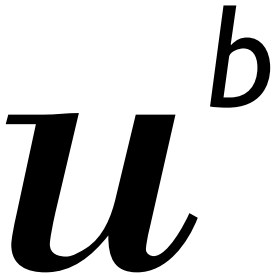

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Comparing three different methods of antimicrobial data collection

Valerie-Beau Pucken, Clinic for Ruminants, Vetsuisse-Faculty, University of Berne
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Background

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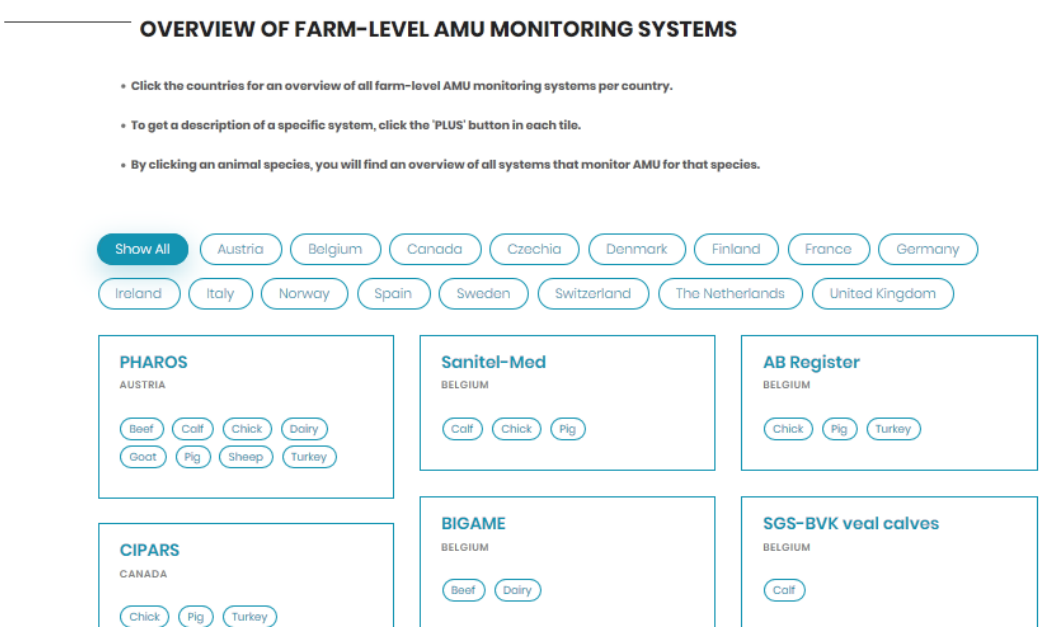
Overview of farm-level antimicrobial usage (AMU) monitoring systems

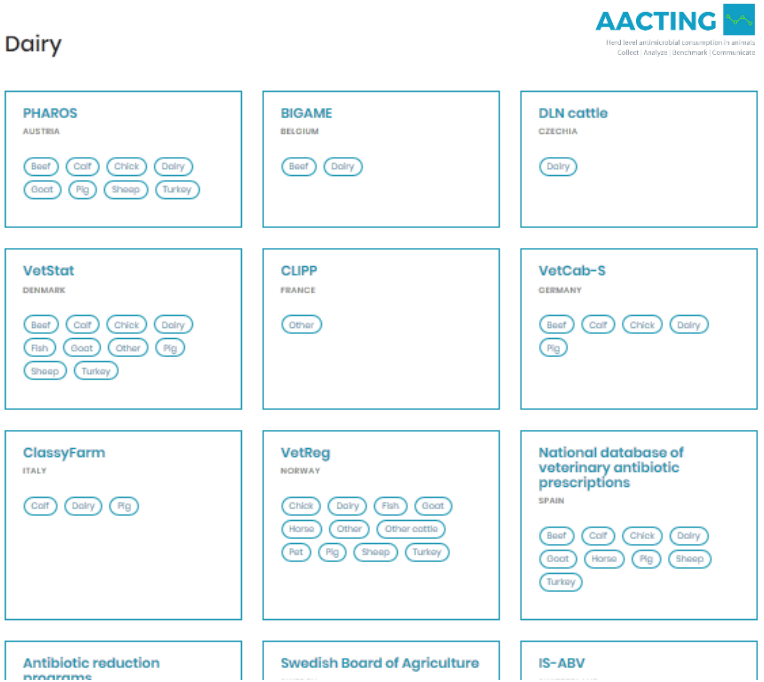
AACTING
Herd level antimicrobial consumption in animals
Collect | Analyze | Benchmark | Communicate



Background

Overview of farm-level AMU monitoring systems – Dairy

- **Reporting is?**
  - **Mandatory** or **voluntary**
- **Who?**
  - **Veterinarians**, farmers, pharmacies, feed mills
- **How?**
  - **Electronically** or paper forms



Background

Antimicrobial (AM) prescription and recording in Switzerland

- AM can only be prescribed by a veterinarian
- Since april 2016 veterinarians may no longer leave stockpiles of AMs on farms:
    1. For prophylactic treatment of farm animals
    2. Highest priority critically important antimicrobials (HPCIAs)
- On-farm recording of AMU
    - ➢ Treatment journal
        - Mandatory for livestock farmers
        - Electronically or paper written
        - Control of treatment journal every 4 Years

Background

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AMU in dairy industry in Switzerland

The most common reason for antimicrobial therapy in dairy cows are udder diseases and dry cow therapy.

