

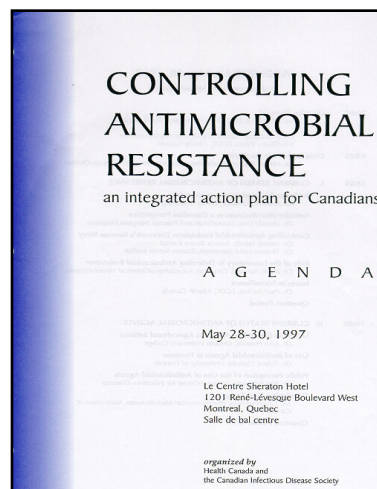
Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS)

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“Toward Integrated Epidemiologic Surveillance”
PAHO Interagency Forum 2012, Santiago, Chile

Consensus Conference, 1997

Recommendation:
To establish a national surveillance system to monitor antimicrobial resistance and use in the agri-food and aquaculture sectors...

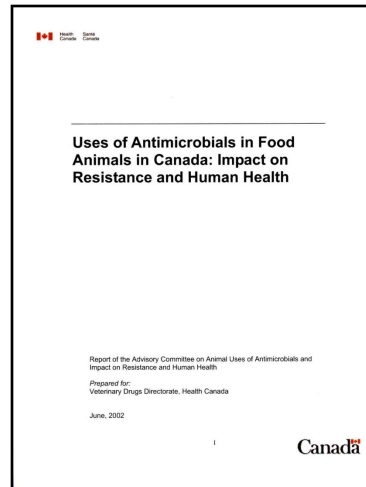


Advisory Committee report to Health Canada

Recommendations

26: *Design and implement a national surveillance program of antimicrobial use in food animals ...*

28: *In consultation with the provinces, other federal agencies and industry groups, design and implement an ongoing, permanent, national surveillance system for antimicrobial resistance arising from food-animal production.*

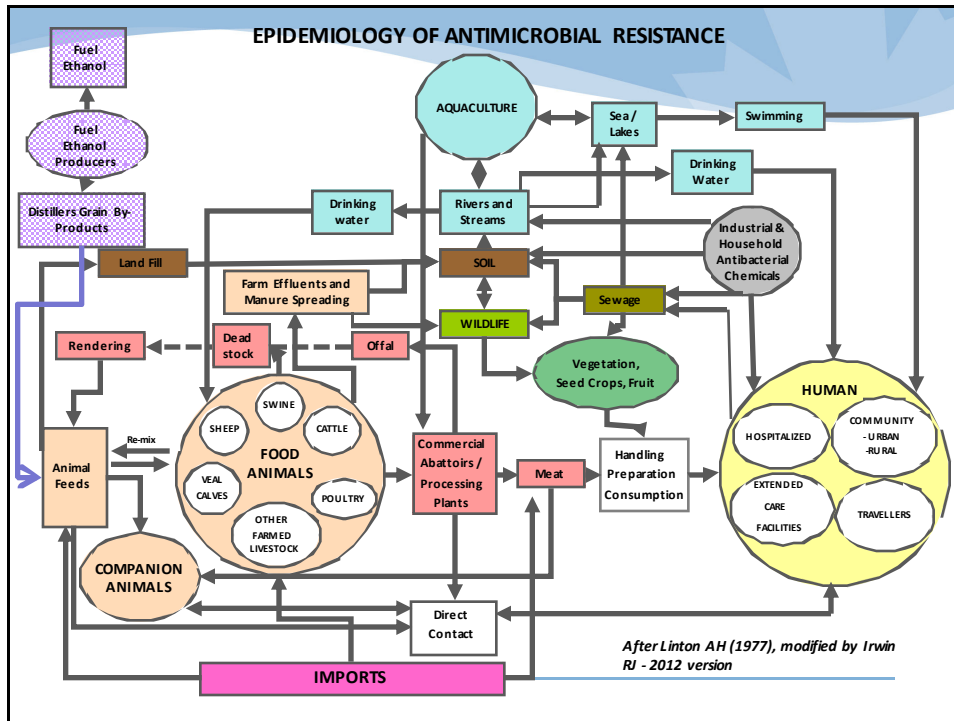


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CIPARS from humble beginnings....

