



Canadian Antimicrobial Resistance Surveillance System

Key findings from the 2018 CARSS update

Centre for Communicable Diseases and Infection Control



Purpose

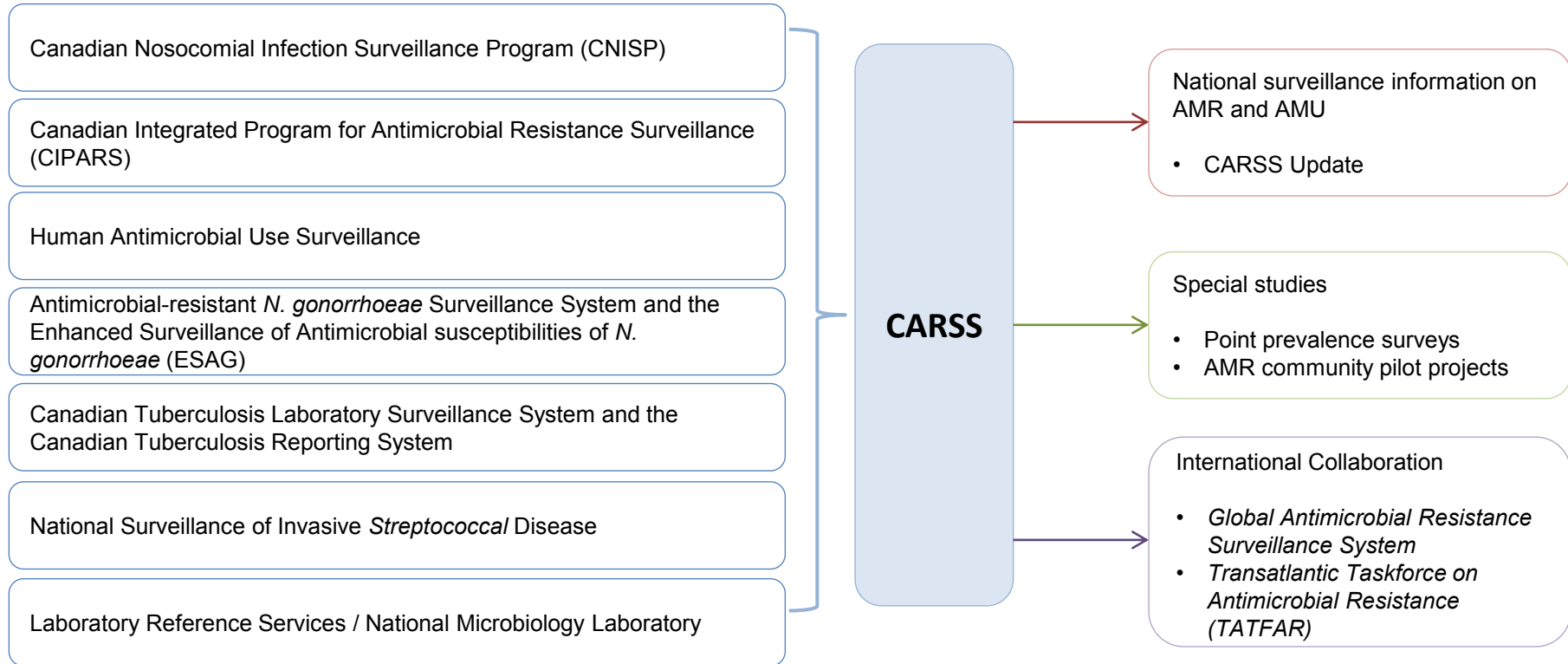
- To summarize the key findings from the Executive Summary of the Canadian Antimicrobial Resistance Surveillance System (CARSS) in a readily accessible, integrated format.
- To present the most up to date result from surveillance on antimicrobial resistance (AMR) and antimicrobial use (AMU) with a description of antimicrobial stewardship initiatives.
- To highlight planned activities for 2019-2020.

Background

CARSS is one of the Public Health Agency of Canada (PHAC)'s commitments in the Federal Framework for Action, launched in March 2015.

- Integrates and synthesizes information from PHAC surveillance systems and laboratory references services.
- Covers both human and animal food-producing populations.
- Aims to provide evidence to support policy and programming to foster prudent AMU, and to prevent, limit, and control AMR in Canada.
- CARSS will establish baselines and allow for monitoring of the performance of antimicrobial stewardship activities.