(Menéndez González et al. 2010)

Switzerland is the country with the highest sale of intramammary antimicrobial preparations per population correction unit (biomass of livestock and slaughtered animals) in comparison to 29 other European countries.

(Eighth ESVAC report 2018; Sales of veterinary antimicrobial agents in 30 European countries in 2016)

Background

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AMU in dairy industry in Switzerland

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Background

Experiences in Switzerland for AMU data collection on dairy farms

6% of treatment journal entries had to be discarded, due to lack of relevant information.

(Menéndez González et al., 2010)

There was a significant difference between veterinary invoice and treatment journal and a significant difference between own documentation system and treatment journal.

(Spycher et al., 2002)

Background

Other possibilities of data collection?

Data of antimicrobial use on Canadian dairy farms were gathered by collecting empty containers of all antimicrobials in garbage bins. (Saini et al., 2012)

Aims

Quantify and compare on-farm used AMs using three different data collection methods

1. Prescription data from veterinarians' practice software

2. Discarded drug packages collected on farms

3. Recordings of treatment journals

Materials and methods

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Study design – Study population

Recruiting of 21 Swiss cattle practitioners

- Preconditions
  - Working with specialized practice software

5 farms per veterinary practices were selected to collect data on AMU

- Preconditions:
  - Veterinary practice should be the main farm veterinarian
  - Permission of farmers to use AMU data

Materials and methods

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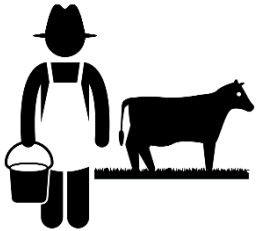

Materials and methods

Study design – Data collection of AMU concerning udder health on recruited farms

- **18 months of data collection (Aug 2016 - Jan 2018)**
- **Data were obtained from:**
  - ➢ Sales data from veterinary practice software
  - ➢ Special garbage bins that have been placed on the farms for this purpose
  - ➢ Treatment journal (electronically or paper written)

Materials and methods

Study design – Data collection

Sales data from veterinary practice software

- Several software systems in Switzerland
- Data extraction
  - Excel file
  - Portable document format (PDF)

08.02.2017	1 Stk.	Collodium 8% 80g
13.02.2017	1 Stk.	Collodium 8% 80g
	1 2.5ml	Eisprungspritze//Abgabe Receptal 2.5ml
04.03.2017	1 Stk.	Collodium 8% 80g
23.03.2017	2 Stk.	Collodium 8% 80g
13.04.2017	1 Pck.	Bockshornkleesamen Pulver 1kg
02.05.2017	2 ml	Estrumate Injektionslösung abgefüllt
06.05.2017	2 Stk.	Dolovet
17.07.2017	1 Fl.	Intertocine 50 ml
02.08.2017	2 Pck.	Super Mastitar Euterschutz
07.08.2017	1 Fl.	Intertocine 50 ml
11.08.2017	2 Pck.	Super Mastitar Euterschutz
	1 Pck.	Biclox Dry Cow
25.08.2017	1 Fl.	Intertocine 50 ml
02.09.2017	2 Fl.	Intertocine 50 ml
21.09.2017	2 Fl.	Intertocine 50 ml
19.10.2017	2 Stk.	Collodium 8% 80g
	2 Fl.	Intertocine 50 ml
08.11.2017	1 Fl.	Intertocine 50 ml
23.01.2018	2 Stk.	Collodium 8% 80g
31.01.2018	1 2.5ml	Eisprungspritze//Abgabe Receptal 2.5ml

Materials and methods

Study design – Data collection

Special garbage bins that have been placed on the farms for this purpose

- Farmers changed labelled garbage bags in the corresponding garbage bins every month
- These labelled garbage bags were collected three times over study period

Materials and methods

Study design – Data collection

Treatment journal (TX-Journal)

