Antimicrobial use in Irish dairy herds: A comparison of three recording methods

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Summary
- This study provides the first overview of antimicrobial use in a sample of Irish dairy farms.
- Results show that antimicrobial use is low on average with a small number of high users making up a large proportion of use.
- There were variations in the antimicrobial use recorded by the three recording methods, with veterinary data giving the highest figures for use.

Introduction

Antimicrobials (AMs) are used on Irish dairy farms to maintain animal health and welfare, however there is no published information on the amounts and types of AMs used on these farms. In Ireland, the sales of veterinary AMs are published annually by the Health Products Regulatory Authority (HPRA) and from 2023 the Department of Agriculture, Food and the Marine will collect all veterinary prescriptions in a central database. Farm-level antimicrobial use (AMU) data has been collected in the pig and poultry sectors but to date has not been collected in the dairy sector. This study aimed to provide the first overview of AMU in a sample of Irish dairy farms comparing three different recording methods.

Materials and methods

Thirty-three dairy (Table 1) farms were randomly selected from the dairy client lists of six private veterinary practices across Ireland and enrolled in the study for a 12-month period between 2021 and 2022. Three recording methods were used to assess AMU on the farms;

- Veterinary prescription records (VET)
- Herd recording software records (FARM)
- Inventory of empty medicine packages (BIN)

Table 1. *Farm characteristics of the 33 participating dairy herds*

Farm characteristics	
Average herd size	100 milking cows Range (24–400 milking cows)
Average farmer age	42 years old
Calving systems	22 farms – Spring 11 farms – Split
Cow breeds	21 farms – Holstein Friesian (HF) 5 farms – Jersey crossbred 7 farms – Majority HF & some crossbred
Average somatic cell count (SCC)	152,000 cells/ml

The VET data was obtained directly from the farms veterinary practice. For the FARM data, farmers were asked to record their AMU using a herd recording software or 'app' on their phone. Ten farmers did not use the software to record their use, they kept paper records, however these were not included in the analysis. For the BIN data, farmers were asked to throw all empty medicine packages including bottles, tubes, sachets and cans of antibiotics, anti-inflammatories and vaccines into a 60L bin provided to them and this bin was collected twice during the study.

Population Correction Unit (mg/PCU)

The results of this study are reported in the mass-based metric milligrams of active ingredient per Population Correction Unit (mg/PCU). The PCU is an estimate of weight at treatment defined for each species. In this study it is calculated by multiplying the herd size (no. of milking cows) by a standardised weight (425kg).

AMU by recording methods

The results are shown in Table 2, which illustrates that the VET data gave the highest recorded use. This is to be expected as the VET data will show all medicines prescribed to the farm including medicines in stock which are not yet used. A stock of medicines on the farm was taken at the initial and final visits. Most farms had a low amount of medicine stock kept on the farm, suggesting that any medicines bought were used straight away. The farmers treatment records (FARM) showed the lowest recorded use. Six different herd recording systems were used to record AMU and ten farmers did not use any herd recording software to record their AMU. The inventory of empty medicines is considered one of the most reliable sources of AMU data however some farmers did not dispose of all medicine containers used into the bin. AMU recording varied greatly between farms as did the usage of the bins to dispose of AMs used.

Table 2. *Antimicrobial use by recording method*

	VET	BIN	FARM
Min	2.86 mg/PCU	2.05 mg/PCU	1.04 mg/PCU
Max	84.55 mg/PCU	86.27 mg/PCU	23.44 mg/PCU
Mean	18.70 mg/PCU	13.89 mg/PCU	9.13 mg/PCU

Levels of AMU recorded

The levels of AMU recorded on Irish dairy farms are comparable to similar studies carried out on dairy farms in the United Kingdom (UK). Usage was low on average, with a small number of farms accounting for a large proportion of overall use. When looking at the VET data, four farms made up one-third of the total use.

Routes of administration

When looking at the VET data the most common route of administration was the systemic route (injectables) making up 78% of use, followed by dry cow intramammary (IMM) tubes accounting for 12% of use, with other (oral and intrauterine routes) accounting for 7% and IMM tubes for lactating cows making up 3 % of use. For the BIN data, injectables accounted for 82% of use, dry cow tubes made up 12%, lactating cow tubes were 4% and other made up just 1% of use. For the FARM data injectables made up 76% of use, dry cow tubes were 17%, lactating cow tubes were 4% and other made up 3% of use.

Conclusions

This study gave the first overview of AMU in a sample of Irish dairy farms. On average AMU was low on these farms with just a small number of high users. There was variation in the levels of AMU recorded by the three recording methods, for the majority of farms the veterinary data gave the most accurate representation of actual AMU on the farm. Collecting veterinary data at the national level will allow us to gain a better insight into AMU in the Irish dairy sector as a whole.

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