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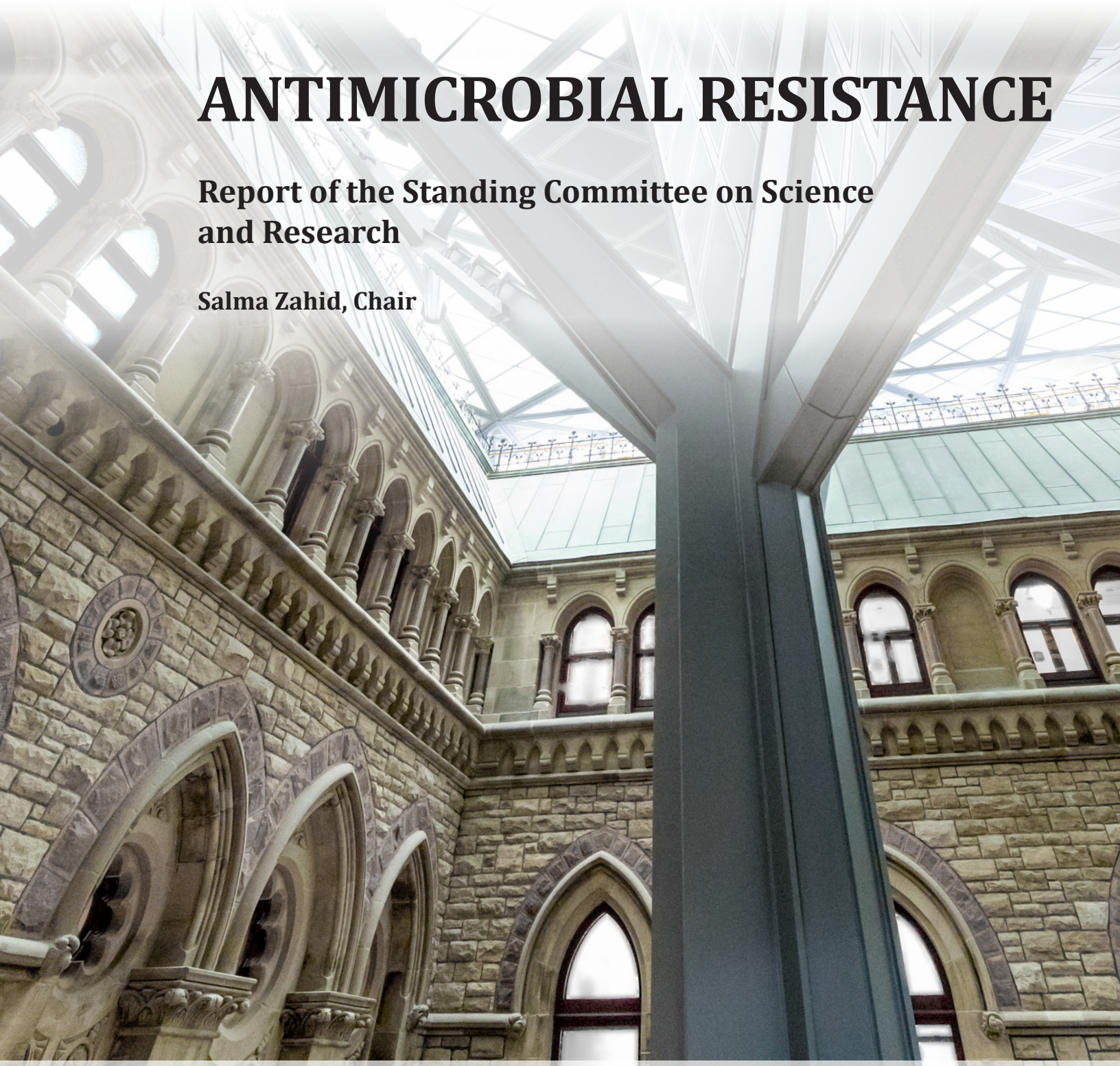

ANTIMICROBIAL RESISTANCE

Report of the Standing Committee on Science and Research

Salma Zahid, Chair

MAY 2026
45th PARLIAMENT, 1st SESSION

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NOTICE TO READER

Reports from committees presented to the House of Commons

Presenting a report to the House is the way a committee makes public its findings and recommendations on a particular topic. Substantive reports on a subject-matter study usually contain a synopsis of the testimony heard, the recommendations made by the committee, as well as the reasons for those recommendations.