Materials and methods

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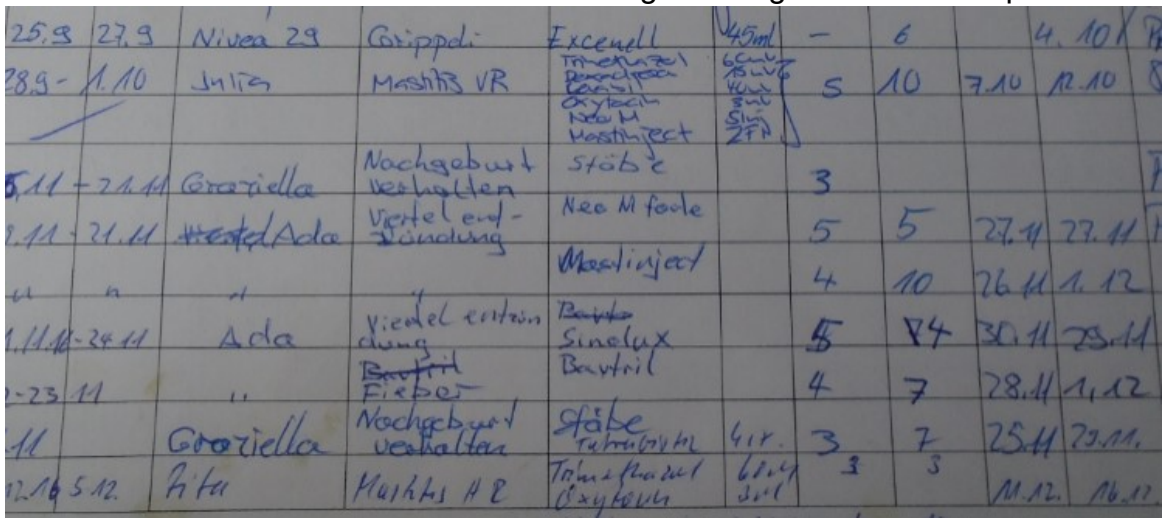
Study design – Data collection

Treatment journal (TX-Journal)

Date	Identification	Indication	Drug	Dosage	Withdrawal period



Materials and methods

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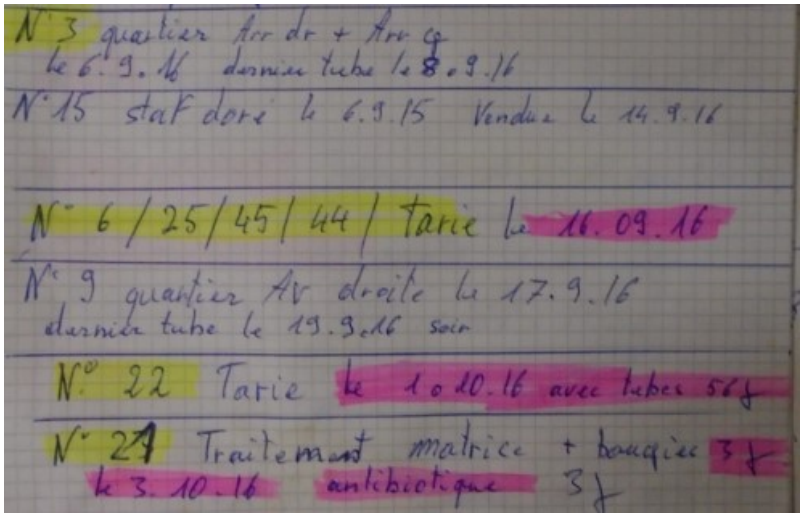
Study design – Data collection

Treatment journal (TX-Journal)



Materials and methods

Study design – Data collection

Treatment journal (TX-Journal)

- TX- Journal

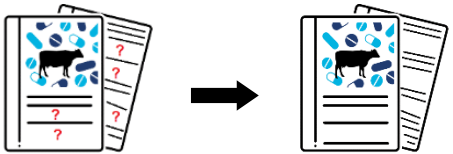
- TX- Journal added

Materials and methods

Study design – Data collection

Treatment journal (TX-Journal)

- TX- Journal



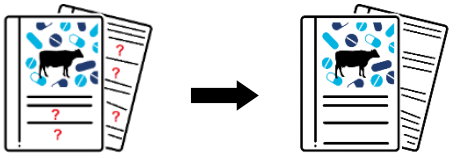
- TX- Journal added

Materials and methods

Study design – Data collection

Treatment journal (TX-Journal)

- TX- Journal



- TX- Journal added

** Swiss online compendium of registered drugs for veterinary use*

Materials and methods

Study design – Data collection

Data of AMU on farms were obtained from:

