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# Understanding antimicrobial use and resistance in the Ontario cow-calf sector: A building block for sustainability initiatives

*A Data Management Plan created using DMP Assistant*

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## **Project abstract:**

Antimicrobial use data will be collected from cow-calf operations across Ontario. This will be combined with on-farm verification of antibiotic use, fecal and nasal swab samples for evidence of antimicrobial resistance, and information about the herd management procedures to look at antimicrobial use and resistance on cow-calf operations in Ontario. This data will be compared with similar data from provinces across the country and utilized to provide practical and effective prudent antimicrobial use guidelines for Ontario cow-calf operations.

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## Data collection

**Provide an overview of the data that will be generated, collected or acquired to support this project. If data will be acquired from a third party, specify the source.**

Data collected from cow-calf producers - information on herd management procedures, antimicrobial use data, information about antimicrobials on premises  
Data collected from the AHL - fecal and nasal swab samples will be submitted for culture and susceptibility to examine evidence of antimicrobial resistance, results from these tests will be used by study personnel  
Data collected from veterinarians - if permission is granted and veterinary clinic is able, data on purchase of antimicrobials will be collected from the veterinarians of enrolled herds  
The data will be compiled to examine antibiotic use patterns and evidence of antimicrobial resistance on cow-calf operations. This will be utilized to provide a baseline for the industry and to develop prudent antibiotic use guidelines and resources for producers.

**What method(s) of data collection will be employed?**

Data will be collected through interview/survey with producers (herd management procedures), lab analysis of fecal and nasal swabs for culture of relevant bacteria and evidence of antimicrobial resistance, purchase receipts from the vet clinics, and observation of farm by researchers.

**What types of data will be included?**

Numeric, text, images, lab data

**What software or digital formats will be used to collect, manage and analyze the data?**

MS Excel  
Data will also come from PDFs and Qualtrics, but will be entered/converted to Excel

**Provide an indication of the scope of the data?**

Data will be collected from 10 cows and 10 calves on each of 20 enrolled farms (total of 400 animals). Producer respondents will be 1 per farm (total of 20).

## Data storage

**Estimate the size of data storage that will be required.**

Approximately 1 GB of data will be generated.

**Where will your data be stored during the collection, collation and analysis phases of the project?**

All data will be stored on an encrypted, password protected laptop, an encrypted, password protected back up drive, and on OneDrive.

**What backup strategy will be employed?**

The data will be backed up once a week on an encrypted, password protected external hard drive. The hard drive will be stored in a locked cabinet.

**How will your data files be organized? What file naming conventions will you use? A brief overview or example would be adequate.**

Folders will be created for the data in each phase: raw, cleaned, collated and final. Files within each folder will be named with a coded participant identifier, type of data (sampling or survey) and year/season of data collection. Example: C01\_sample\_2023spring.xlsx.

**What metadata will be developed for your data? Will there be supplemental documentation prepared to assist with the interpretation and analysis of your data?**

Each column in the spreadsheet will have a simple text heading (e.g. cowID). A supplementary document will map the column names to survey questions or additional information on the column (e.g. The identification assigned to the animal by the producer). Units of measure will be noted as necessary (e.g. cow's age in years or calf's age in days).

## Data archiving and preservation

**Will you deposit your data in the UG data repository or an external data repository? If you are opting to not archive your data in a repository, where will your data be housed after completion of your project?**

The data will be archived in the UG data repository for long-term preservation.

**Discuss any data transformations that will be needed so your data is preserved in appropriate, non-proprietary formats.**

The data will be exported from Excel and preserved as plain text CSV files.

**If some of your data will not be preserved, how long will you retain it? Will the non-preserved data be destroyed?**

Data that identifies the producer directly will be destroyed after 1 year. De-identified data will be stored indefinitely.

## Sharing and reuse

**Will the data that you archive in a data repository be made available for sharing and reuse by other researchers?**

The data will be freely and openly shared through the UG data repository.

**Explain which version of your data or subset of your data will be shared.**

A de-identified version of the final data will be shared.

**When will your data be available for discovery by other researchers? Will you impose an embargo on publication of your data? If so, please provide details on the duration of the embargo.**

The data cannot be shared until after the study has been published.

**Will you limit who can access your data? If so, who will that be and why are you limiting the data's reuse?**

Final, de-identified data will be openly available. De-identified raw data may be provided to researchers who submit a request to the PI.

**Are there specific license terms you will assign to users of your data?**

The data will be licensed with a CC BY-SA license.

## Restrictions/limitations

**Are there limitations or constraints on how you manage your data resulting from legal, ethical or intellectual property concerns?**

Identified raw data cannot be shared due to privacy concerns for the producers. Raw data in some categories may need to be excluded from sharing if the anonymity of the producer cannot be maintained (e.g. only prouder that has more than 300 cows). In this case, data would be categorized prior to being shared.

**Would your data need to be anonymized or de-identified before being shared with others?**

The data will be de-identified prior to sharing.

## Confidential information

**What information do you want to include in your DMP that should not be publicly shared?**

None