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Validation of the Nordic disease databases

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Background

- Disease recording in the Nordic countries:
  - Norway – 1975; Finland – 1982; Sweden – 1984; Denmark – 1992
  - Nationwide (almost)
  - Comprehensive database, with milk- and AI-recording, claw trimming information
  - Used for
    - Monitoring of endemic diseases
    - Advisory services
    - Genetic evaluation
    - Research

Background, cont'd

- Disease recording in the Nordic countries:
  - Similar
    - because veterinarians are (almost) always involved
  - Different
    - because technical solutions differ

Background, cont'd

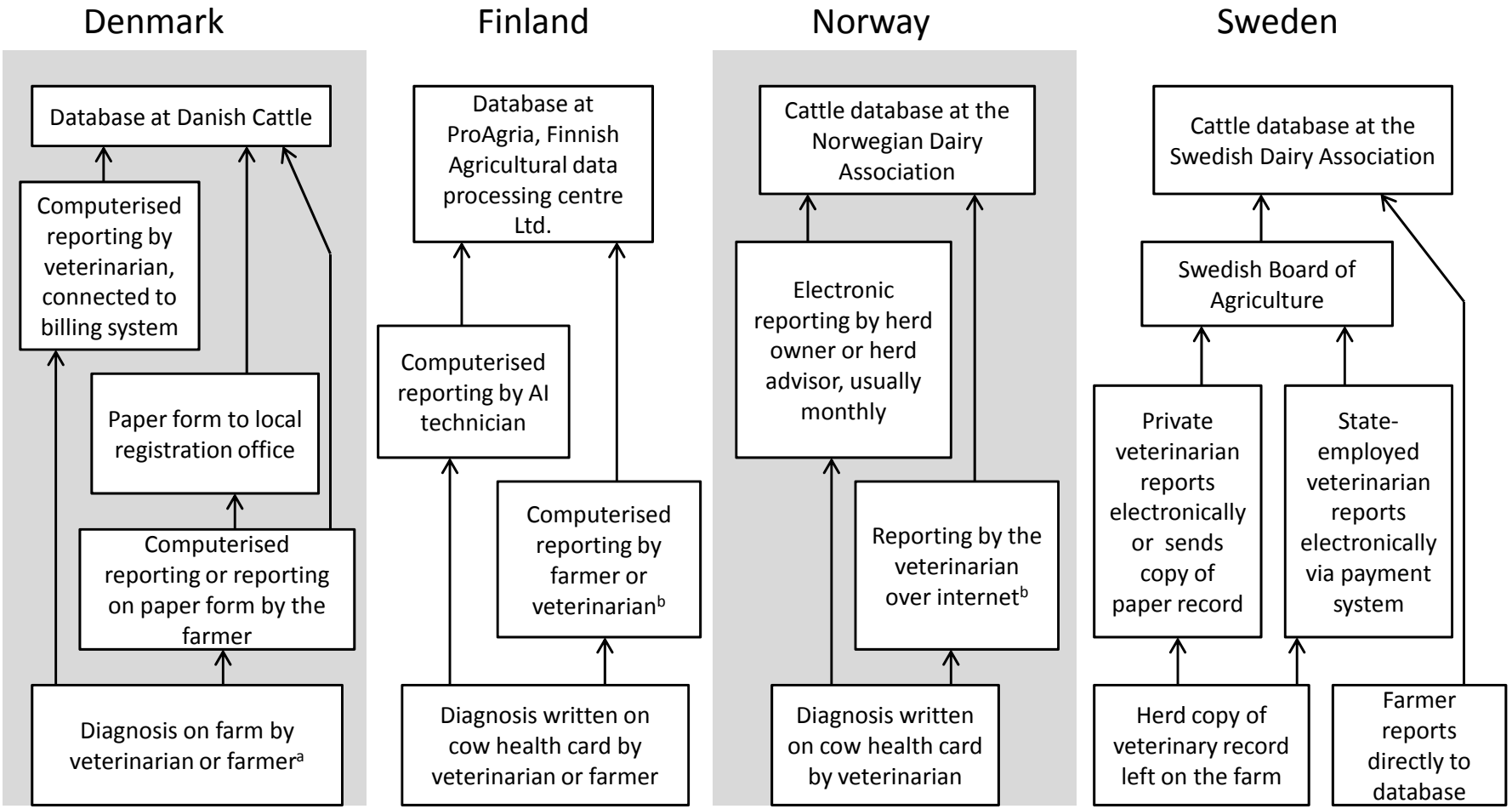

Figure 1. Data flow for disease records from the herd to the central cattle database in the four Nordic countries (Wolff, 2012)

Background, cont'd

- Disease recording in the Nordic countries:
  - Similar
    - because veterinarians are (almost) always involved
  - Different
    - because technical solutions differ
    - because observations tells us so?