CARSS Overview



Priority organisms and antimicrobial use

AMR in human populations

- Carbapenemase-producing *Enterobacteriaceae*
- *Clostridioides difficile*
- Methicillin-resistant *Staphylococcus aureus*
- Vancomycin-resistant *Enterococcus* spp.
- *Streptococcus pyogenes*
- *Streptococcus pneumoniae*
- *Neisseria gonorrhoeae*
- *Mycobacterium tuberculosis*
- Typhoidal *Salmonella enterica*
- Non-typhoidal *Salmonella enterica*

AMR in retail meat

- *Campylobacter* spp.
- *Salmonella* spp.
- *Escherichia coli*

AMU

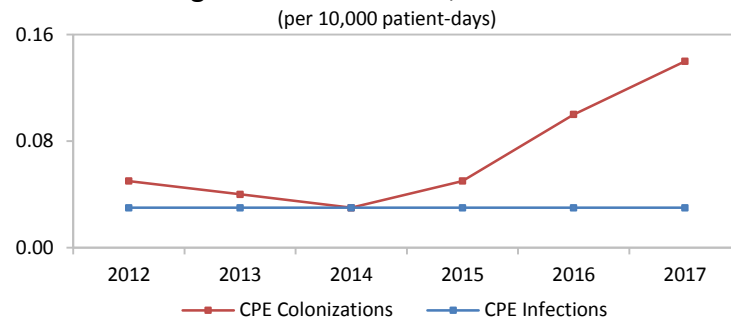
- Antimicrobials dispensed in the community for use in humans
- Antimicrobials purchased by hospitals for use in humans
- Antimicrobials for use in food-producing and companion animals and crops

Key findings from the 2018 CARSS Update

Carbapenemase-producing *Enterobacteriaceae* (CPE)

- CPE infection rates remained low and stable
- CPE colonization rates have increased almost five-fold (people who carry CPEs, but did not have an infection)
This is a growing public health concern because the colonizing bacteria can be transmitted to others
- Public health laboratories across Canada have also seen more CPE isolates

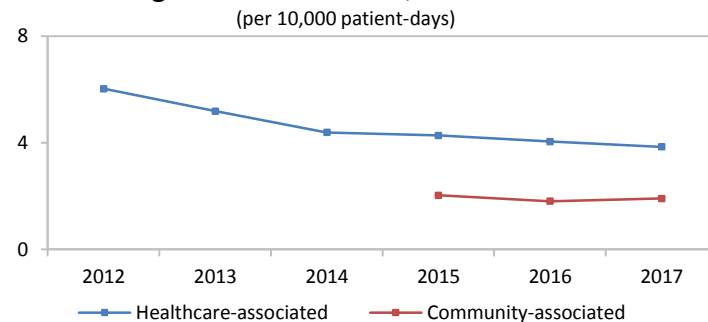
Figure 1: Rates of CPE, 2012-2017



Clostridioides difficile infection (CDI)

- CDI rates have declined 40% since 2012
- Among people in hospital who had CDI, one-third of these infections came from the community

Figure 2: Rates of CDI, 2012-2017



Methicillin-resistant *Staphylococcus aureus* (MRSA)

- Overall MRSA infection rates increased by 13% since 2012
 - MRSA infections in hospitals have declined 6%
 - MRSA infections that came from the community have increased 62%
- The rate of more serious and invasive MRSA infections (i.e. blood stream infections) remained high in paediatric hospitals
- Resistance to clindamycin has decreased by half

Vancomycin resistant *Enterococcus* (VRE)

- More serious VRE (blood stream infection) rates continued to increase
 - Notable increases in resistance to gentamicin
 - High levels of resistance to nitrofurantoin (45%)
- Other types of VRE infection increased for the first time since 2012

Figure 3. Rates of MRSA, 2012-2017
(per 10,000 patient-days)