- Software 
- Garbage 
- TX-Journal 
- TX-Journal added 

Materials and methods

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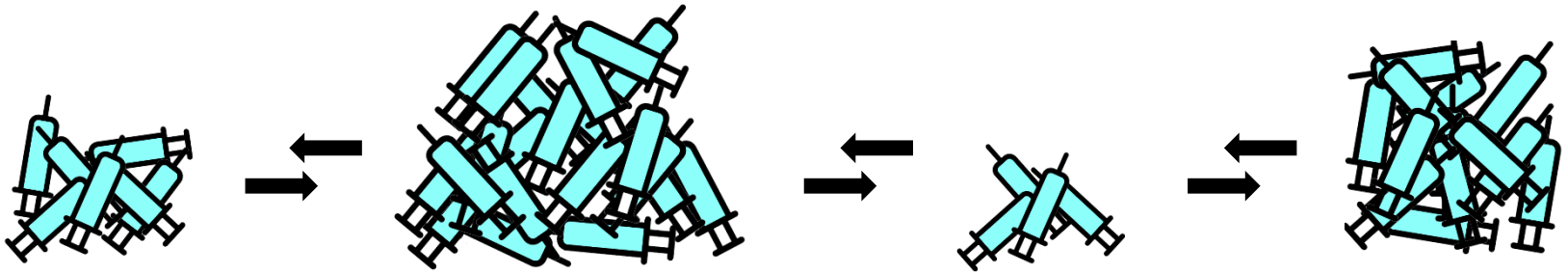
Antimicrobial data

Divided into:

- Intramammary AM preparations used during lactation (IMM)
- Intramammary AM preparations for dry-off (DRY)
- Systemic AM preparations for mastitis treatments (SYS)

Materials and methods

1. Comparison of the amount of AMs found in the different data sources



Materials and methods

Measure of AMU

Calculation **T**reatment **I**ncidence (TI) per 1000 cow-days at risk

$$TI_{IMM} = \frac{\sum Intramammary\ AM\ injectors\ during\ lactation}{DDD_{vet}[UD/teat] \times number\ of\ cows \times observation\ period\ (days)} \times 1000$$

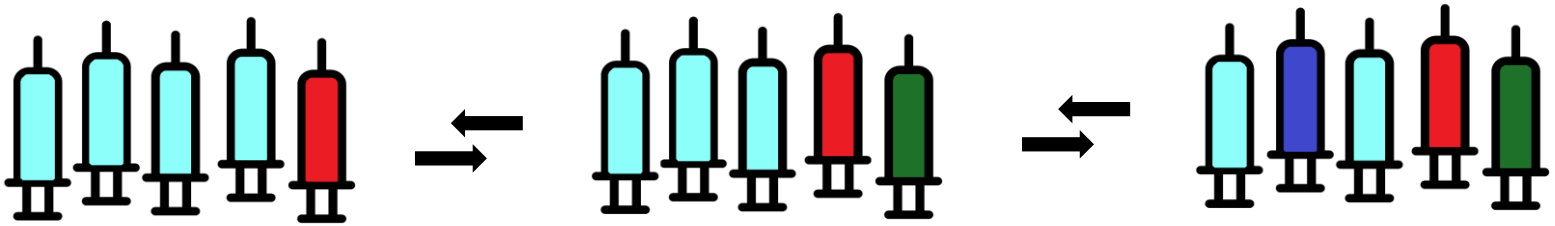
$$TI_{DRY} = \frac{\sum Intramammary\ AM\ injectors\ for\ dry-off}{DCD_{vet}[UD/udder] \times number\ of\ cows \times observation\ period\ (days)} \times 1000$$

$$TI_{SYS} = \frac{\sum systemic\ AM\ for\ mastitis\ treatment\ (mg)}{DDD_{vet} \times number\ of\ cows \times kg\ per\ cow \times observation\ period\ (days)} \times 1000$$

UD= Unit Dose

Materials and methods

2. Comparison of products found in the different data sources



Results

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Data collection

- 92 farms fulfilled the required criteria and were included in the analysis

- Veterinary practice software
  - Excel file 49 farms
  - PDF document 43 farms

- Treatment Journal:
  - Electronically 50 farms
  - Paper written 41 farms
  - Both 1 farm

