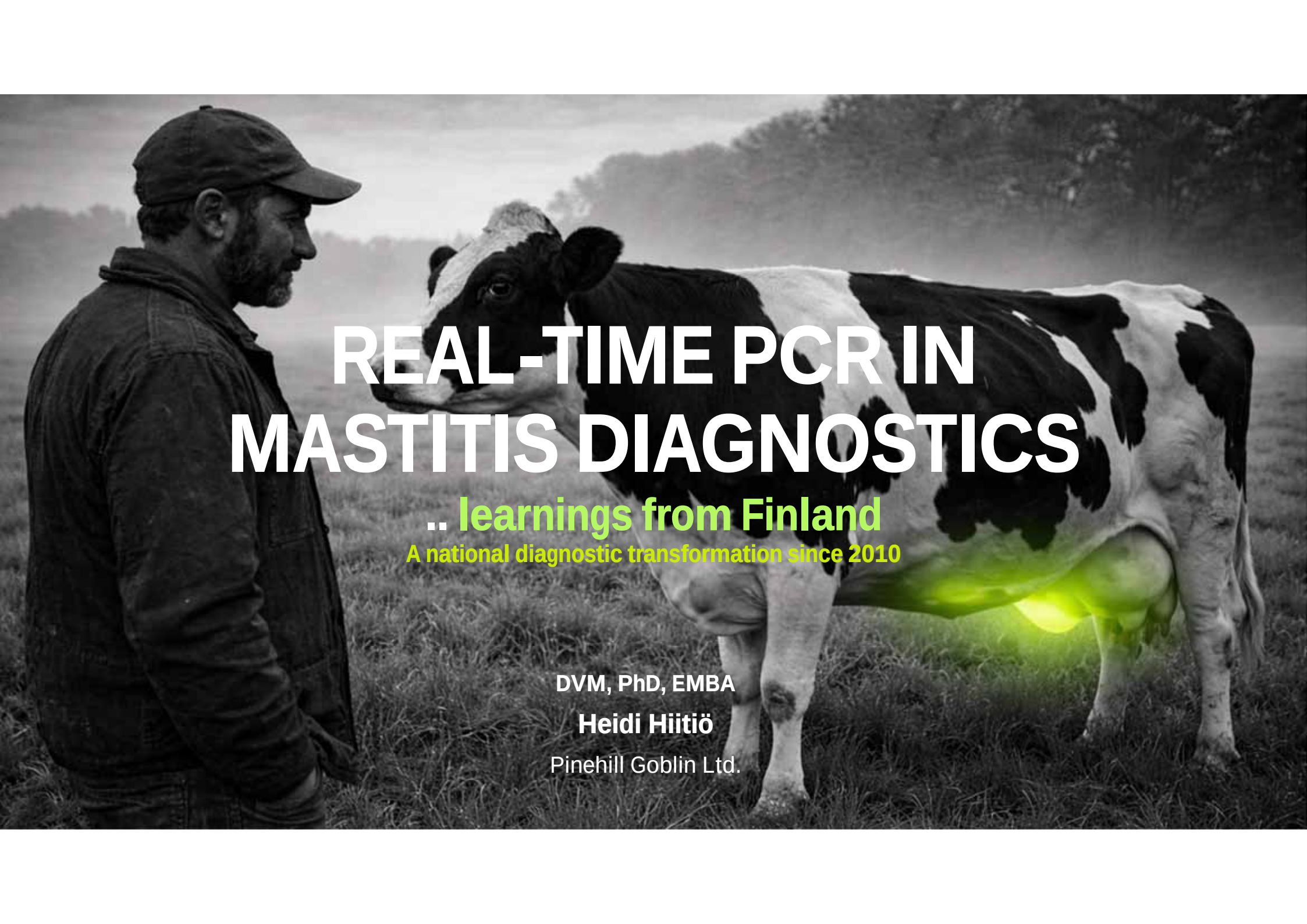




REAL-TIME PCR IN MASTITIS DIAGNOSTICS

.. learnings from Finland

A national diagnostic transformation since 2010

DVM, PhD, EMBA

Heidi Hiitiö

Pinehill Goblin Ltd.