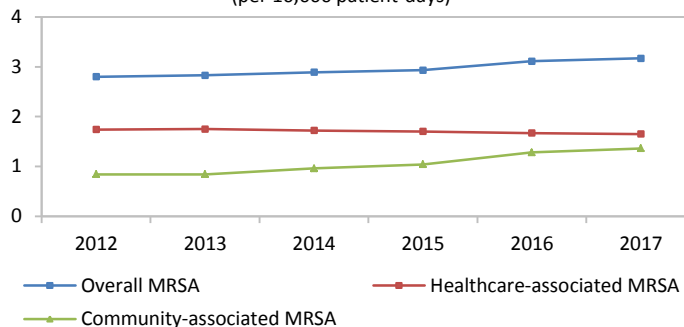
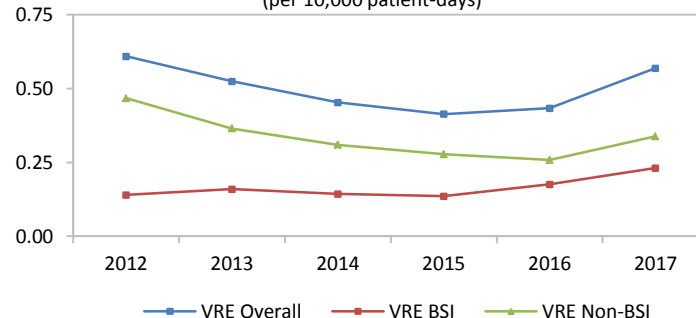


Figure 4. Rates of VRE, 2012-2017
(per 10,000 patient-days)



Neisseria gonorrhoeae

- Infection rates have increased 20% since 2015
- In Canada, there have been no cases failing treatment with combination therapy (ceftriaxone or cefixime, administered with azithromycin)
- Resistance to azithromycin has increased 53% since 2015
- Activity of 3rd generation cephalosporins continues to improve.

Mycobacterium tuberculosis (TB)

- 8% of all TB cases were resistant to at least one first line anti-TB drug
- TB drug resistance was highest among people who acquired their TB who outside of Canada
- Although TB rates are the highest among Indigenous people, TB drug resistance in this group remains very low

Figure 5: Resistance patterns relating to *N. gonorrhoeae*, 2011-2016

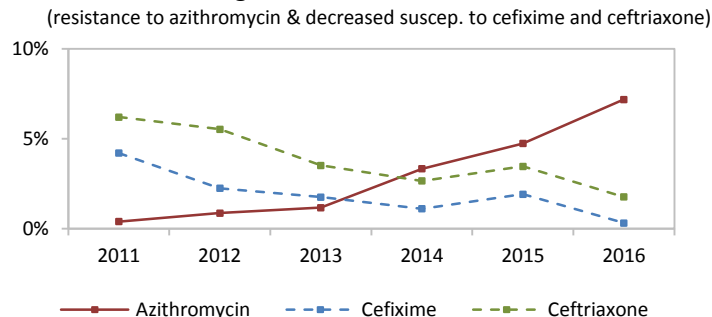
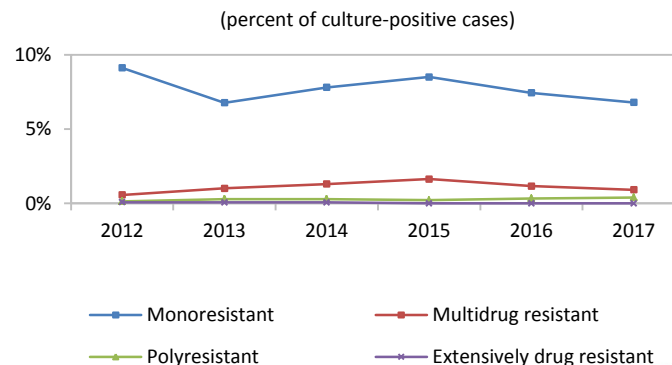


Figure 6: TB cases by resistance profile, 2012-2017



One of the Other Pieces of the Puzzle Antimicrobial Use (AMU)

