Sources of variation in treatment practices for clinical mastitis in Norway.

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Introduction

- Mastitis is a prevalent disease in dairy cows worldwide.
- In Norway, it accounts for one third of disease treatments and is the most common reason for antibiotic use.
- Antibiotic resistance is a significant global concern for both human and animal health.
- Understanding current treatment practices and their sources variations is essential for identifying areas to improve antibiotic stewardship.
- The aim was to estimate the relative contribution of variance in treatments choices attributed to attending veterinarians and herd factors .

Materials and Methods

- A total of 97.877 treatments for mild and moderate/severe clinical mastitis were recorded in the Animal Health Recording System from 2021 to 2023.
- For descriptive purposes treatments were categorised :
  - according to the AMEG categories for active substances
  - treatments containing more than one active substance were placed in the category of the most restrictive antibiotic (European Medicines Agency, 2019).
  - according to route of administration (treatments with penicillin only).
- Prior to analysis, treatment outcomes were dichotomized
  - Penicillin G (yes/no)
  - systemic versus combined and intramammary treatments.
- Logistic random intercept models with farms cross-classified within veterinarians was applied to both outcomes.
- The Variance Components Partitioning (VPC) was estimated for each level in the hierarchy.
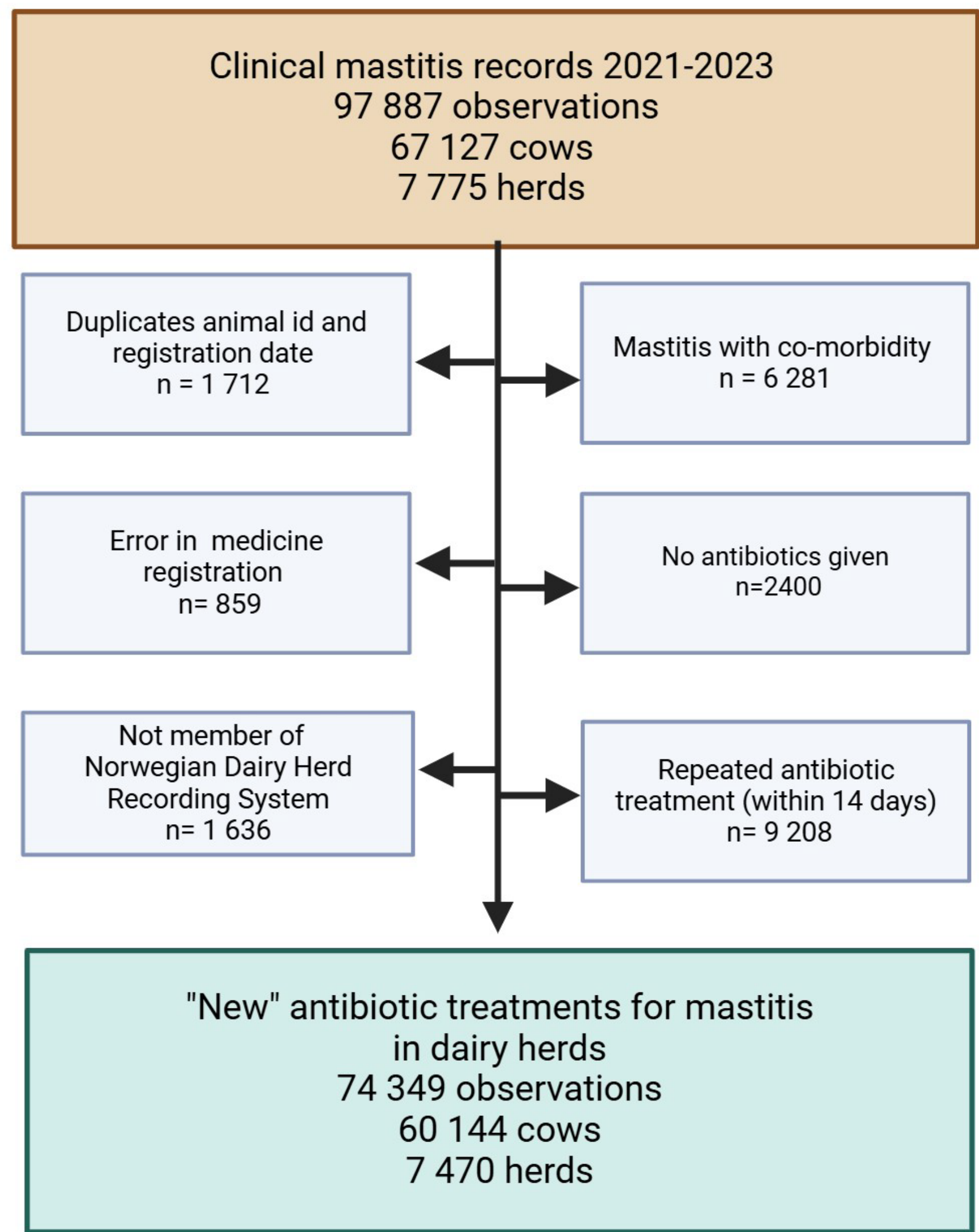

