What are Antimicrobial Resistant Organisms (AROs)? - Canadian Perspectives

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Canadian Consensus Development Conference on Surveillance and Screening for AROs
June 18, 2014



PROTECTING CANADIANS FROM ILLNESS

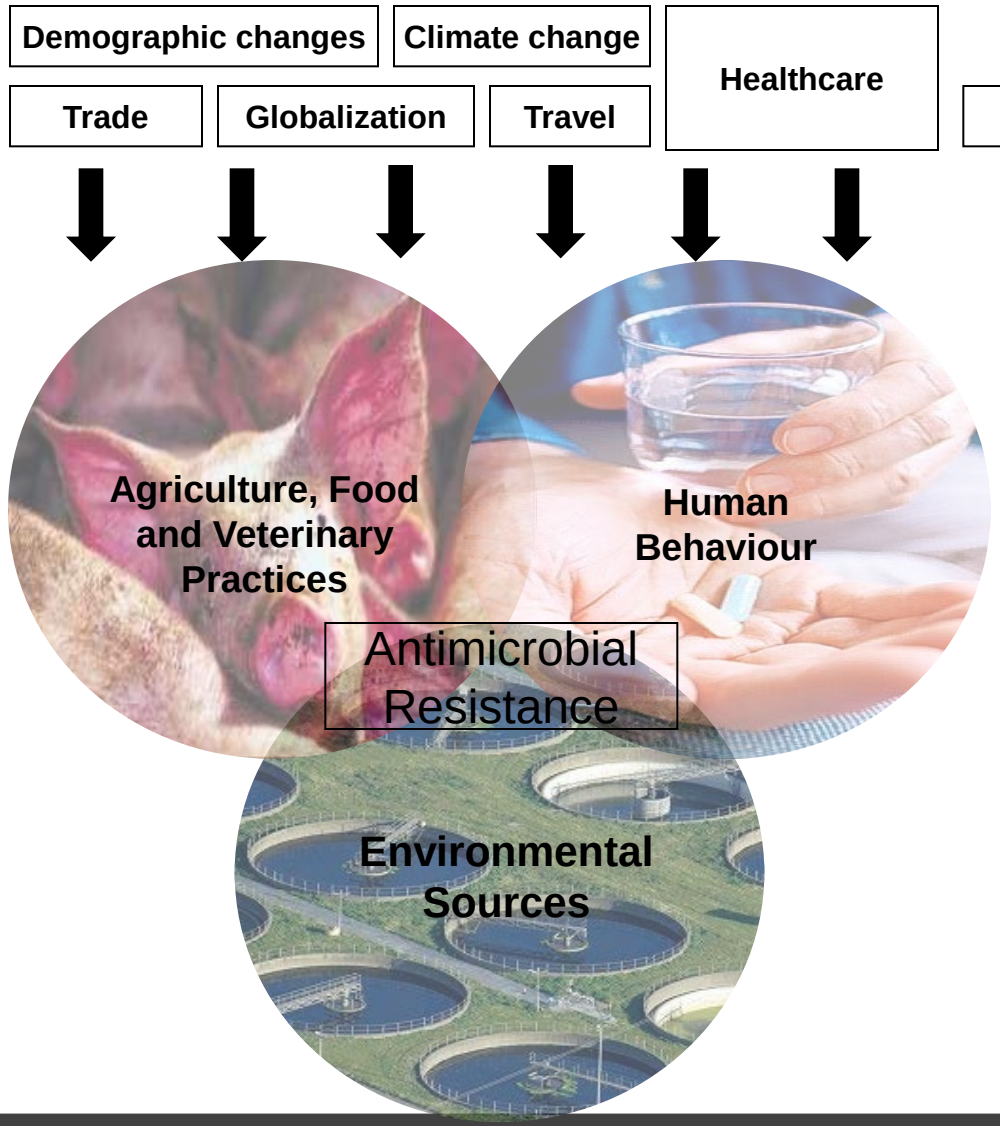
- AMR is a global threat to the prevention and control of infectious diseases
  - » It is complex and multi-faceted

- The loss of effective antibiotics will undermine our ability to fight infectious diseases
  - » Increasing morbidity and mortality throughout world
  - » Less effective antimicrobials for treatment of infectious diseases
  - » Longer, more severe illnesses / complications in vulnerable populations
  - » Increasing costs to the health care system (i.e. hospitalization, wait time, complex treatments)

- Investment in development of new antibiotics is decreasing
  - » Research, development and commercialization to bring a new antibiotic to market is costly and may take years to develop.