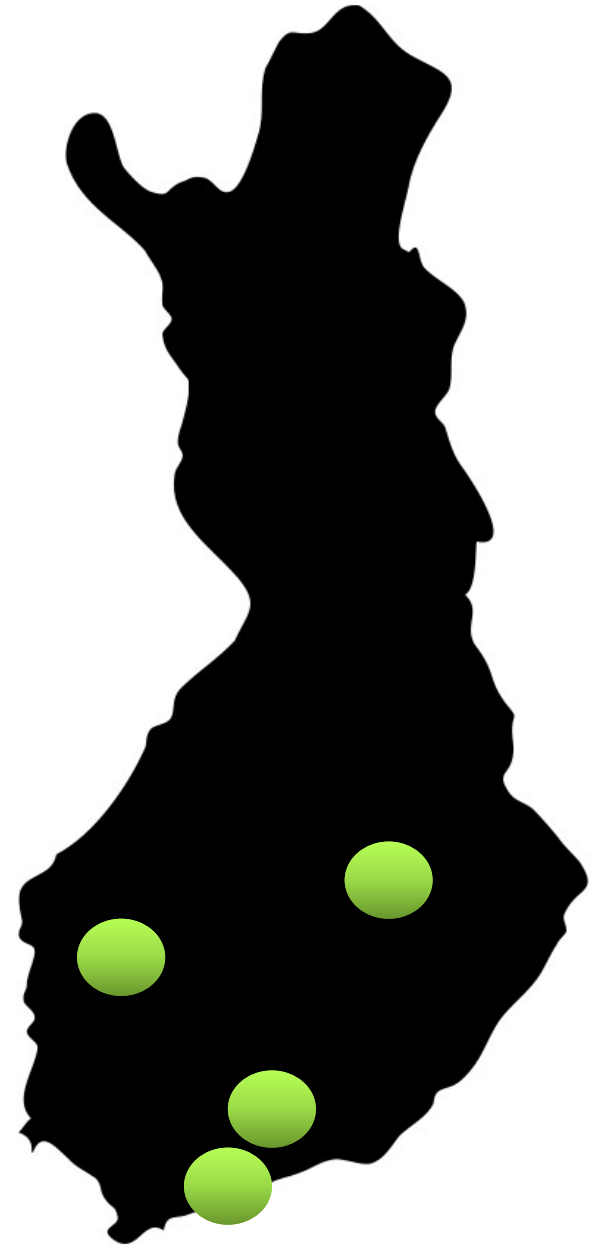
Finland has used real-time PCR for
mastitis diagnostics at national
scale since 2010,

providing a unique opportunity to
evaluate how molecular diagnostics
influence

udder health management and
antimicrobial use.

IN JUNE 2010 FINLAND SWITCHED FROM CULTURE TO PCR OVER NIGHT.

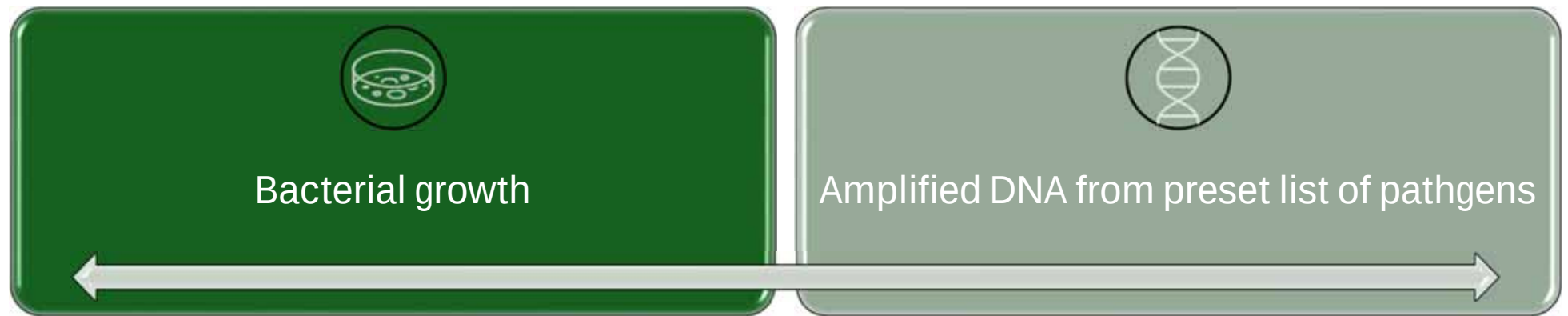
- BEFORE 2010
 - Based on culture
- JUNE 2010
 - Valio Oy (covering 83% of Finnish farms) changed from conventional BC to PCR
- One of a sudden over 75 % of all results are based on PCR
 - Currently well above 95% (estimate)
 - 160 000 samples in total per year.
- AFTER THE CHANGE
 - Faster turnaround times
 - Increased lab productivity
 - Faster diagnostics for farmers