Figure 1. Flowchart of eligible treatment records, reasons for exclusions and the final study sample.

Results

- The final study sample included 74.349 treatments of clinical mastitis in 7.470 dairy herds.
- The treatments were initiated by 952 unique veterinarians.
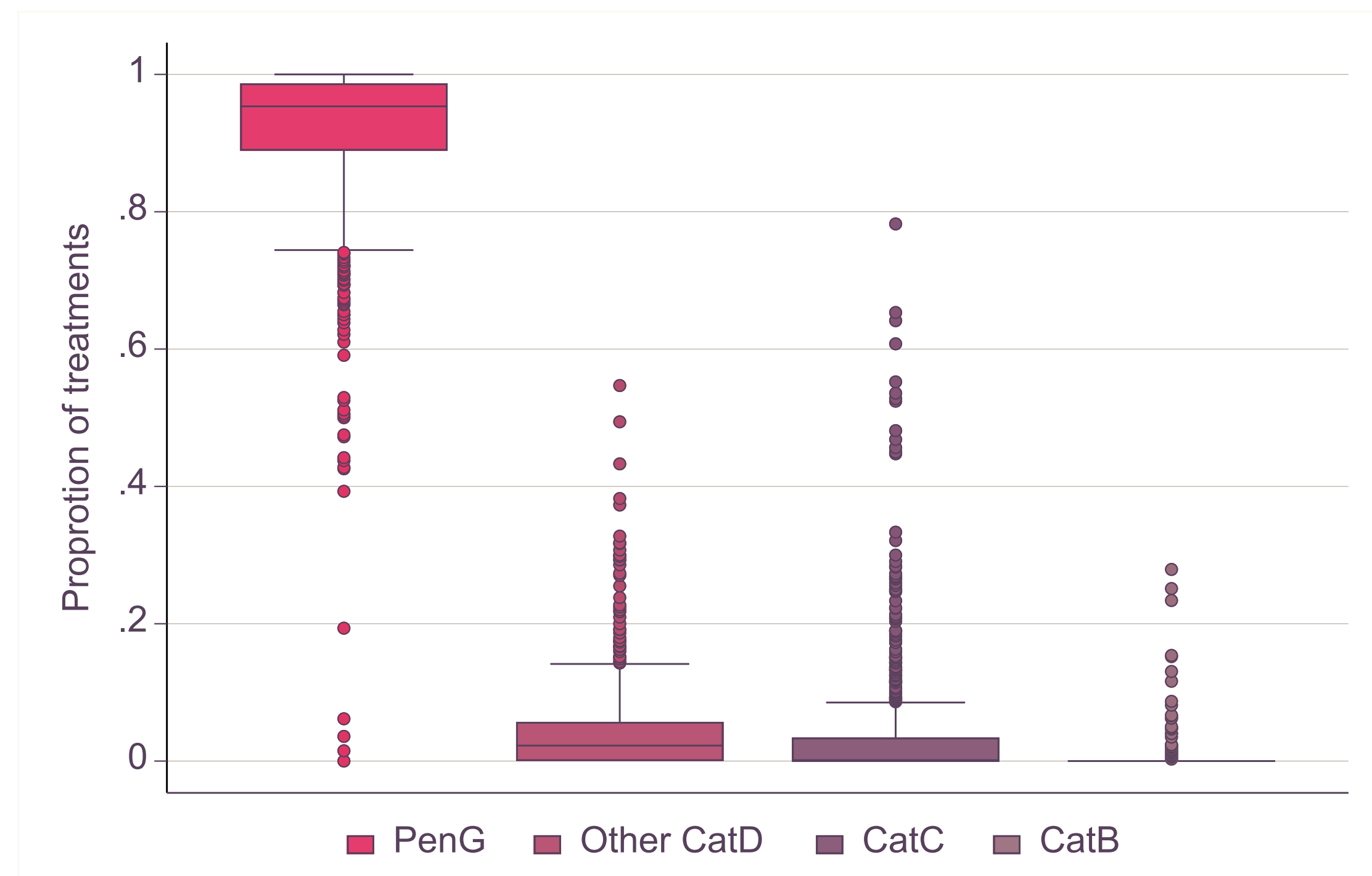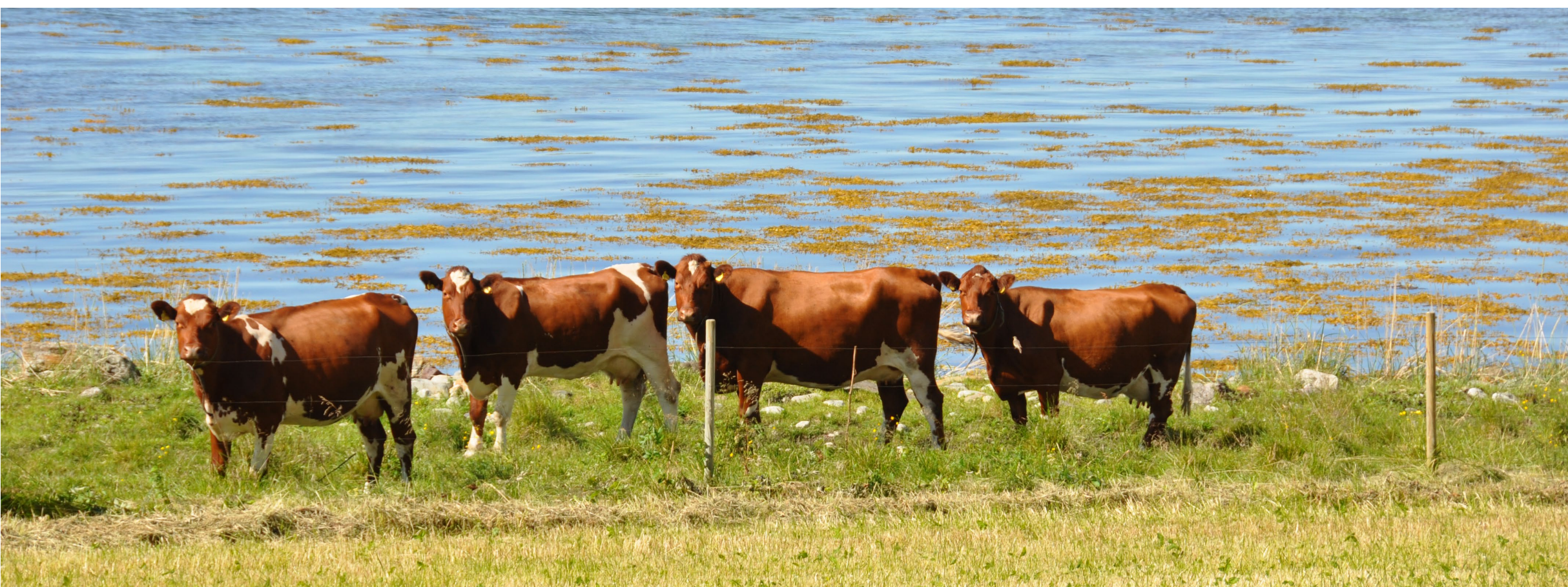- The median (IQR) treatment per veterinarian was 42 (13 to 121)