Results

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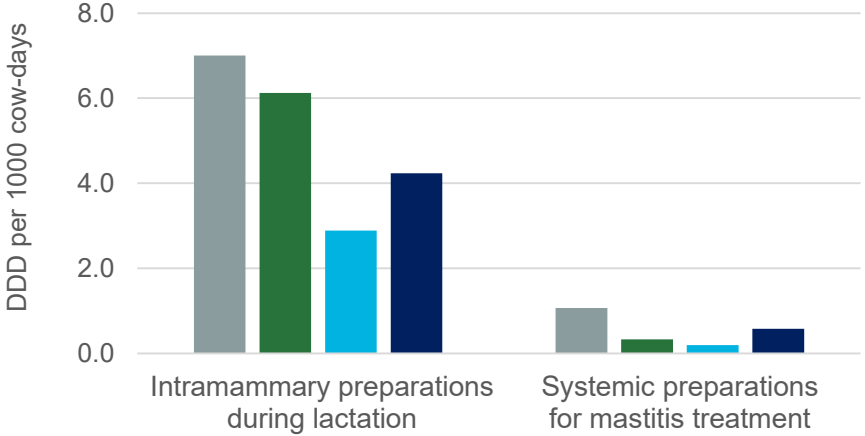
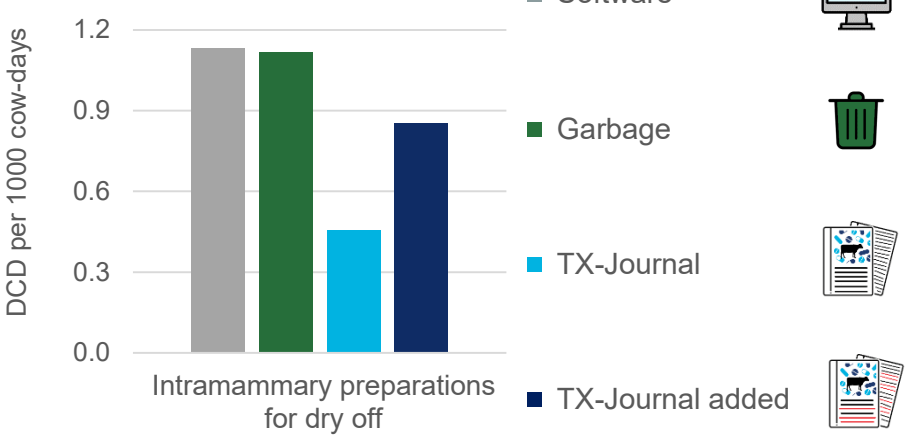
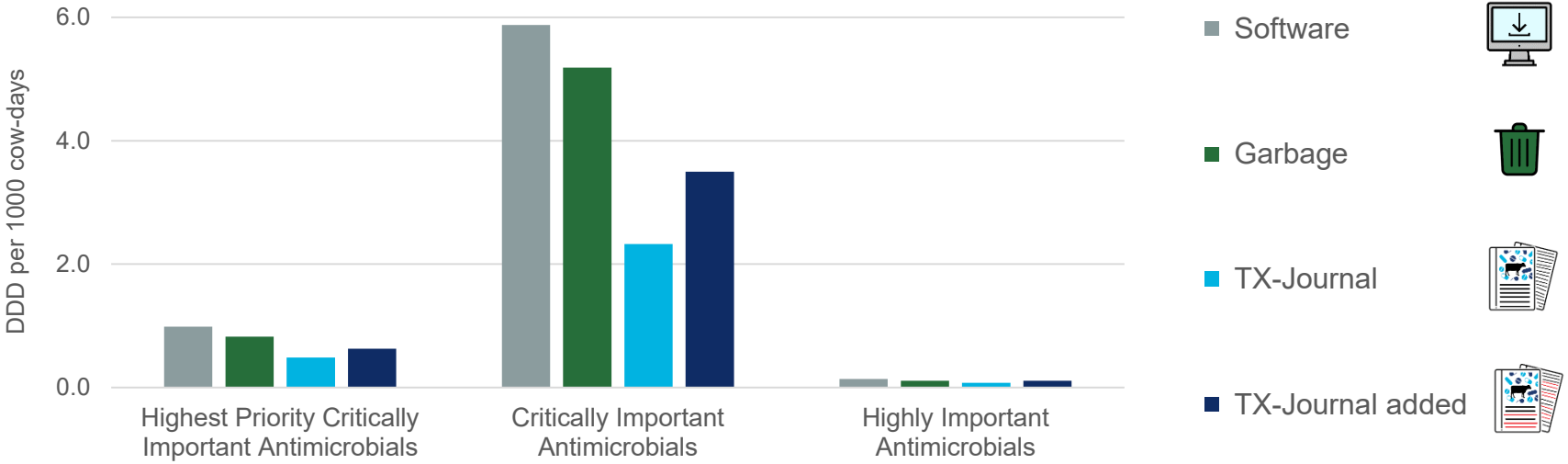
Comparison of the amount of AMs found in the different data sources