INITIAL CONCERNS..

- Not enough EB guidelines or information for vets nor farmers
- PCR too sensitive?
 - Fear of dirty samples >> result too easy to get >> increases antibiotic usage for sure
- Everything will be ruined..

WHAT ACTUALLY CHANGED IN PRACTICE?



BOTH METHODS REQUIRE

1. interpretation
2. clinical context
3. professional judgement

Both methods report "quantity"

Low +
Intermediate ++
High +++



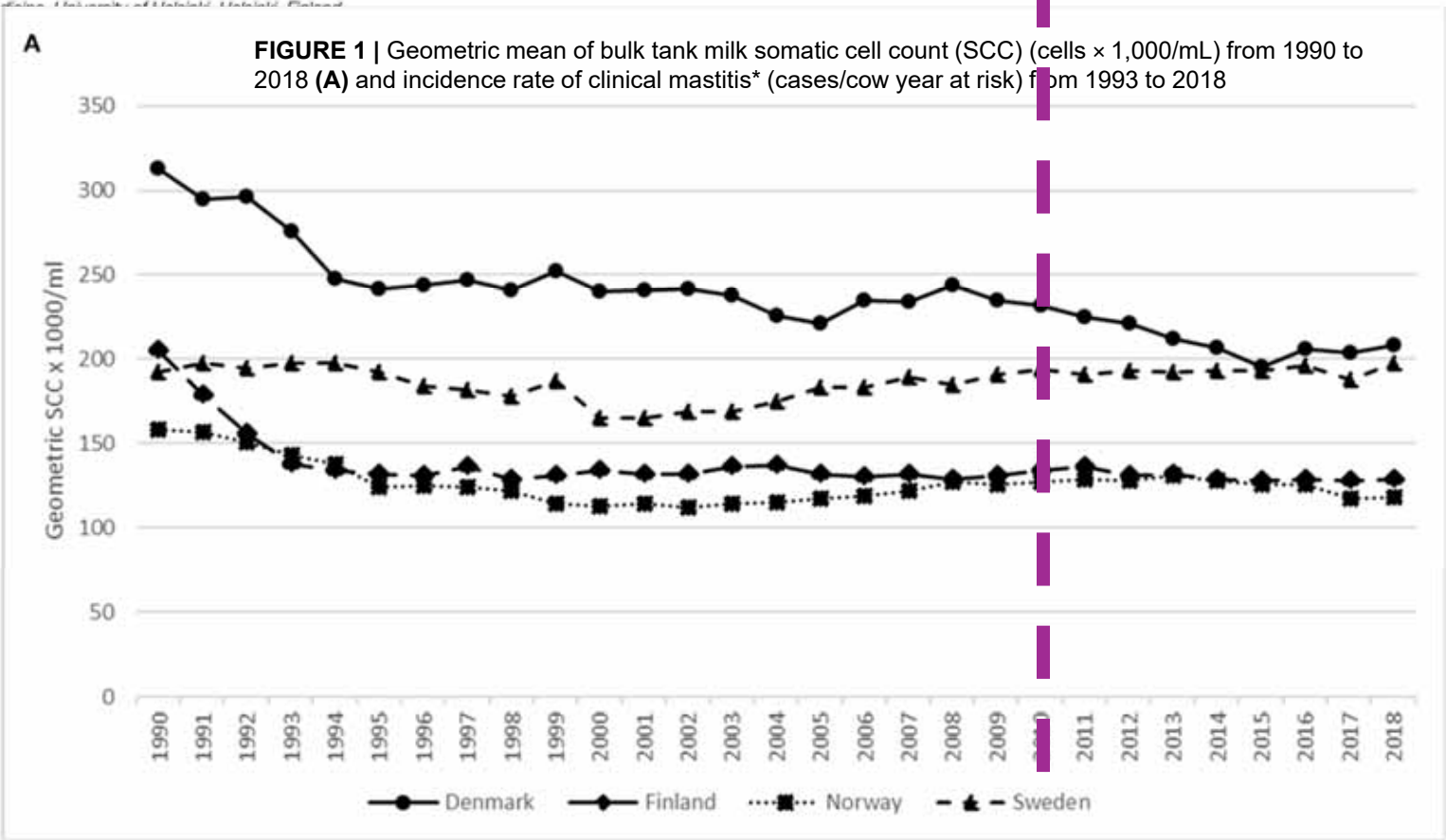
..people can do amazing things when no choice..