- Potential return to a pre-antibiotic era treatment options for a number of resistant infections are running out (i.e. multi-drug resistant gonorrhea)

DRIVERS AND SETTINGS FOR AMR



Examples include:

- Carbapenem-resistant *Enterobacteriaceae (CRE)* (e.g., NDM-1)
- Methicillin-resistant *Staphylococcus aureus* (MRSA)
- Vancomycin-resistant *Enterococci* (VRE)
- Multidrug resistant *Salmonella* species
- Multidrug resistant tuberculosis (MDR-TB)
- *Neisseria gonorrhoeae (N. gonorrhoeae)*
- *Escherichia coli* isolates in wastewater
- *Clostridium difficile (C. difficile)*

KEY PHAC AMR RELATED ACTIVITIES

1) AMR and AMU Surveillance
   - » CNISP
   - » CIPARS
2) Knowledge translation and exchange
   - » Guidance on infection prevention and control practices
   - » Webinars and educational tools to increase awareness
   - » Public awareness campaigns to improve knowledge and influence behaviour
3) Partnerships
   - » Public sector
   - » Private Sector
   - » NGOs/Professional Associations
4) Laboratory services
   - » Reference services
   - » Technical support
   - » Development of diagnostic tests
5) Outbreak Support
   - » Epidemiological and laboratory support to hospitals and provincial and territorial public health authorities on request

The Agency has two main AMR and AMU surveillance programs:

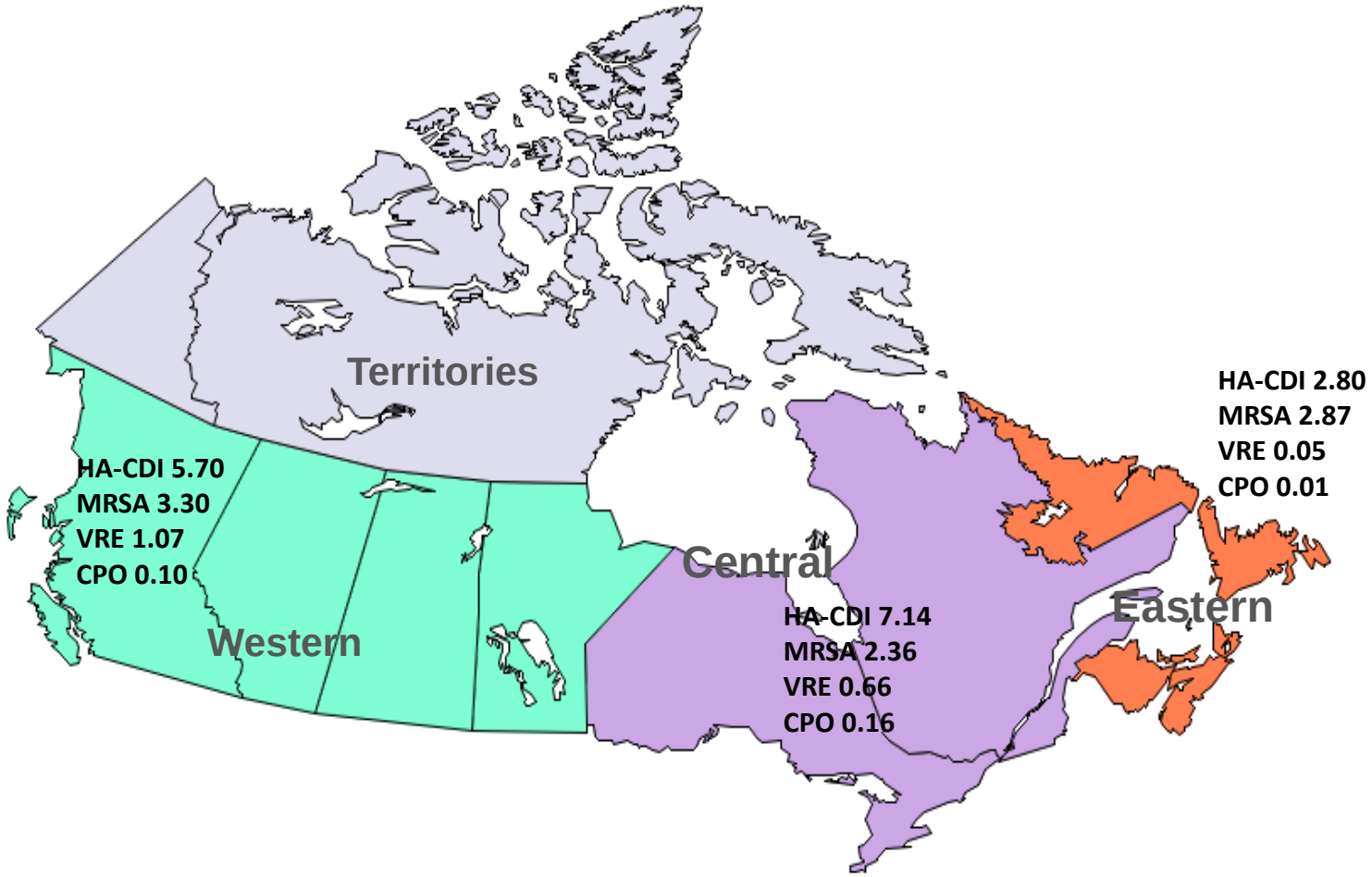
Canadian Nosocomial Infection Surveillance Program (CNISP)