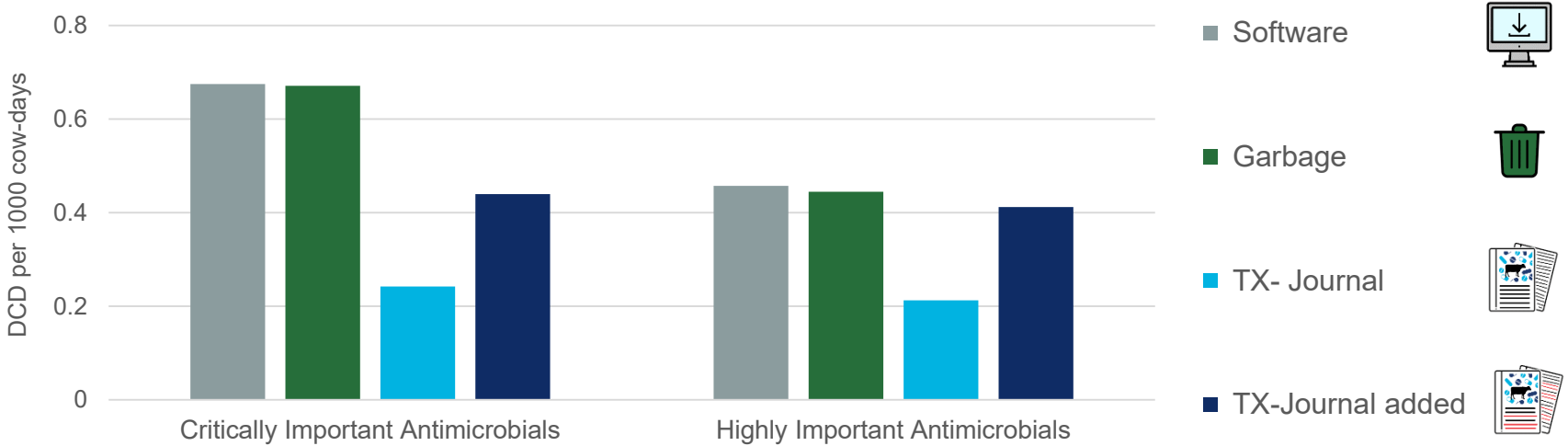
Results

Comparison of the amount of:
Intramammary preparations used during lactation (TI_{IMM})



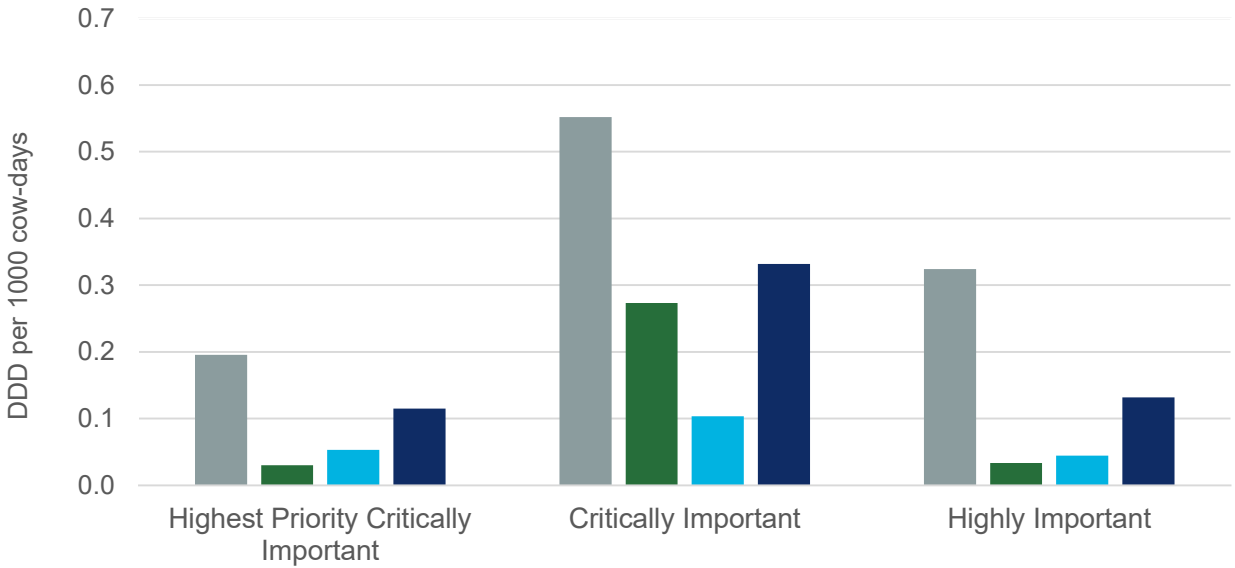
Results

Comparison of the amount of:
Intramammary preparations used for dry-off (TI_{DRY})