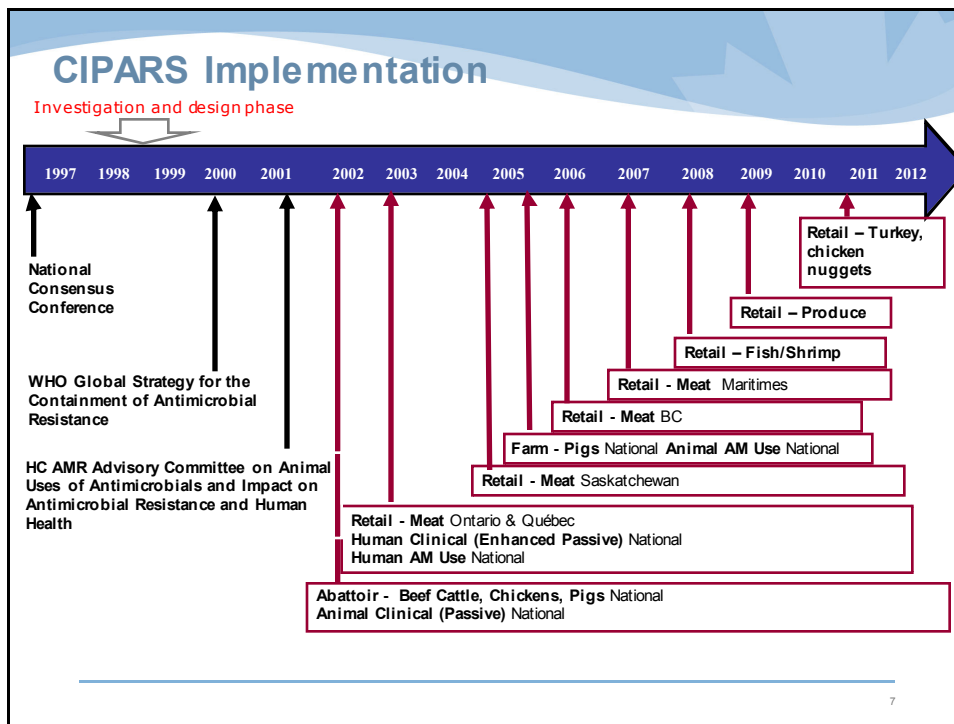
- Link between animal and human AMR controversial
- AMR not considered a food safety issue
- No existing infrastructure for AMU or AMR surveillance along food chain
 - residue avoidance
 - OIE reportable Salmonella
 - sampling for export purposes or RTE meats
- Design required veterinary epidemiological expertise

