

Progress on Antimicrobial Resistance and Utilization Surveillance Programs in Canada (2014-2019)

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NCC for Infectious Diseases
CCN des maladies infectieuses

Introduction

- Antimicrobial resistance (AMR) is a recognized global public health threat (1).
- Integrated, One Health based surveillance of AMR and antimicrobial use (AMU) must underpin efforts to protect human, animal, and crop health.
- In 2014, the **National Collaborating Centre for Infectious Disease (NCCID)** published a report assessing AMR/AMU surveillance in Canada along with recommendations to address gaps in Canada (2).
- The **Canadian Council of Chief Veterinary Officers (CCVO)**, in 2016, published a report evaluating current and alternative models of AMU surveillance for veterinary antimicrobials (3). Identified gaps were integrated into the NCCID recommendations and evaluated.
- Objective:** assess the progress made towards these recommendations by:
 - Cataloguing surveillance programs in Canada.
 - Describing program scope.
 - Evaluating progress made.

Methods

- Federal, provincial, and territorial surveillance programs were identified by jurisdictional scan.
- Semi-structured interviews were conducted with 28 experts from across Canada.
- Based on the collected evidence, the authors assessed the progress made on each recommendation using a rubric and a set of criteria.
- Criteria were adapted from previous work that examined what the elements of a public health program (eg: funding, organizational capacity, partnerships, etc.) should look like to be sustainable (4).

Results

Table 1: Evaluation of program components identified in the 2014 NCCID Report
Excerpt of progress achieved on NCCID recommendations for AMR/AMU surveillance in Canada. Progress was evaluated in several key components of sustainable public health programs using criteria developed for this study (4).

Legend
Sustainable Operation
Full Operation
Initial Implementation
Programme Adoption
Exploration

Recommended Program Component	Stage of Development						
	Funding	Organization Capacity	Partnerships	Program Adaptability	Communication	Strategic Planning	Enabling policy
1. National Integrated AMR/AMU Surveillance System							
Federally coordinated, cross-sectoral, integrated system of AMR/AMU surveillance	Exploration	Exploration	Initial Implementation	Exploration	Exploration	Exploration	Programme Adoption
Standardized surveillance definitions and metrics	Exploration	Exploration	Initial Implementation	Exploration	Exploration	Exploration	Programme Adoption
2. Maintain and increase resources for existing AMR/AMU surveillance programs							
Multi-sector plan for comprehensive surveillance	Exploration	Exploration	Initial Implementation	Exploration	Exploration	Exploration	Programme Adoption
3. National AMR data warehousing initiative							
AMR data warehouse (based on EU model)	Initial Implementation	Programme Adoption	Programme Adoption	Exploration/program adoption	Programme Adoption	Programme Adoption	Programme Adoption
4. National Human AMR and AMU data collection							
Centralized collation of hospital AMU data (CNISP is the only AMU program evaluated)	Full Operation	Full Operation	Sustainable Operation	Full Operation	Exploration	Exploration	Initial Implementation
AMR Surveillance (Human nosocomial pathogens CNISP; foodborne pathogens in humans)	Sustainable Operation	Sustainable Operation	Sustainable Operation	Full Operation	Full Operation	Full Operation	Initial Implementation
AMR surveillance for other human pathogens (e.g., other pathogens, community-acquired Antimicrobial Distribution and Prescribing Data - Human (IQVIA data))	Exploration	Exploration	Exploration	N/A	N/A	N/A	N/A
AMR Surveillance of Veterinary Pathogens (e.g. AMR Net, other surveillance)	Exploration	Exploration	Exploration	N/A	N/A	N/A	N/A
Reporting requirements for antimicrobial susceptibility data from veterinary labs	Exploration	Exploration	Exploration	Exploration	Exploration	Exploration	Exploration
Antimicrobial Distribution Data for animals	Sustainable Operation	Sustainable Operation	Full Operation	Full Operation	Full Operation	Full Operation	Full Operation
Farm-level AMU surveillance - swine and poultry	Sustainable Operation	Sustainable Operation	Sustainable Operation	Full Operation	Full Operation	Sustainable Operation	Sustainable Operation
Farm-level AMU surveillance - feedlot cattle	Initial Implementation	Initial Implementation	Full Operation	Full Operation	N/A	Full Operation	Full Operation

Major Gaps Identified

National:

- Animal surveillance:**
 - No national veterinary AMU prescribing surveillance.
 - No veterinary pathogen AMR surveillance
 - No AMU surveillance for companion animals.
- No AMR surveillance of soil and water.**
- Human surveillance:**
 - Lack of community-level human AMR/AMU surveillance data.

Provincial/Territorial:

- Animal surveillance:**
 - AMR surveillance in Quebec only
 - No AMU surveillance currently
- Human surveillance:**
 - Limited AMU surveillance
 - Only B.C. and Ontario produce an integrated, province wide, AMR surveillance report.

Conclusions

- Progress has been made to improve AMU/AMR surveillance system in Canada.
- Significant gaps remain in both animal and human surveillance that limit the comprehensiveness of collected data and the timeliness and actionability of reporting.
- More sustained resources are needed to support new and existing comprehensive surveillance initiatives at all levels of government.
- The necessity of having an objective set of criteria to evaluate the program components in table 1 has led to the creation of criteria that can be used in the future to continue to monitor progress towards sustainability.

Figure 1: Overview of Provincial/ Territorial AMR/AMU Surveillance

Overview of the number of experts interviewed, subject matter expertise, and the number of provincial animal and human AMU/AMR surveillance programs by province as determined from jurisdictional scan and from the interviews.



1. World Health Organization. Antimicrobial Resistance Global Report on Surveillance [Internet]. WHO Press. 2014. Available from: https://apps.who.int/iris/bitstream/handle/10665/112647/WHO_HSE_PED_AIP_2014_2_eng.pdf

2. Grant J, Saxinger L, Patrick D, Keen P. Surveillance of Antimicrobial Resistance and Antimicrobial Utilization in Canada [Internet]. 2014. Available from: <https://nccid.ca/publications/surveillance-of-antimicrobial-resistance-and-antimicrobial-utilization-in-canada/>

3. CCVO Antimicrobial use in animal agriculture committee - AMU surveillance working group. Non-Human Antimicrobial Use Surveillance in Canada: Surveillance Objectives and Options [Internet]. 2016. Available from: https://www.cahns.ca/media/uploads/cipars/documents/17-08-01_19-44/CCVO_AMUCommittee_Non-HumanAMUSurveillance_FINAL_NgATA.pdf

4. Schell SF, Luke DA, Schooley MW, Elliott MB, Herbers SH, Mueller NB, et al. Public health program capacity for sustainability: A new framework. *Implement Sci*. 2013;8(1):1-9.