TOGETHER WE MADE IT WORK?

Prudent Use of Antibiotics in Dairy Cows: The Nordic Approach to Udder Health

Päivi Rajala-Schultz^{1*}, Ane Nødtvedt², Tariq Halasa³ and Karin Persson Waller⁴

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² Department of Production Animal Clinical Sciences, Faculty of Veterinary Medicine, Norwegian School of Veterinary Science, Oslo, Norway, ³ Section of Welfare and Disease Control, Faculty of Medical Sciences, University of Copenhagen, Copenhagen, Denmark, ⁴ Strategies, National Veterinary Institute (SVA), Uppsala, Sweden



SALES OF ANTIMICROBIAL DROPPED

Sales of veterinary antibiotics and antibiotic resistance
finres-vet 20-22

- Since 2014 sales of intramammary products for the lactation period per cow - **53%**.
- Lactation period
 - 85% of the intramammary tubes narrow spectrum penicillin
 - proportion of cloxacillin 14%.
- This is a reason we do not actively need other than Blaz on the field

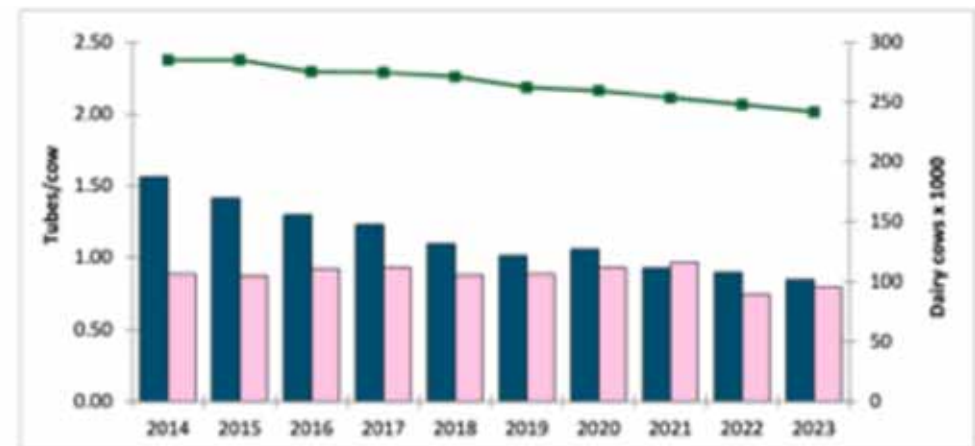


Figure 1.6. Antibiotics for intramammary use per cow during lactation period (blue column) and during dry cow period (pink column) and the number of dairy cows (green curve).



TIME IS MONEY. AND HEALTH.

- SPEED

1) LOGISTICS

Milk trucks. Post. Vets.