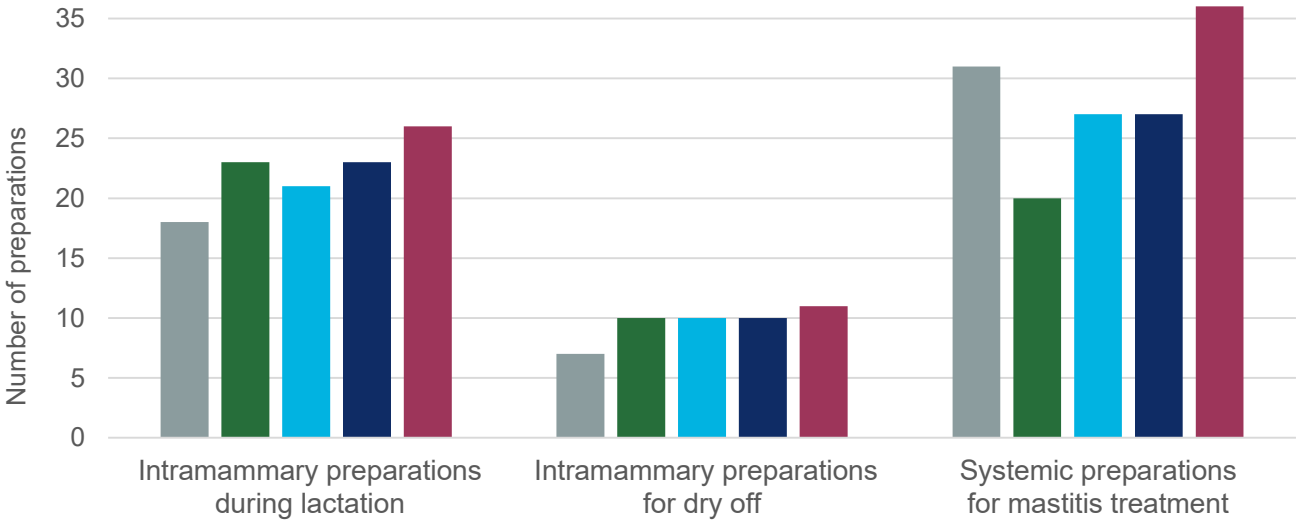
Results

Comparison of the amount of:
Systemic preparations (TI_{SYS})



Results

Comparison of products found in the different data sources



Discussion

Quantification of on-farm used AMs

Most AM could be collected with software ⟷ fewest AM could be collected with TX-Journal

- Intramammary AMs:
  - Data collection for intramammary AM preparations from garbage almost as high as data collection from veterinarians' practice software
    - The farmer will apply these in most cases himself

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Discussion

Quantification of on-farm used AMs

- Systemic AMs
  - Data collection for systemic AM preparations is most complete with veterinarians' practice software
    - Treatment of acute mastitis
  - With the TX-Journal added the second most data could be collected
    - TX-Journal is recorded by farmer and veterinarian, but often without dosage
    - Might be the danger of over- or underestimation if dosage is added with *Swiss online compendium of registered drugs for veterinary use*
  - In the garbage mostly systemic AMs with critically important active substances were found
    - Penicillins and aminoglycosides given by the farmer

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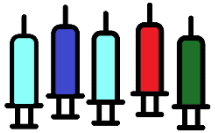


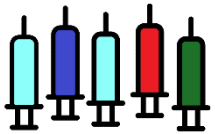
Comparison of AM products

- In none of the analyzed data sources all of the used AM preparations could be found.

- Highest number of intramammary AM preparations/products:
  - Garbage and TX-Journal
    - Other veterinarian?
    - Abroad?

- Highest number of systemic AM preparations/products:
  - Veterinarians' practice software
    - Treatment of acute mastitis

Discussion



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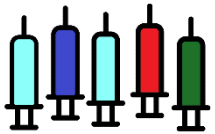

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  - Veterinarians' practice software
    - Treatment of acute mastitis

Discussion

New Recording System in Switzerland:
Information System Antimicrobials in Veterinary Medicine

IS ABV
Informationssystem Antibiotika in der Veterinärmedizin

- Since January 2019
  - mandatory to record AM prescriptions for animal groups
- From October 2019 on:
  - mandatory to record AM prescription for every single animal (livestock and pets)
- Interface between several (not all) practice software programs and IS ABV

Conclusion

- None of the used AM data collection methods was able to capture the complete information on the used antimicrobials.
- Either the quantity or the variety was underestimated.
- The number and variability of AMs recorded between the various data sources studied almost never coincided.

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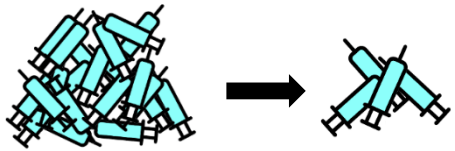

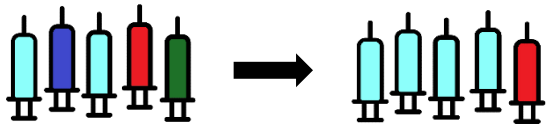

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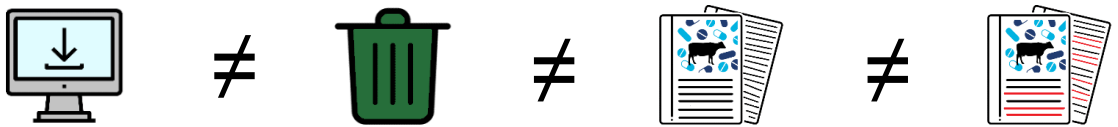

Acknowledgements

Cooperation partners

- Vetsuisse Faculty of the University of Bern
  - Clinic for Ruminants
  - Veterinary Public Health Institute
- FSVO (Federal Food Safety and Veterinary Office)
- Swiss Association of Ruminant Medicine

Thanks to all participating veterinarians, farmers, master students and colleagues!