Background, cont'd

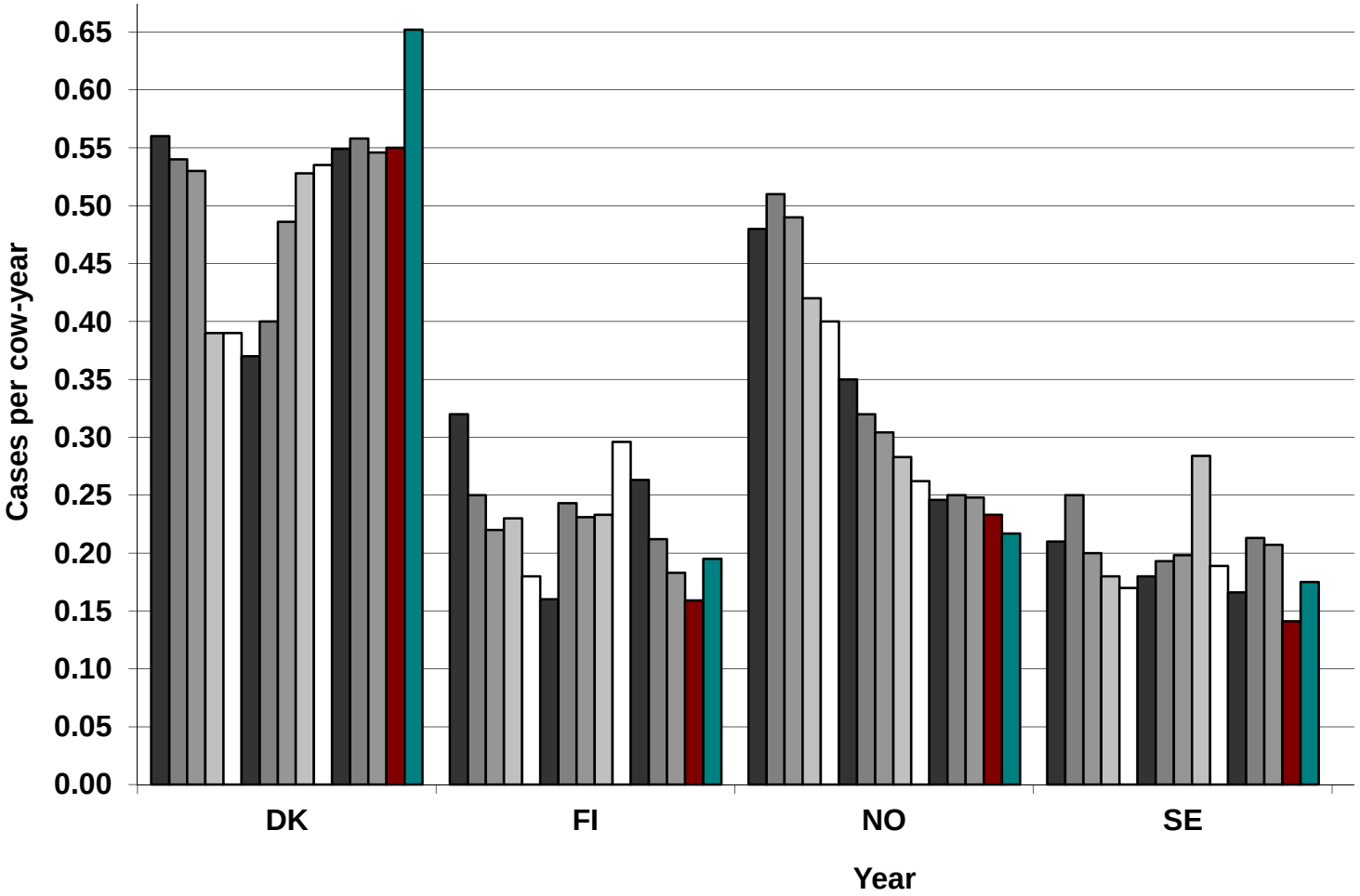

Figure 2. Incidence rate of clinical mastitis (Østerås, 2007)

Background, cont'd

- Disease recording in the Nordic countries:
  - Similar
    - because veterinarians are (almost) always involved
  - Different
    - because technical solutions differ
    - because observations tells us so?
  - Comparable?