- Ongoing national surveillance system in selected Canadian hospitals, established in 1995 through a partnership between the Agency and the Association of Medical Microbiology and Infectious Diseases Canada (AMMI), Canadian Hospital Epidemiology Committee (CHEC)
- Current participants include 60 sentinel hospitals across 10 provinces
- Data collected on selected organisms (MRSA, VRE, C.Difficile, CPO)
- Benchmark data provided to practitioners, policy and program decision makers

Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS)

- Ongoing national surveillance system to monitor antimicrobial use in animals and humans, as well as antimicrobial resistance, established in 2002
- Currently collects data from humans, animals and animal-derived food sources across all provinces in Canada
- Data collected on selected food-borne bacteria in humans and throughout the food chain
- Benchmark data provided to practitioners, policy and program decision makers

National & Regional ARO infection rates per 10,000 patient days, CNISP, 2012

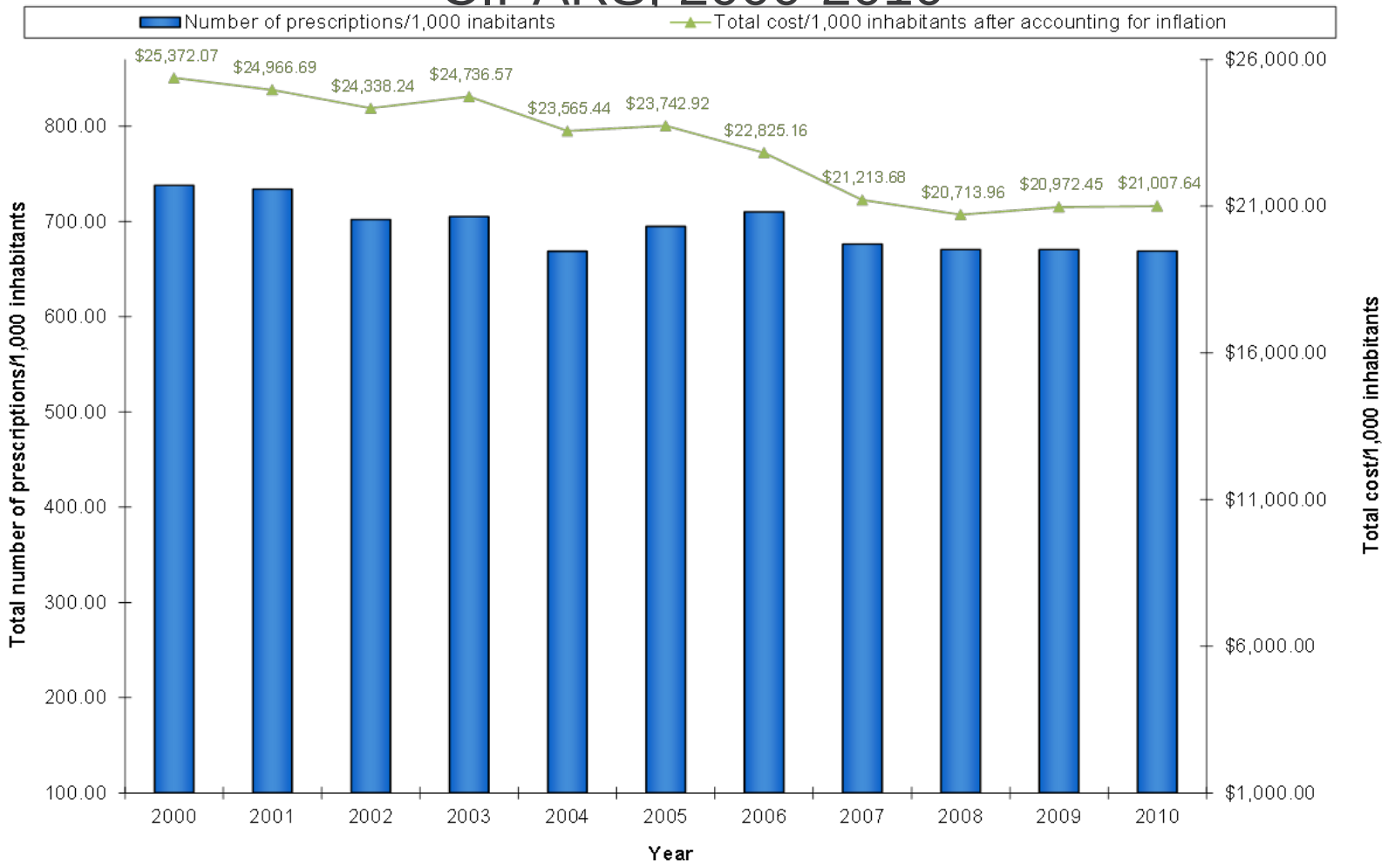


National ARO infection rates per 10,000 patient days

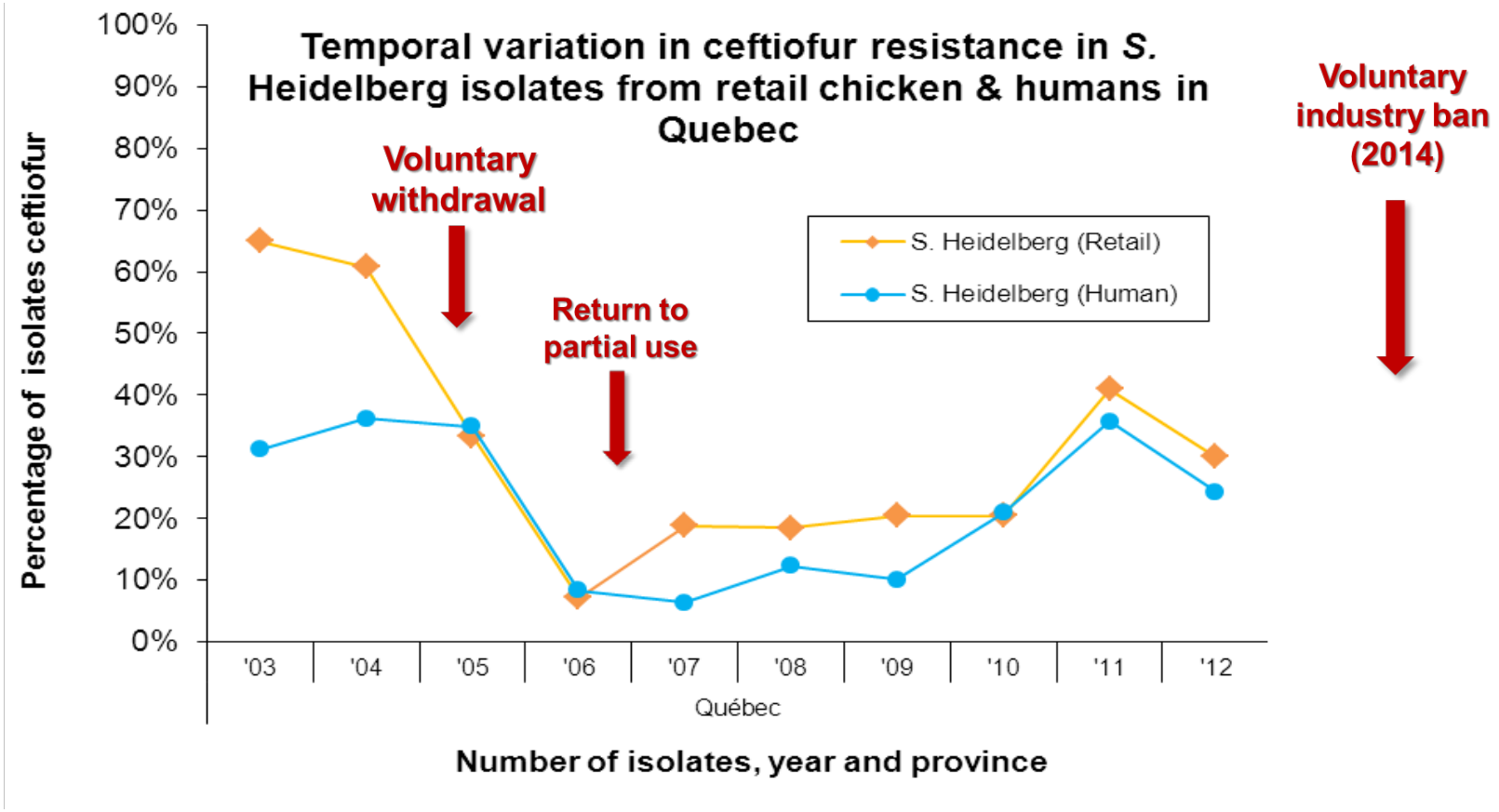
HA-CDI 6.04	VRE 0.74