Figure 2. Proportion of treatments in each AMEG category among 653 veterinarians who treated more than 19 cases from 2021 to 2023
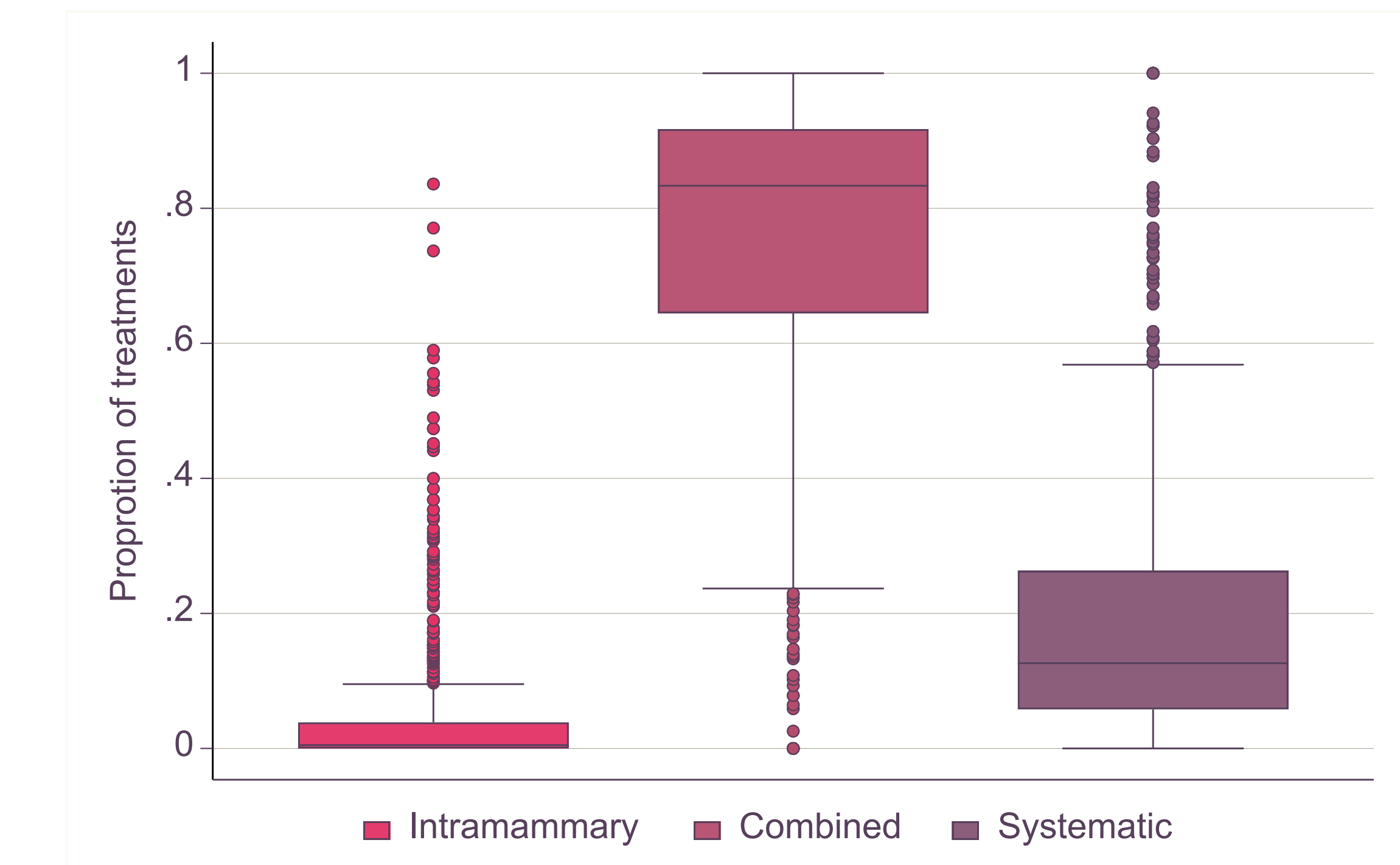