Objective

- DAHREVA – assess true disease situation in the Nordic countries:
  - Compare actual and recorded diseases
  - Characterize data loss (auditing) in recording systems
  - Behaviour and intentions of farmers and veterinarians
  - Anna-Maija Virtala (FI), Hans Houe (DK), Olav Østerås (NO) + project partners + 4 PhD-students/thesis:
    - Ann-Kristina Lind (DK) – locomotion
    - Cecilia Wolff (SE) – mastitis
    - Mari Espetvedt (NO) – metabolic
    - Simo Rintakoski (FI) – reproductive
  - ~40 publications

Objective, cont'd

Disease registration in the central database

Record entered into the central database, errors detected and corrected

Record submitted

Record written including the diagnosis

Veterinarian visits, examines and establishes a diagnosis

Farmer decides to contact a veterinarian

Farmer notices diseased cow

Clinically diseased cow

Healthy to subclinically diseased cow

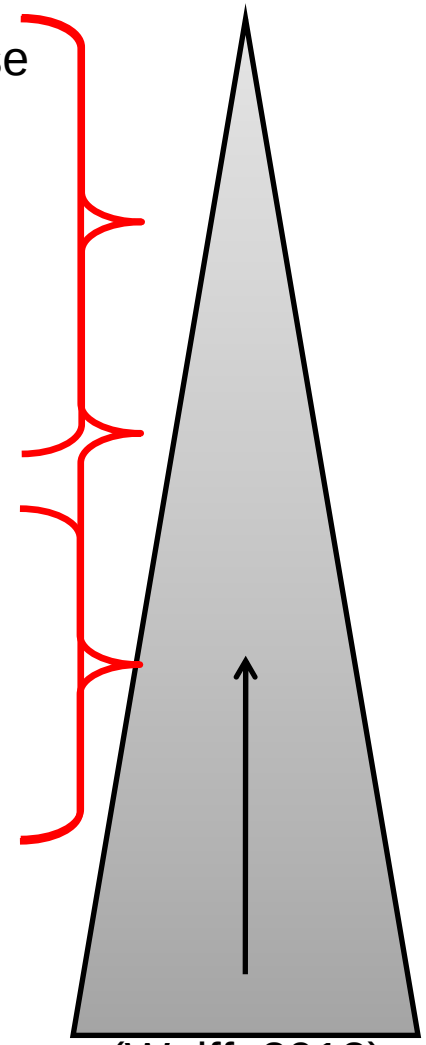

Figure 3. Data flow from diseased cow to database (Wolff, 2012)

Study 1: Actual vs recorded diseases – M&M

- “Secondary data source”
- “Randomly selected” farms; n=105 to 179 per country
- Recorded clinical disease; 2 times 2-month periods in 2008
- Purpose-made recording sheets
- Definitions provided to farmers
- Veterinary attended or not
- Matched with data from national database

Study 1: Actual vs recorded diseases – Results

- Completeness (~sensitivity), i.e. the proportion of actual disease cases that were found in database:

Mastitis	DK	FI	NO	SE
Vet. treated	0.94	0.56	0.82	0.78
Farmer observed	0.90	0.51	0.75	0.76

Vet. treated	DK	FI	NO	SE
Oestrus	0.96	0.93	0.85	0.85
Milk fever	0.88	0.71	0.80	0.82
Locomotor	0.88	0.56	0.60	0.33

Study 1: Actual vs recorded diseases – Problems

- Poor recording

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- Solution – use only good reporters. Small effects, except for DK

Study 1: Actual vs recorded diseases – Problems

- Poor recording
- Date differences
  - Increase from ±0 days to ± 4 / ±7 days increased completeness
  - Increase from ±7 days to ±30 days did not increase completeness further

Study 1: Actual vs recorded diseases – Problems

- Poor recording
- Date differences
- Translation of disease codes
  - Huge differences in the amount of diagnose codes b/w countries
  - Differences in how specific the codes are
  - Subcategories of the disease coding

Study 1: Actual vs recorded diseases – Problems

- Poor recording
- Date differences
- Translation of disease codes

Diagnose	Denmark	Finland	Norway	Sweden
Mastitis	7	3	2	14
Teat lesions	4	7 + 1	1	12
Subclinical mastitis	1	1	1	2
Dry period treatment	1	1 + 1	1	0
Udder other	1	4	4	15
Total	14	16 + 2	9	43