Human antimicrobial use in Canada has been stable over the past five years

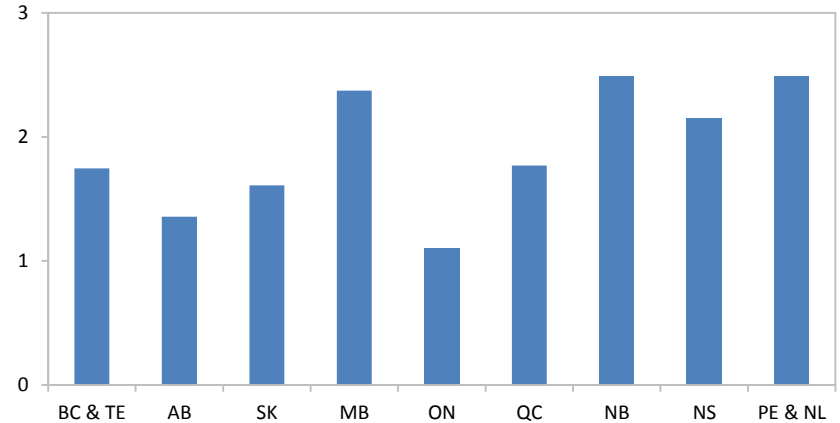
Total 262,590 kg of antimicrobials dispensed through community pharmacies or purchased by hospitals (approximately \$822 million expenditure)

- About 2% of Canadian population could be receiving antimicrobials on an average day
- Most AMU (92%) dispensed through retail pharmacies

Prescribing patterns

- Hospital antibiotic purchasing over twice as high in Atlantic provinces as in Ontario
- Rate of community prescriptions lowest in BC and Territories, highest in PEI and NL
- Most common indication for antimicrobial use in adults were respiratory and urinary tract infections
- In children, 43% of prescriptions were for treatment of otitis media (ear infection)

Figure 7: Prescribing patterns by P/T, 2017
(DDDs per 1,000 inhabitant-days)



Antimicrobial Stewardship in Priority Areas

Rx Patient Name : _____ Date : _____

The symptoms you presented with today suggest a **VIRAL** infection.

- Upper Respiratory Tract Infection (Common Cold) : Lasts 7-14 days
- Flu : Lasts 7-14 days
- Acute Pharyngitis ("Sore Throat") : Lasts 3-7 days, up to ≤10 days
- Acute Bronchitis/"Chest Cold" (Cough) : Lasts 7-21 days
- Acute Sinusitis ("Sinus Infection") : Lasts 7-14 days

You have not been prescribed antibiotics because antibiotics are not effective in treating viral infections. Antibiotics can cause side effects (e.g. diarrhea, yeast infections) and may cause serious harms such as severe diarrhea, allergic reactions, kidney or liver injury.

When you have a viral infection, it is very important to get plenty of rest and give your body time to fight off the virus.

If you follow these instructions, you should feel better soon :

- ➔ Rest as much as possible
- ➔ Drink plenty of fluids
- ➔ Wash your hands frequently
- ➔ Take over-the-counter medication, as advised :

- Acetaminophen (e.g. Tylenol®) for fever and aches
- Ibuprofen (e.g. Advil®) for fever and aches
- Naproxen (e.g. Aleve®) for fever and aches
- Lozenge (cough candy) for sore throat
- Nasal Saline (e.g. Salinex®) for nasal congestion
- Other : _____

(e.g. Nasal decongestant if Salinex® does not work, for short-term use only!)

Please return to your provider if :

- ➔ Symptoms do not improve in _____ day(s), or worsen at any time
- ➔ You develop persistent fever (above 38°C, or _____ as directed)
- ➔ Other : _____

Prescriber _____



This "Your Prescription Pad" has been adapted from the RCPSC Antimicrobial Stewardship Program: www.rcpsc.ca/antimicrobialstewardship. It is available in other languages. <http://www.rcpsc.ca/antimicrobialstewardship> Visit www.RxFiles.ca/RxFiles for more information.

Rx DELAYED PRESCRIPTION

About Your Delayed Prescription

WAIT. Don't fill your prescription just yet. Your health care provider believes your illness may resolve on its own. Follow the steps below to get better.

First, continue to monitor your symptoms over the next few days and try the following remedies to help you feel better:

- Get lots of rest.
- Drink plenty of water.
- For a sore throat: ice chips, throat lozenges or spray, or gargle with salt water.
- For a stuffy nose: saline nasal spray or drops.
- For fever and pain relief: acetaminophen or ibuprofen.
- Other: _____

Wash your hands often to avoid spreading infections.

If you don't feel better in _____ days, go ahead and fill your prescription at the pharmacy.

If you feel better, you do not need the antibiotic and the prescription can be thrown out.

If things get worse, please contact your health care provider.

Antibiotics should only be taken when medically necessary. Unwanted side effects like diarrhea and vomiting can occur, along with destruction of your body's good bacteria that can leave you more susceptible to infections.