Figure 3. Proportion of Penicillin G treatments by route of administration among 653 veterinarians who treated more than 19 cases from 2021 to 2023

The VPC showed that veterinarians explained 37% and 35% of the total variation in choice of active substance and route of administration, respectively.

The VPC ratio was 3.3 for active substance and 2.2 for route of administration, indicating that farm-level factors had a relatively larger influence on the choice of administration route compared to the choice of active substance.
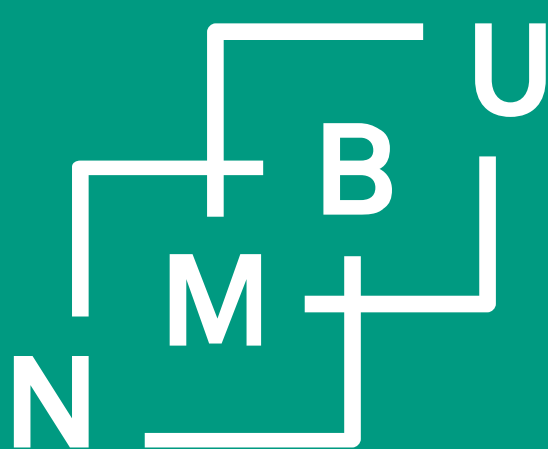
Conclusion

Difference in treatment practices between veterinarians contributed more to the overall variance in antibiotic treatment choices compared to the farm. Farm-level factors had a relatively larger influence on the choice of administration route compared to the active substance.

References

European Medicines Agency, 2019. Categorisation of antibiotics in the European Union.

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