

# CIPARS On-Farm : Surveillance of Antimicrobial Use and Resistance in Canadian Swine Herds



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## Introduction

The Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS) was initiated in 2002 to monitor trends in antimicrobial use and resistance in selected bacterial organisms. The on-farm active surveillance program is the newest component and is currently supported by the Agricultural Policy Framework (APF) agreement between Agriculture and Agri-Food Canada and various partners including Health Canada and the Public Health Agency of Canada.

## Objectives

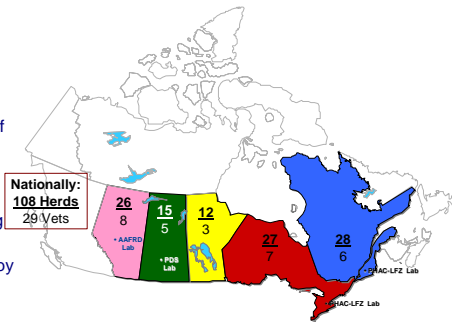
- Establish infrastructure to support a national surveillance program
- Describe temporal & geographic (provincial) patterns and trends in antimicrobial use and resistance
- Provide representative on-farm data on antimicrobial use and resistance
- Investigate associations between antimicrobial use and resistance together with targeted research
- Provide data for human health risk assessments

## CIPARS On-Farm Surveillance Program Design & Implementation

- Sentinel herds in the five major pork producing provinces
- Allocation of herds per province is proportional to the number of Grower/Finisher Units in each province. Provincial funding provided 10 additional herds in Alberta and Saskatchewan (Fig. 2)
- Purposive selection of swine veterinarians for participation in surveillance program

- Veterinarians enrolled client producers using the following criteria:

**FIGURE 2: Distribution of sentinel herds and veterinarians**



- Inclusion**
- On Farm Food Safety Program (CQA) validated,
  - >2000 hogs marketed/year,
  - representative of demographic and geographical distribution of the veterinary practice

- Exclusion**
- organic herds
  - edible residual material feeding herds

- Field work supervised/conducted by veterinarians for biosecurity and producers confidentiality issues

## Preliminary Results

### Summary of 2006 Activities

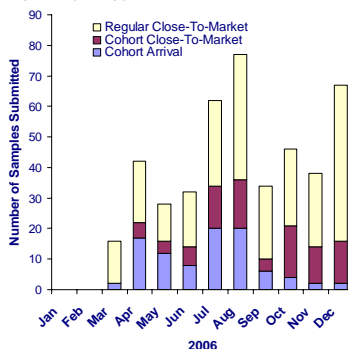
#### Sampling

Number of herd visits completed	287 (89%)
Annual Questionnaires	65
Sampling Day Questionnaires	89
Cohort Arrival Samples	93 (21%)
Cohort Close-To-Market Samples	92 (21%)
Regular Close-To-Market Samples	257 (58%)
Total Samples	442 (79%)

#### Isolates

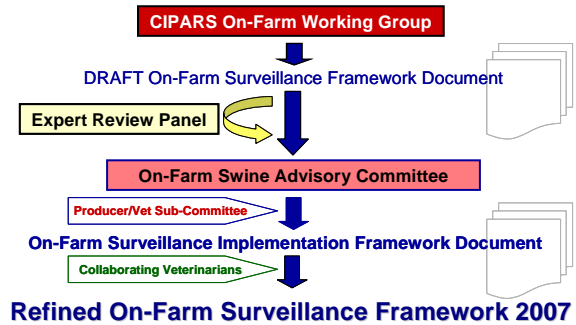
<i>E.coli</i> (%Pos. Samples)	2189 (100%)
<i>Salmonella</i> (%Pos. Samples)	92 (21%)
<i>Enterococcus</i> (%Pos. Samples)	946 (82%)

**FIGURE 4. Sample Submissions by Sample Type**



## CIPARS On-Farm Surveillance Program Development

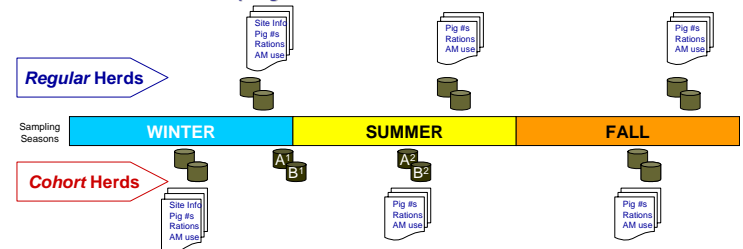
**FIGURE 1: Framework Design Process**



## Sample and Data Collection

- Fecal sampling of Market Hogs (>80 kg) 3 times per year by herd veterinarian (fig. 3)
- "Cohort" Sampling in a sub-set of herds, in any one of the 3 sampling seasons per year
  - Fecal sampling of cohort hogs within 6 hrs of arrival (approx. 25 kg; A1/B1 Samples)
  - Fecal sampling of Cohort Market Hogs (>80 kg) by herd veterinarian (A2/B2 Samples)
- Herd demographic and management data collected by questionnaire on enrollment and annually on next winter sampling day
- Pig health and antimicrobial use data collected by questionnaire at each close-to-market sampling visit

**FIGURE 3. Schematic: Sampling & Data Collection**



## Conclusion

In addition to providing data on antimicrobial use and resistance in the Canadian swine industry, CIPARS On-Farm will offer a research platform for specific antimicrobial resistance and animal health studies. On-farm surveillance provides unique challenges in logistics, data management, confidentiality, and providing representative data. CIPARS On-Farm will provide valuable information to help refine methodologies for antimicrobial use and resistance surveillance. This surveillance system will inform the development of antimicrobial use guidelines and policy by industry and government. The system will also provide critical information on the logistics, resources and support required for a broader, sustainable multi-commodity national surveillance system for both antimicrobial resistance, zoonotic enteric pathogens, and animal health pathogens.

## Acknowledgements

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