Associations of the Swiss national reporting system's antimicrobial use data and management practices in dairy cows on tiestall farms

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1 INTRODUCTION

- Dairy cows are administered more antimicrobials than other livestock production branches in Switzerland (National AMU report IS ABV, 2020)
- The Information System of Antimicrobials in Veterinary Medicine IS ABV was established as part of the National Strategy on Antibiotic Resistance (BLV, 2023)
- Tiestalls are a common housing system

OBJECTIVES

1. Estimate AMU using the newly established national reporting system in livestock and
2. Identify associated factors on Swiss tiestall dairy farms

2 MATERIALS AND METHODS

- Farmers needed to be milk producers and house lactating cows in tiestall barns. Management information was collected via an on site questionnaire and AMU data was sourced from the national database IS ABV after obtaining written informed consent
- TI for each treatment and administration route were calculated using the DDD methodology suggested by the EMA (EMA 2013, 2016)
- A generalized linear model with gamma distribution was constructed to identify potential risk factors of the overall TI

3 RESULTS

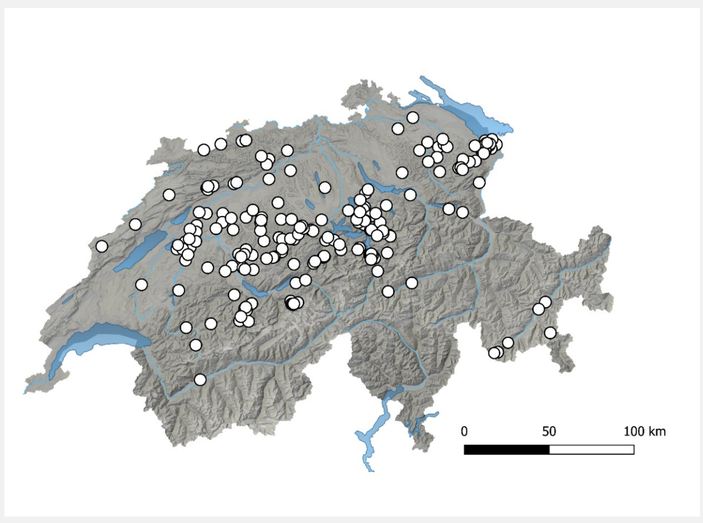

Figure 1. Map of Switzerland showing the geographical location of the 221 included study farms (white dots) across 20 different Swiss cantons. Map source: QGIS®.

- Data on 7,619 treatments were retrieved from the national database from a total of 221 enrolled farms
- 37 antimicrobial drugs were reported and the antimicrobial classes most commonly used were penicillins (41.7%, TI: 2.31 DDD/ cow-year) followed by aminoglycosides (23%, 1.37 DDD/cow-year) and tetracyclines (13.9%, 0.76 DDD/ cow-year)
- The mean overall TI was 5.46 DDD/cow-year
- Intramammary treatment during lactation accounted for highest TI (3.24 DDD/cow-year), whereas dry-cow therapy accounted for lowest TI (0.44 DCD/cow-year)
- A total of 5 herd factors were significantly associated with TI

Predictor	Estimate	*P*-value
Organic production	-2.16	0.004
Herd size	-0.81	<0.001
Predominant breeds Brown Swiss, Holstein Friesian	1.56	0.007
Hygienic powders on lying area	1.10	0.043

Table 1. Results of the final generalized linear model with gamma distribution showing associations between herd characteristics and management practices on the farm level and the TI, (measured in DDD/cow-year).

4 DISCUSSION

- Results regarding AMU were similar to a nationwide study basing data on farm treatment records[1], suggesting that the Swiss national reporting system reports AMU accurately
- The mean estimated TI is in line with results from other studies conducted in dairy herds from other countries like the Netherlands[2], USA[3] and Canada[4]. However, direct comparisons are difficult due to varying data collection methods, AMU metrics, and standard cow weights across countries
- In Swiss tiestall dairies, AMU is mainly linked to mastitis during lactation, with less frequent use of antimicrobials for dry-cow therapy. Switzerland has the highest antimicrobial use of intramammary products in Europe[5], but prophylactic use is no longer allowed since 2016.[6] Dry-off injectors may only be used as individual therapy and after thorough diagnostics (e.g. milk culture or SCC)[7]. Future research and guidelines should focus on enhancing udder health and antimicrobial stewardship during lactation
- In Switzerland, cows in organic production must not be treated with antimicrobials >3 times per year, and critically important drugs are not allowed for initial treatments[8]. Our results suggest that restricting antimicrobial use by governmental regulations may be an effective way to tackle AMU on dairy farms
- Larger tiestall farms, likely with newer infrastructure and professional management, may have better health practices, explaining their lower TI compared to smaller farms
- Genetic factors and selective breeding significantly affect mastitis susceptibility[9], especially in high-yielding breeds like Holstein Friesians, compared to moderate-yield breeds[10]
- Hygienic powders (chalk) were commonly used on lying areas (67%) and were linked to increased TI, likely due to reverse causality, as farmers with higher TI may use powders to improve bedding hygiene

5 CONCLUSION

- To our knowledge, this study is the first to use AMU data from the newly established Swiss national antimicrobial prescription reporting system IS ABV
- This study revealed some novel aspects specific to tiestall farms and their management conditions in association with AMU
- The Swiss national reporting system IS ABV is a key milestone for unified AMU data collection, enabling comparisons across farms, years, and countries for future research

References/Acknowledgements

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