MRSA 2.80	CPO 0.12

Source: CNISP ARO Surveillance Report 2007-2012

Overall outpatient antimicrobial use trends in Canada, IMS, CIPARS, 2000-2010



Temporal Variation in Ceftiofur Resistance in S. Heidelberg Isolates from Retail Chicken & Humans in Quebec, CIPARS, 2003-2012



The Agency focuses on key KTE activities:

- Public awareness
  - To inform the public about antimicrobial resistance so that individuals can protect their own health.
    - Webinars, educational tools, outreach campaigns aimed at health professionals, Canadian families, and the media
    - Specific campaigns in Aboriginal and northern communities (e.g. drug-resistant tuberculosis and methicillin-resistant Staphylococcus aureus)
    - Work with stakeholders, provinces and territories during Antibiotic Awareness Week in November

- Public health guidance
  - To inform the responsible use of antimicrobials and infection control
  - Develop and improve evidence-based guidelines on infection prevention and control practices
    - Examples include infection control guidance for hospitals and human vaccination guidance

Examples of the Agency's infection prevention and control guidelines and reports:

- Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Healthcare Settings - May 2013
- Routine Practices and Additional Precautions Assessment and Educational Tools - March 2013
- Hand Hygiene Practices in Healthcare Settings - March 2013
- *Clostridium Difficile* Infection - Infection Prevention and Control Guidance for Management in Long-term Care Facilities - January 2013
- *Clostridium Difficile* Infection - Infection Prevention and Control Guidance for Management in Acute Care Settings - January 2013
- Seasonal Influenza - Infection Prevention and Control Guidance for Management in Home Care Settings - December 2012
- Infection Prevention and Control Guideline for the Prevention of Healthcare-Associated Pneumonia - March 2012
- Infection Prevention and Control Guideline for Flexible Gastrointestinal Endoscopy and Flexible Bronchoscopy - February 2011

The Agency plays a key role in optimizing partnerships with key AMR stakeholders including:

- International organizations (WHO, etc.)
- Other federal government departments
  - Health Canada
  - CFIA
  - CIHR
  - Agriculture and Agri-Food Canada
  - Industry Canada
- Provinces and Territories (Public Health Network, etc.)
- NGOs
- Professional Associations