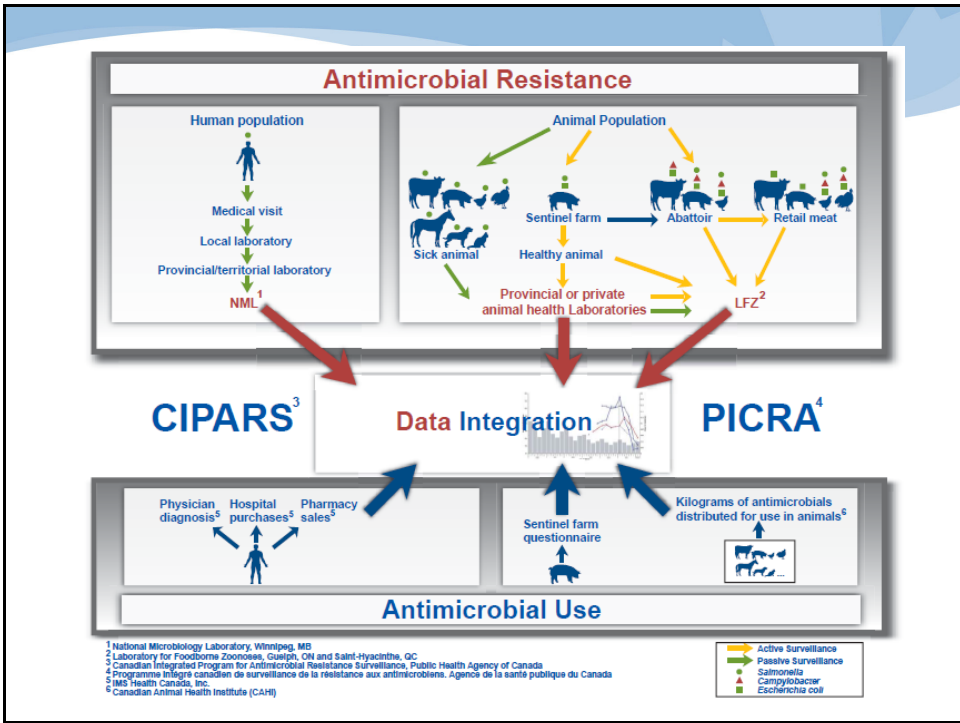
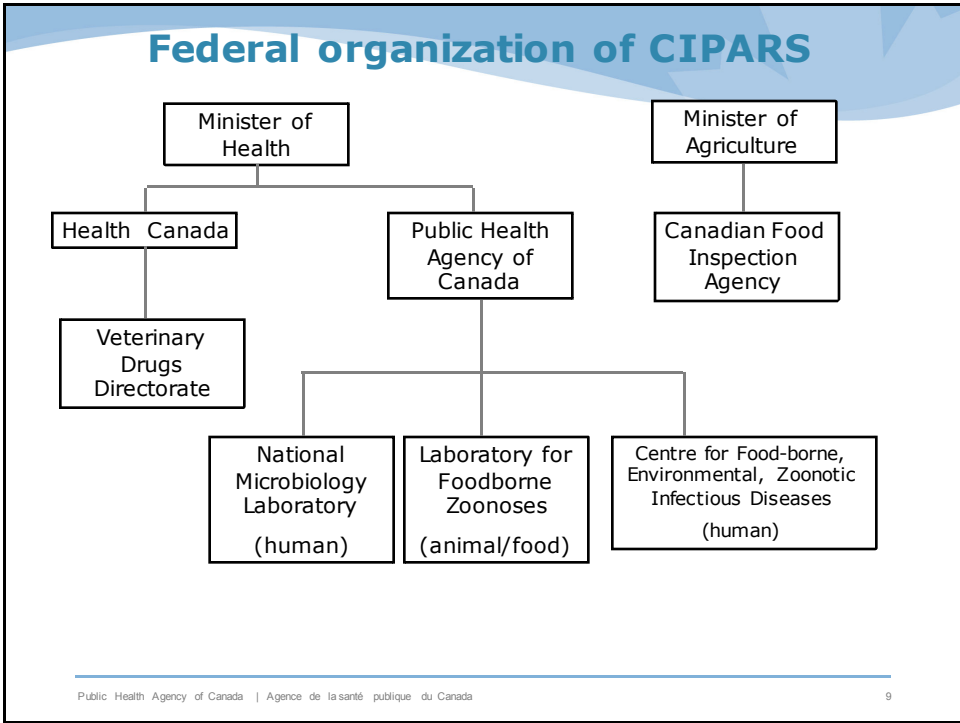
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CIPARS Objectives

- **Monitor trends** in antimicrobial resistance and antimicrobial use in humans and animals
- Generate **timely reports**
- Generate **nationally representative data** that can contribute to assessing the **public health impact** of antimicrobials used in human and agricultural sectors
- Create **surveillance platform** to collect representative data on enteric disease risks across the food chain continuum.
- Allow accurate **international comparisons** with other countries that use similar surveillance systems (e.g. U.S., Denmark & Colombia)





Antimicrobial Use

- **Human**
 - Intercontinental Medical Statistics Health (Canada)
 - Defined Daily Dose (DDD): the assumed average maintenance dose per day for a drug used for its main indication in adults
 - prescription data from (7400) retail pharmacies (non-hospital)
- **Animal**
 - Canadian Animal Health Institute (CAHI) data
 - Kg active ingredient distributed by member companies (90% of licensed product sales) for sale in all animal species
 - Doesn't include own-use, API antimicrobials, human labelled products, non-member products
 - Farm surveillance
 - Sentinel Swine since 2006
 - Beef longitudinal research project
 - Poultry – under development with industry