To learn more, visit www.choosingwiselycanada.org/antibiotics



A mini-campaign, *Using Antibiotics Wisely* was developed by Choosing Wisely Canada with support from PHAC. The campaign is aimed at reducing unnecessary antibiotic prescribing in two priority areas- upper respiratory infection in primary care and urinary tract infection in long-term care.

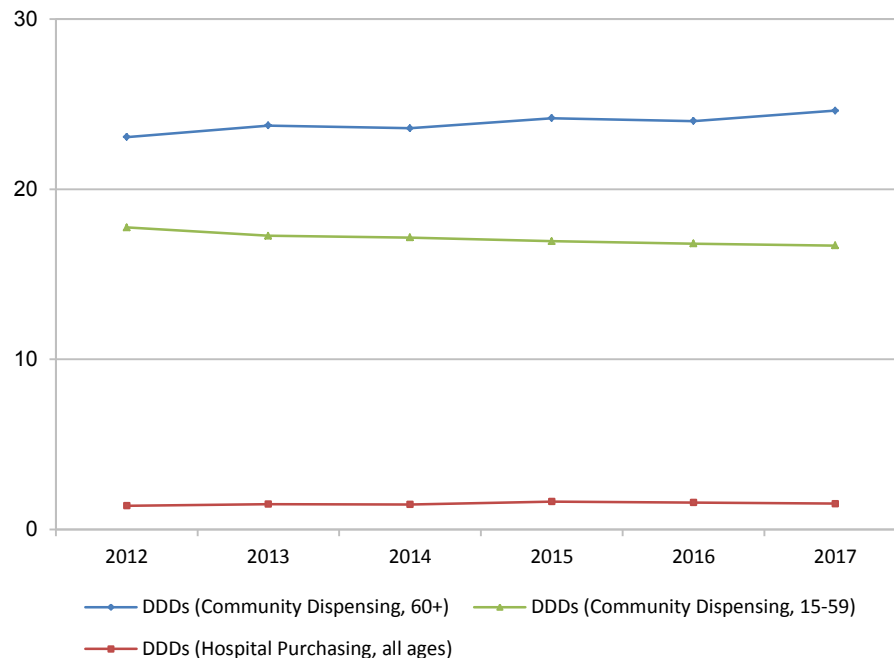
Hospital versus community AMU

Majority of antimicrobials are dispensed through community pharmacies

- Community AMU among adults far greater than total hospital antimicrobial purchasing

However, people who are in hospital are much more likely to be receiving antibiotics than people in the community

Figure 8: Patterns of antimicrobial use by age group as dispensed by community pharmacies and purchased by hospitals, 2012-2017
(DDDs per 1,000 inhabitant-days)

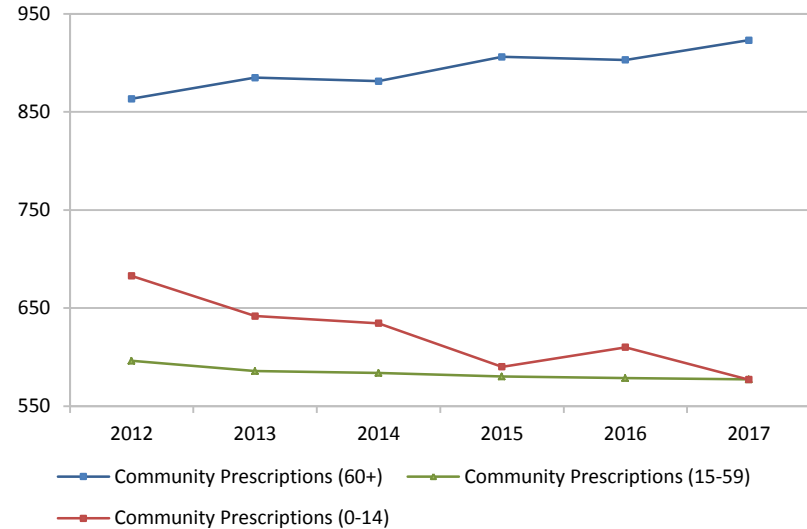


AMU by age group

Canadians aged 60 years or older received the most antibiotic prescriptions in 2017

- Prescription rate among Canadians aged 60+ rising over time; nearly 60% greater than among adults 15 to 59 years
- Prescription rate among children under 15 years has decreased notably over time