Thanks for your attention

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Results

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Participating farms

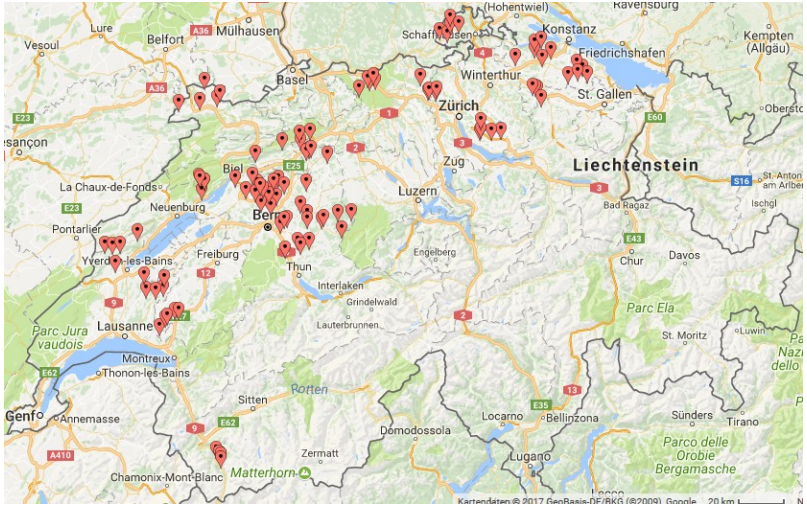
92 Farms fulfilled the required criteria and were included in the analysis

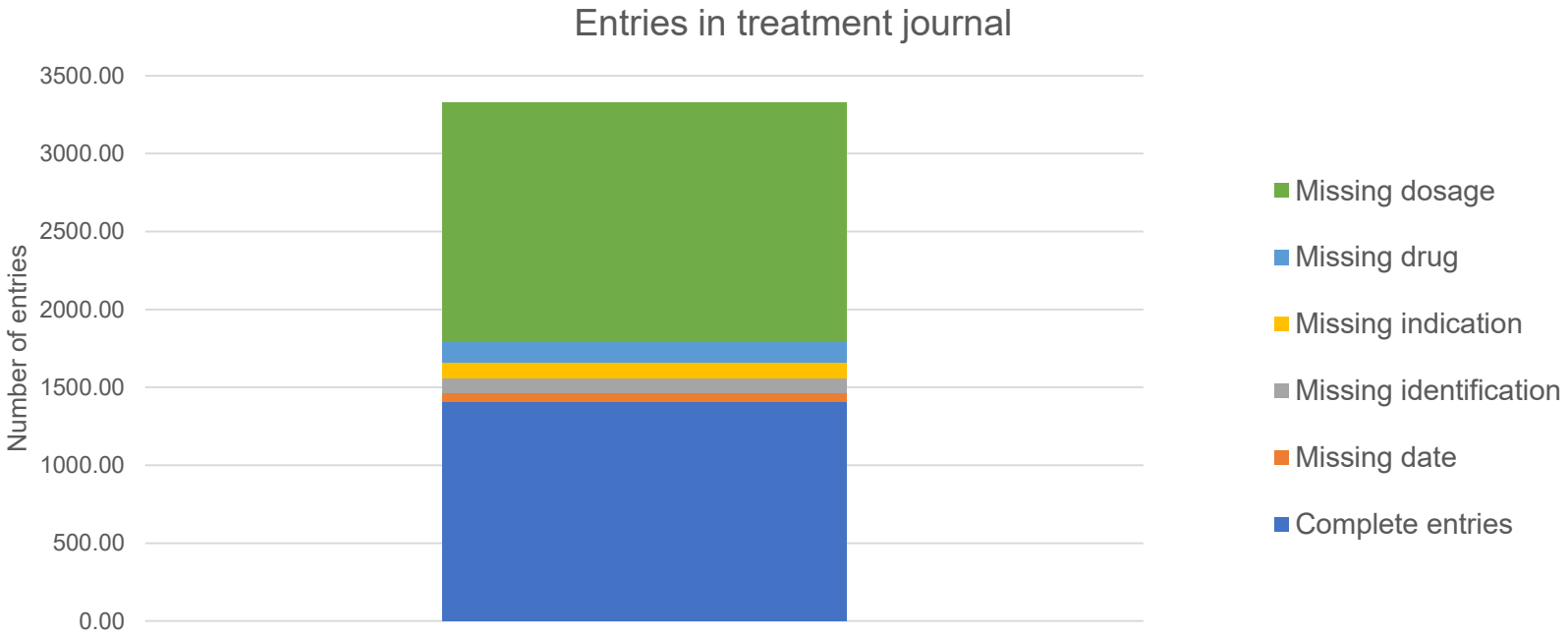
Reasons for exclusion from the study:

Missing documentation (5), change of veterinarian (2), quitting dairy farming (2), leaving study (1), incomplete data records (3)

Preparations from abroad

- IMM (found in TX-Journal or Garbage): 0.08 – 0.2 %
- DRY (found in Garbage): 0.05%
- SYS: not found




Entries in treatment journal
Number of entries
3500.00
3000.00
2500.00
2000.00
1500.00
1000.00
500.00
0.00
Missing dosage
Missing drug
Missing indication
Missing identification
Missing date
Complete entries