Study 1: Actual vs recorded diseases – Conclusions

- Underreporting for all diseases
- Significant differences between countries
- Some of the differences were due to study design

Study 2: Data loss – M&M

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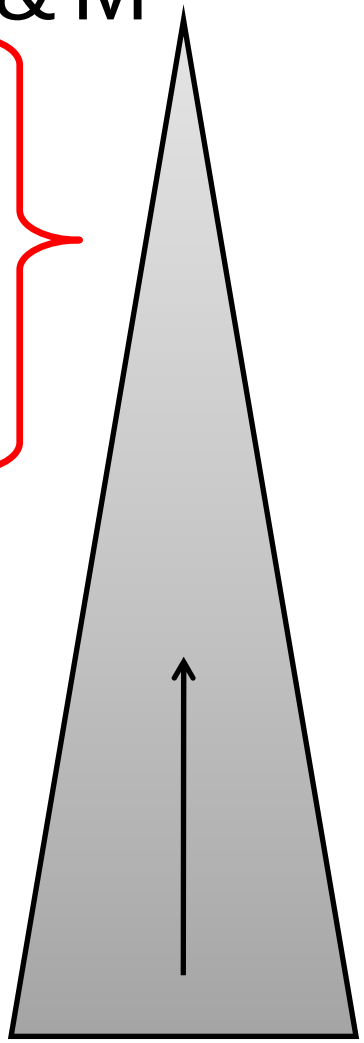

Study 2: Data loss – M&M

- “Patient chart review”, i.e. comparing on-farm records (receipts, herd ledger, cow-card, etc) with database
- Design varied by country
- Calculation of completeness and correctness

Study 2: Data loss – Results

- Completeness:

DK	FI	NO	SE
0.79-0.85	0.83	0.88	0.74-1.00

- affected by homebred/purchased cow, diagnosis, type of veterinarian/system (SE), animal age group, region
- Correctness:

DK	FI	NO	SE
-	0.92	0.98	-

- NB! Auxiliary data!