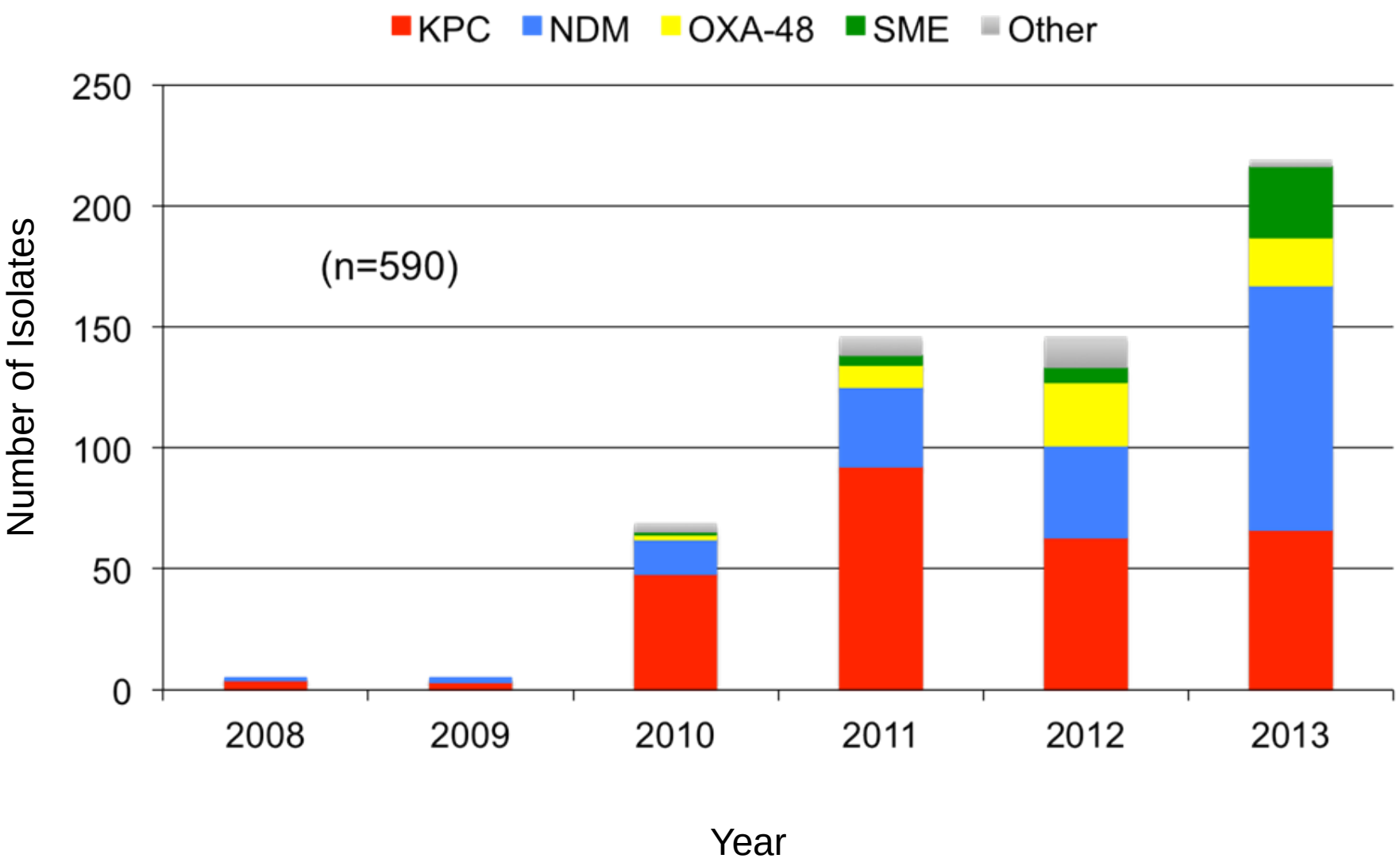
Canada


Yukon
Whitehorse
Northwest Territories
Yellowknife
Nunavut
Iqaluit
British Columbia
Alberta
Edmonton
Saskatchewan
Regina
Manitoba
Winnipeg
Ontario
Quebec
Québec
Ottawa
Toronto
Newfoundland and Labrador
St. John's
Prince Edward Island
Charlottetown
Fredericton
New Brunswick
Halifax
Nova Scotia
Victoria
CANADA – Political
International boundary
Provincial/territorial boundary
Alberta Province/territory
Ottawa National capital
Regina Provincial/territorial capital
Scale
0 250 500 750 1 000 km

The Agency has specialized services to support labs, hospitals and public health units across the country and internationally

- Reference services to confirm types of resistance or molecular typing for outbreak support
- Technical support to assist with the interpretation of results submitted by other labs
- Ongoing development of diagnostic tests to identify gonorrhea infections and identify drug resistance

CABAPENEMASE-PRODUCING ENTEROBACTERIACEAE (CPE) REPORTED TO NML IN CANADA



The Agency provides epidemiological and laboratory support to hospitals and provincial and territorial public health authorities on request

- To assist in the management of outbreaks caused by AMR organisms
- To support surge capacity

- AMR requires a pan-Canadian approach involving a wide range of stakeholders to address multi-sectoral issues across the spectrum of human, animal, food, and environment
  - All levels of government
  - Professional organizations
  - Non-governmental organizations
  - Private sector
  - Canadian public

- Focus for the Agency:
  - Strengthen AMR and AMU surveillance
  - Continue with KTE activities
    - Increase the use and uptake of guidance knowledge translation and exchange
    - Build upon previous public awareness campaigns to increase knowledge and behaviour change
  - Facilitate linkages and increase coherence among partners
  - Continue laboratory services excellence and develop new diagnostic tools to manage emerging ARO
  - Continue outbreak management and support