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CIPARS-Farm

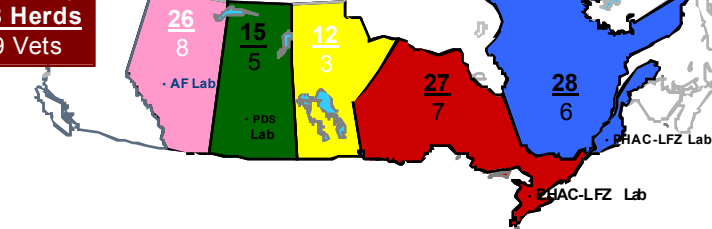
- Most recent component of CIPARS
- Most important source of antimicrobial use information
- Established swine as first commodity

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Distribution of Sentinel Herds & Vets

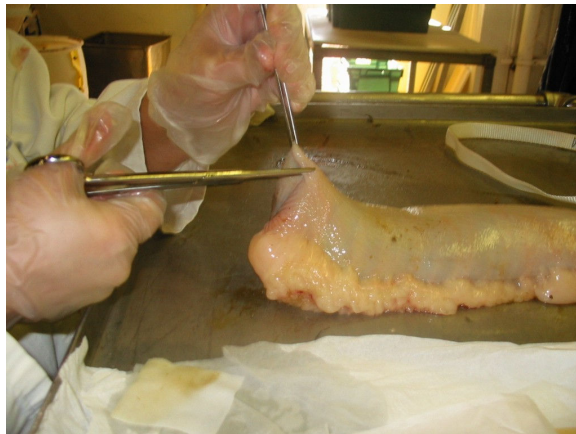
- At implementation, herds were allocated per province proportional to the number of *Grower/Finisher Units* in each province
- Provincial funding provided 10 additional herds in Alberta and Saskatchewan during the 2006-07 surveillance periods

Nationally:
108 Herds
29 Vets



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CIPARS – Abattoir Surveillance



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CIPARS - Abattoir

- Beef - beef & cull dairy cattle
 - generic *E.coli*, *Campylobacter*
- Pork - market hogs
 - *Salmonella*, generic *E.coli*, *Campylobacter*
- Chicken – broilers
 - *Salmonella*, *Campylobacter*, *E.coli*



- Sample size calculated to generate 150 isolates of *Salmonella* & *E.coli*, 100 isolates of *Campylobacter*

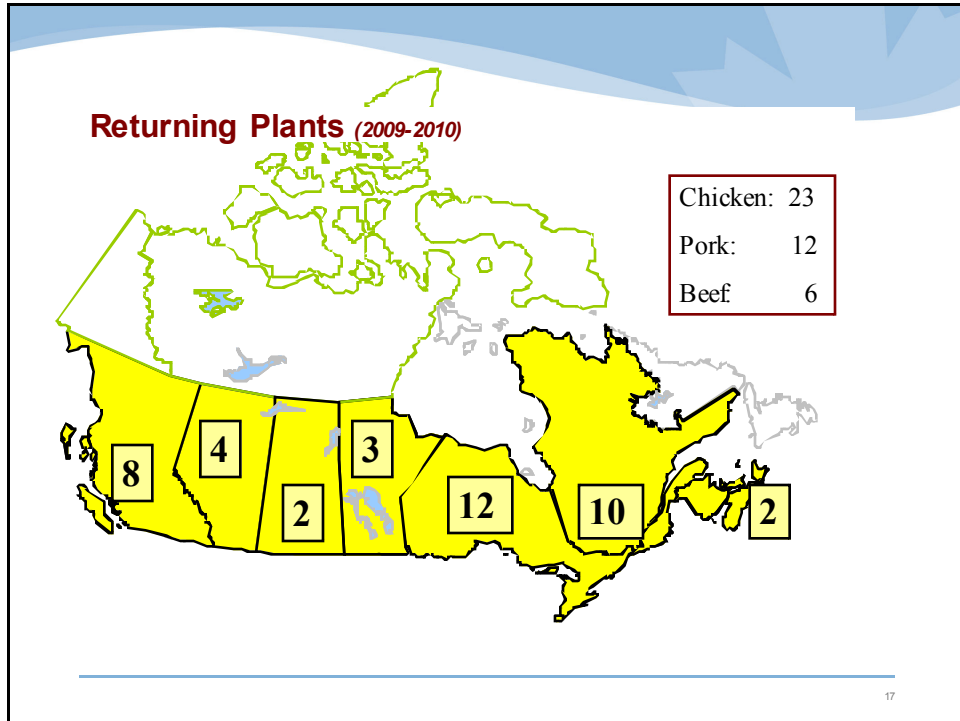
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CIPARS - Abattoir