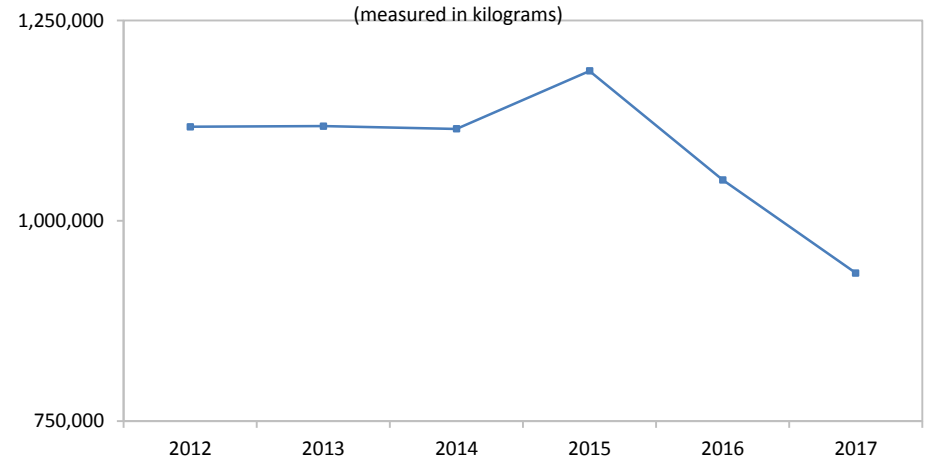
Figure 9: Patterns of AMU by age group, 2012-2017
(Prescriptions per 1,000 inhabitants)



AMU in animals and crops

- Total volume of antimicrobials distributed for use in animals in 2017 was approximately 950,000 kg (nearly four times the amount used in humans)
 - 11% lower than in 2016, and the lowest volume reported since 2006
- More pig and chicken farms reporting no use of medically important antimicrobials
 - No use of fluoroquinolones or 3rd generation cephalosporins by sentinel chicken farms
- Reduction in ceftriaxone resistance in *Salmonella* spp. isolated from animals and humans

Figure 10: AMU trends among animals and crops, 2012-2017

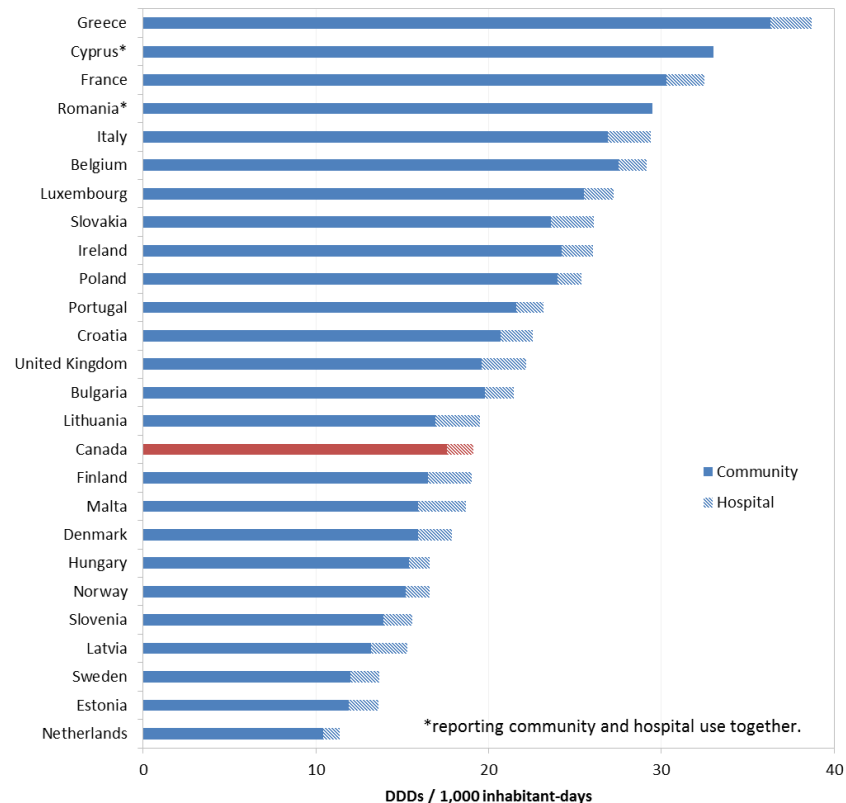


Canada's AMU in the international context

Among 26 countries reporting community dispensed and hospital purchased AMU to the European Surveillance of Antimicrobial Consumption Network (ESAC-Net) in 2016:

