Antimicrobial Use On Canadian Dairy Farms

Vineet Saini[1], J Trenton McClure[2], David Léger[3], and Herman W. Barkema[1]

[1]Department of Production Animal Health, Faculty of Veterinary Medicine, University of Calgary, 3330 Hospital Drive NW, Calgary, AB, T2N 4N1;[2]Department of Health Management, Atlantic Veterinary College, University of Prince Edward Island, CIA 4P3; [3]Laboratory for Foodborne Zoonoses, Public Health Agency of Canada, N1G 5B2.
Email: vsaini@ucalgary.ca

Use of antimicrobials is a key driver of antimicrobial resistance in bacteria. Mastitis is the primary reason for use of antimicrobials on dairy farms. However, an association between antimicrobial use (AMU) and resistance in common mastitis pathogens in a dairy farm environment has not been proven yet. Lack of such information in Canada had initiated the present study with an objective to determine AMU on Canadian dairy farms.

On-farm AMU data was collected for two years on 89 dairy farms across 6 Canadian provinces (Alberta, Ontario, Québec, New Brunswick, Nova Scotia and Prince Edward Island) using health-records and inventory of empty antimicrobial containers. It was measured as antimicrobial drug use rate (ADUR) in the units of animal daily doses (ADD)/1000 cow-days.

Overall, ADUR was 14.35 ADD/1000 cow-days across 89 dairy herds. Cephalosporins, penicillins, penicillin-combinations and tetracyclines were the 4 most commonly used drug classes (ADURs: 3.05, 2.56, 2.20, and 1.83 ADD/1000 cow-days, respectively). Antimicrobial drugs were frequently used in greater quantity via intramammary route than by other routes of administration; however, ADURs between intramammary route and systemic route of administration did not differ. Except for third-generation cephalosporins and tetracyclines, ADURs were not different across regions. Dairy herds in Ontario and Québec were the highest and the lowest users of third-generation cephalosporins (ceftiofur) (ADUR: 2.97 and 1.24, respectively); dairy herds in Alberta were the highest users of tetracyclines whereas dairy herds in Ontario and Québec were the lowest users (ADUR: 3.68 and 0.68, respectively).

Implications: ß-lactams, penicillin-combinations and tetracyclines were the most commonly used antimicrobial drug classes on majority of dairy farms in Canada. Except for third-generation cephalosporins and tetracyclines, variation in overall on-farm AMU between different provinces was not evident.