- Implementation in fall of 2002 (51 plants)
- Currently in Year 10 of sampling
- Federally registered abattoirs - National
- CAECAL samples
- Collect Province of origin (last residence) of animal
- Microbiological data
 - species
 - serotype
 - phagetype
 - quantitative AMR



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Retail Food Surveillance

- 7 (of 10) provinces
 - Ontario, Québec (2003), Saskatchewan (2005), British Columbia (2006), Nova Scotia/New Brunswick/PEI* (2007)
- Continuous sampling
 - Weekly or every other weekly sampling in each province (* sampled as one province)
 - 280 (ON, QC)/140 samples/commodity/province/year

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Retail Food Surveillance

- Samples
 - Chicken *leg* (C)
 - Pork *chop* (P)
 - Beef *ground* (B)
 - Turkey ground (pilot)
 - Chicken nuggets (pilot)
- Bacteria
 - generic *E. coli* (C/P/B),
Campylobacter (C),
Salmonella (C/P),
 - Goal: 100 isolates/commodity/
province/year for antimicrobial susceptibility testing



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Human Salmonella Surveillance

- Initiated in January 1, 2003
- Provincial public health laboratories forward proportion of human *Salmonella* isolates to NML, Winnipeg
 - BC, Alberta, Ontario, Québec: all isolates received from the 1st to 15th each month; + all *S. Typhi*
 - Saskatchewan, Manitoba, New Brunswick, Newfoundland, Nova Scotia, PEI: All human *Salmonella* isolates received
 - As of 2010, antimicrobial susceptibility testing is only being conducted on *S. Enteritidis*, *S. Heidelberg*, *S. Typhimurium*, *S. Typhi*, *S. Paratyphi A*, *S. Paratyphi B*, and spp. 4,5,12:i:-.

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What has 10 years of CIPARS told us?

A national integrated surveillance system is possible and can support several objectives

- **Public health**
 - Preserve effectiveness of antimicrobials for veterinary and medical use
 - Exposure data to support source attribution studies, intervention studies
 - Pathogen reduction – provide relevant Canadian data to support pathogen reduction strategies; establish means to monitor prevalence of primary food borne pathogens over time
 - Support for prudent use programs (On-Farm Food Safety Programs)
 - Support international efforts to build integrated AMR surveillance programs
- **Animal Health**
 - Pre-approval and Post-approval monitoring of antimicrobial agents for veterinary use
- **International trade**
 - Considered integral to CODEX risk analysis framework for AMR
- **Surveillance Platform**
 - Targeted studies – eg. MRSA, C.Difficile, non-core commodity (turkey, veal, seafood) investigations

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Estimated Use of Antimicrobials in Canada

2007 CIPARS Annual Report

Human - 195,651 kg¹
Animal - 1,617,747 kg² (doesn't include own-use or API)

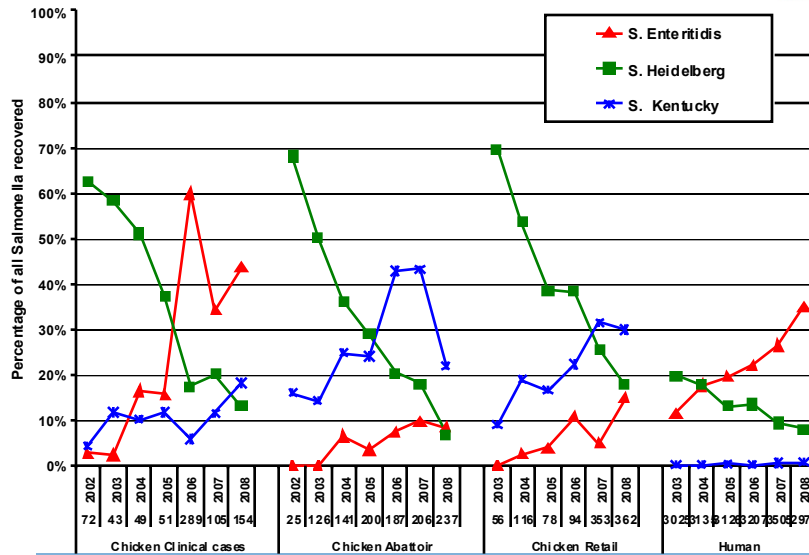
- Approximately 88% of the total volume (by weight of active ingredient) of antimicrobials distributed for sale in Canada are for animal use.
- Two-thirds are of antimicrobials considered important in human medicine (HC – VDD categorization scheme)