- Canada continued to place in the mid to lower spectrum of AMU
- Only 10 countries had lower consumption

Figure 11: Antimicrobial consumption, Canada and Europe



Reducing of Antimicrobial Use

Antibiotic Use Awareness Campaign

USE ANTIBIOTICS WISELY
Not All Bugs Need Drugs

Antibiotics don't treat a cold or the flu

Antibiotics should be taken only as directed

Lower your risk of illness by keeping your hands clean and vaccinations up to date.
Talk to your healthcare provider for more information.

CANADA.CA/ANTIBIOTICS

Public Health Agency of Canada

UTILISEZ LES ANTIBIOTIQUES JUDICIEUSEMENT
On n'a pas besoin de pilules pour tous les microbes

Les antibiotiques ne traitent pas le rhume, ni la grippe

Les antibiotiques doivent être pris selon les indications

Réduisez le risque de maladie en gardant vos mains propres et en veillant à ce que vos vaccins soient à jour.
Pour en savoir plus, consultez un professionnel de la santé.

CANADA.CA/ANTIBIOTIQUES

Agence de la santé publique du Canada

An awareness raising marketing campaign targeted to seniors, caregivers and physicians was launched in winter 2018.

Antimicrobial Stewardship Curriculum for Health Professionals

MODULE 1:
Consequences of Use of Antimicrobial Agents

Learning Outcomes

By the end of this module, you should be able to

- define, in plain language, the term antimicrobial resistance (AMR)
- explain how the use of antimicrobial agents contribute to the development of AMR
- identify antimicrobial-resistant organisms (AROs) common to Canadian primary care settings, and
- differentiate between short and long-term harms of antimicrobial use on individual patients and broader community health.

A CME accredited learning module, was developed through the University of Waterloo.

Summary of significant trends

AMR

- Colonization by carbapenemase-producing organisms has increased in hospitals and the community
- Rates of *C. difficile* infection coming from healthcare settings continue to decline
- Rate of methicillin-resistant *Staphylococcus aureus* (MRSA) infection coming from the community has doubled
- MRSA blood stream infections remain high in paediatric hospitals
- Increasing rates of vancomycin-resistant *Enterococcus* infections still being seen in hospitals
- Azithromycin resistance in *Neisseria gonorrhoea* has doubled

AMU

- Canadians 60 years of age and older are using more antimicrobials
- No reported use of fluoroquinolones or third generation cephalosporins by sentinel chicken farms, consistent with recent policy changes banning preventative use of medically important antimicrobials (Category I antimicrobials) on poultry farms across Canada

Planned activities for 2019 – 2020

- Targeted surveillance to better understand the rate of CPO colonization in the community through new initiatives with provincial and local partners;
- Expand surveillance activities to capture patients admitted to hospitals with AMR infections that are acquired in the community;
- Improve the representativeness of hospital-based AMR surveillance through enrolment of additional hospitals in remote areas;
- Align practices with international stakeholders by collecting data on all *Staphylococcus aureus* bloodstream infections as of 2018 (previously only MRSA BSI), so that the proportion resistant infections can be determined;
- Collect antimicrobial susceptibility (antibiogram) data for *Escherichia coli* infections as a first step to identify patterns of resistance for bacterial infections in health-care settings, with consideration being given to expanding the number of organisms captured in the surveillance initiative;
- Building on the success of the pilot projects, implement point prevalence studies to assess AMR and prescribing practices in northern and smaller community hospitals, as well as long term care facilities;
- Begin to develop an interactive data display and visualisation platform to show community-level antimicrobial susceptibility data (AMR-Net);
- Understand antimicrobial prescribing practices in the community through a cross-sectional survey that collects information related to in-home AMU practices, including compliance and patient understanding as to why and how the antimicrobial was prescribed; and
- Include results from freshwater finfish aquaculture AMU surveillance in future reports.



Contact us by e-mail at:

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CARSS report at:

<https://www.canada.ca/en/public-health/services/publications/drugs-health-products/canadian-antimicrobial-resistance-surveillance-system-2018-report-executive-summary.html>