Study 2: Data loss – Problems

- Cow identities
- Date differences

Study 2: Data loss – Conclusions

- Information is lost in the process
- High degree of correctness

Study 3: Attitudes – M&M

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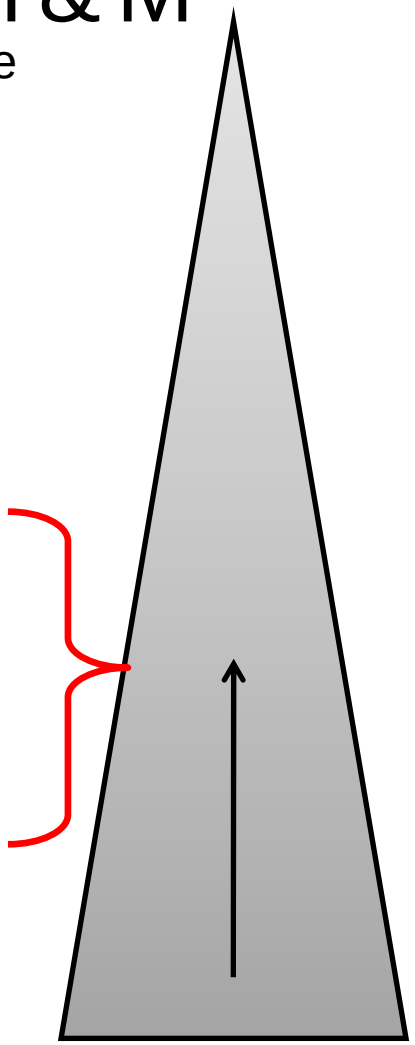
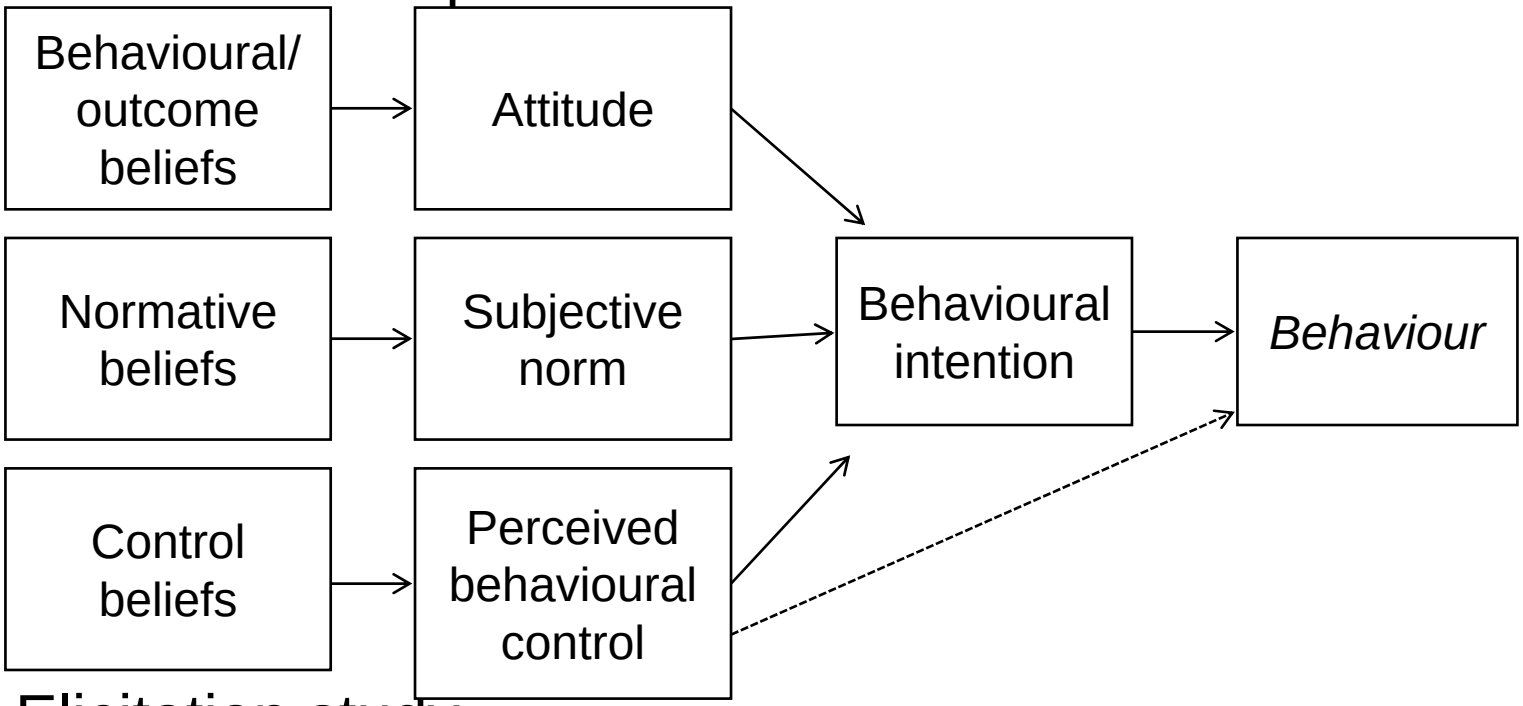


Study 3: Attitudes – M&M

- Theory of planned behaviour (TPB) – only mild clinical mastitis due to practical limitations



- Elicitation study
- Postal questionnaires to random sample

Study 3: Attitudes – Results

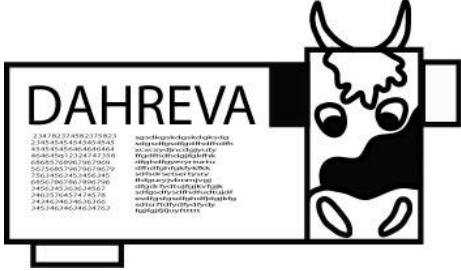
- Median behavioural intention score (range 0-1) to:
  - initiate contact with veterinarian (Farmer)
  - start medical treatment (Vet.)

	DK	FI	NO	SE
Farmer	0.50	0.63	0.50	0.38
Vet.	0.71	0.42	0.58	0.50

- Detailed information about what influences intention – differs b/w countries

Study 3: Attitudes – Conclusions

- Thresholds for action varies between Nordic countries
- Influences proportion of mastitis cases observed on farm that are captured in National databases
- Affects comparisons of official statistics of disease frequencies



Conclusions from DAHREVA

- Completeness lower than 100%, i.e. underreporting
  - Differences between diseases
  - Differences between countries
  - Adjustments possible
  - Further develop systems for recording (harmonization) and reporting! Currently on-going!
- Correctness almost 100%
- Differences in attitudes between countries is an important explanation!

Thank you for your attention ☺