¹ Canadian Animal Health Institute

² IMS Health – Canadian CompuScript (CCS) dataset

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Changes in serovar prevalence across time (CIPARS 2002-2008)



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Extra-label use of Ceftiofur & S. Heidelberg

Ceftiofur

- Can be used in many animal species
- NOT labelled for use in chicken in Canada
 - Used extra-label for the control of *E. coli* omphalitis in broilers

Salmonella Heidelberg

- Notifiable - Frequent: Top 3 serovars in humans in Canada since 1995
- Diarrhea, vomiting, fever, malaise
- Invasive: Can cause septicemia, myocarditis, extra-intestinal infections, and death.

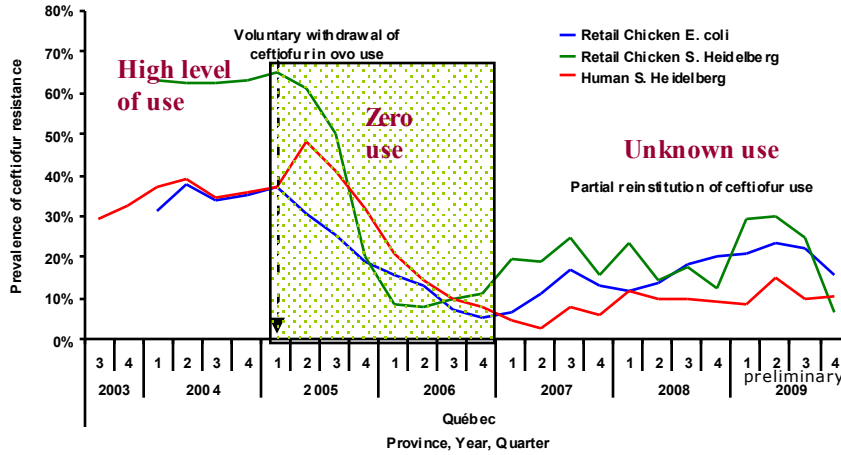
Treatment concern

- Resistance to **ceftiofur** = resistance to **ceftriaxone**; one of the drugs of choice for treatment of pregnant women and children

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Ceftiofur Resistance in Chicken *E. coli* and Human and Chicken *S. Heidelberg* (Québec) - CIPARS 2003-2009

Rolling Average



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Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS)

...working towards the preservation of effective antimicrobials for humans and animals...

2006
Canada

CIPARS Reports available in English and French at:

www.phac-aspc.gc.ca/cipars-picra/index-eng.php

www.phac-aspc.gc.ca/cipars-picra/index-fra.php

- Annual reports
- Short reports
- Issue papers

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Provincial Public Health Laboratories

- British Columbia Centre for Disease Control
- Provincial Laboratory of Public Health, Alberta
- Saskatchewan Laboratory and Disease Control Services
- Cadham Provincial Laboratory, Manitoba
- Ontario Ministry of Health and Long-Term Care
- Institut national de santé publique du Québec
- New Brunswick Enteric Reference Centre
- Microbiology Laboratory, Queen Elizabeth II Health Sciences Centre, Nova Scotia
- Laboratory Services, Queen Elizabeth Hospital, Prince Edward Island
- Newfoundland Public Health Laboratory

Canadian Food Inspection Agency Health Canada, Veterinary Drugs Directorate

Abattoir-Industry Participants
Retail Meat Surveillance Participants
Canadian Animal Health Institute

Provincial Animal Health Labs
Other collaborating laboratories

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Thank you

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