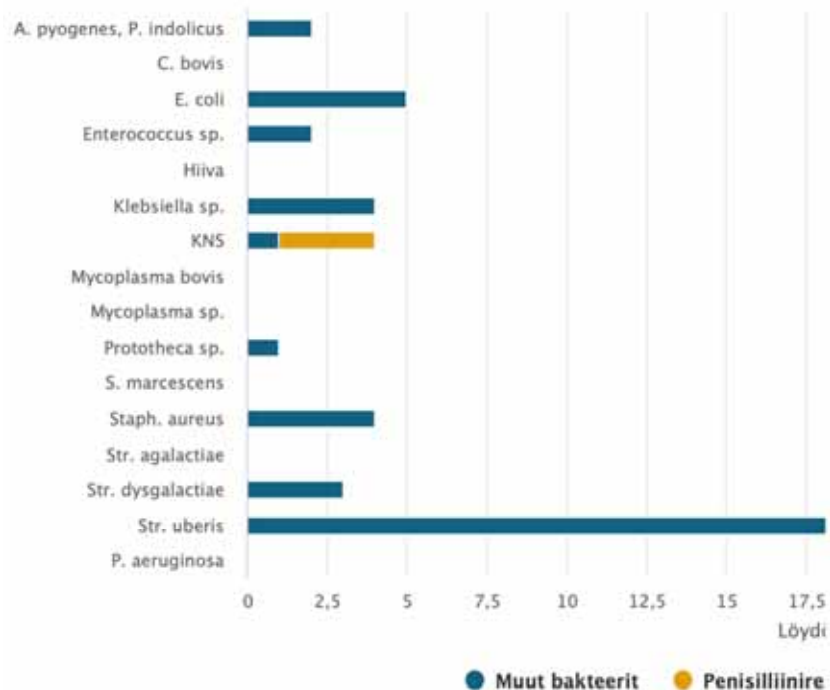
High number of samples each day

Trust of having results fast motivates to sample and give a dose of NSAIDs before empirical treatments.

BUILDING PATHOGEN PROFILES FOR EVERY FARM

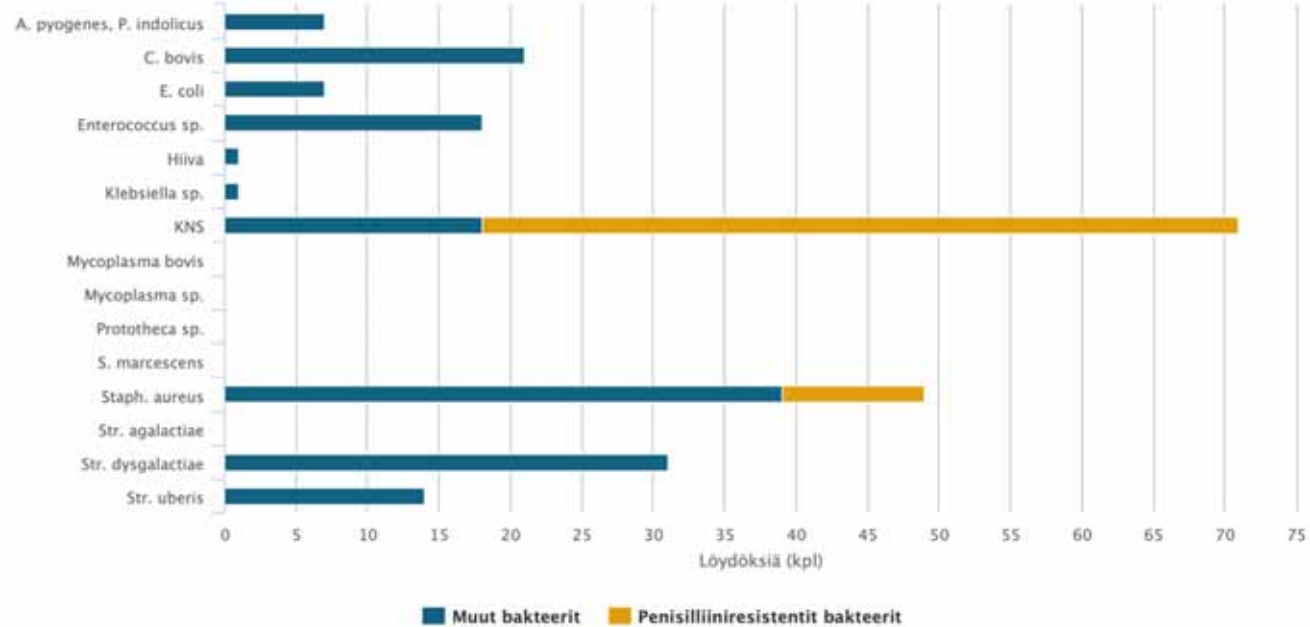
..all the results and medications recorded into national recording system called Naseva

Bakteerilöydökset 29.10.2023 – 29.10.2024



Kuvaajan aineistossa ovat mukana ne bakteerilöydökset, joilla PCR-arvo on vähintään '++'

Bakteerilöydökset 05.03.2018 – 05.03.2019



Kuvaajan aineistossa ovat mukana ne bakteerilöydökset, joilla PCR-arvo on vähintään '++' ja/tai bakteerin suhteellinen osuus on vähintään 90 %.

The image shows three glass bottles of different sizes and colors (green, clear, and clear) filled with various types of trash, including cigarette butts, plastic fragments, and other debris. The bottles are arranged in a row, and the trash is visible through the glass. The text is overlaid on the bottles.

The most crucial things using
PCR (or any) diagnostics are
MINDSET AND SAMPLING.

Garbage in – garbage out.

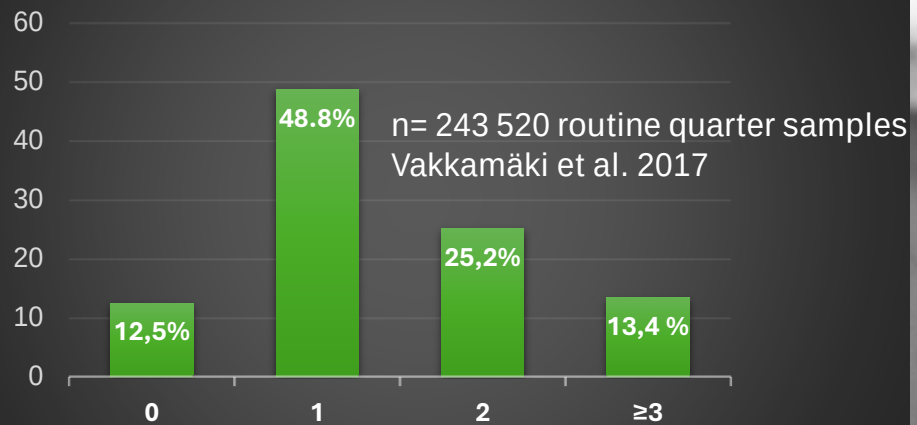
INFLUENCING MINDSETS

1. We take samples in order to **AVOID** antibiotic treatments
 1. Saving money
 2. Milk to the dairy
2. Use of antibiotics: “as little as possible, but always when needed”
 1. Before starting a treatment, you must have a result
 2. Selective dry cow therapy in place for years also based on results
 3. Veterinarians forbidden to take any profits from medicines
3. **Great, aseptic, quarter-based sampling is needed despite the diagnostic technique.**
 1. Teaching farmers
 2. Teaching vets



GREAT QUALITY
SAMPLING IS
POSSIBLE!

Data of Valio Ltd (Finland)
– all PCR samples from years 2010 -2012



Finland's nationwide RT-PCR
implementation demonstrates that
**molecular diagnostics can be
successfully integrated into
large-scale udder-health
management without increasing
antimicrobial use.**

“No gold standard for the diagnosis of mastitis or intramammary infection”
Adkins, P et al. (2018).

A black and white photograph of a man with a beard and a cap, wearing a dark jacket, looking at a black and white cow in a field. The cow is standing and facing the man. The background is a misty or foggy landscape with trees.

REQUIREMENTS FOR SUCCESS

Mindset. **Sampling.** Logistics. Communication. Education. Monitoring.