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THE STANDING COMMITTEE ON SCIENCE AND RESEARCH

has the honour to present its

THIRD REPORT

Pursuant to its mandate under Standing Order 108(3)(i), the committee has studied antimicrobial resistance and has agreed to report the following:

TABLE OF CONTENTS

SUMMARY

On 18 June 2025, the House of Commons Standing Committee on Science and Research (the Committee) decided to undertake a study on antimicrobial resistance (AMR). During its study, the Committee held four meetings between 6 and 22 October 2025. It heard from 23 witnesses and received eight briefs.

AMR occurs when organisms – bacteria, most commonly – become resistant to one or more of the antimicrobials used to treat corresponding infections. It is considered a major threat to human, animal and agricultural health. Experts say that, currently, one in four patients experiencing an infection are resistant to the antimicrobial most commonly used to treat that infection. In Canada, the Committee heard that AMR was responsible for approximately 5,400 deaths in 2018.

AMR is largely driven by the misuse and overuse of antimicrobials. This can be exacerbated by other issues, such as overburdened health care systems, increased global mobility, and armed conflict.

The Committee heard about various challenges Canada faces in addressing AMR, including:

- underfunding of the innovation and research ecosystem, the resulting loss of talent to other fields and jurisdictions, and delays in developing and commercializing new therapies and diagnostics for antimicrobial infections;
- regulatory and market disincentives that reduce the likelihood of pharmaceutical companies bringing new antimicrobials to market in Canada, and the lack of access to novel antibiotics; and
- surveillance gaps related to AMR in non-hospital settings and the environment.

In response to these challenges, the Committee made 15 recommendations for the Government of Canada to enhance Canada's ability to combat AMR, including:

- increased funding for AMR research;

- the development and deployment of push and pull incentives, and changes to the regulatory and valuation processes for novel antimicrobials to support their availability in Canada;

- enhanced AMR surveillance, infection prevention and control, and stewardship practices; and

- federal leadership in addressing AMR, such as through the full and timely implementation of the Pan-Canadian Action Plan on Antimicrobial Resistance and the adoption of a One Health approach to coordinate federal efforts.

The Committee would like to thank all the individuals and organizations that participated in this study.

LIST OF RECOMMENDATIONS

As a result of their deliberations committees may make recommendations which they include in their reports for the consideration of the House of Commons or the Government. Recommendations related to this study are listed below.

ANTIMICROBIAL RESISTANCE

INTRODUCTION

On Wednesday, 18 June 2025, the House of Commons Standing Committee on Science and Research (the Committee) adopted a motion to

> study antimicrobial resistance (AMR), including (i) resistant organisms, (ii) what is driving an increase in AMR, (iii) clinical and economic impacts of AMR in Canada, and (iv) what is needed to support research for new antimicrobial agents, nonpharmacological strategies to eliminate or modify AMR bacteria, new methods of antibacterial drug identification and strategies that neutralize virulence factors.[1]

During its study, the Committee held four meetings between 6 and 22 October 2025. It heard from 23 witnesses and received eight briefs. The Committee would like to thank all the individuals and organizations that participated in this study.

Based on this evidence, the Committee has made 15 recommendations to the Government of Canada to enhance Canada's ability to combat AMR. These recommendations aim to increase AMR research, the commercialization of antimicrobials, surveillance, infection prevention and control, and stewardship practices, and federal leadership.

1 House of Commons, Standing Committee on Science and Research (SRSR), *Minutes of Proceedings*, 18 June 2025.

THE SCOPE AND IMPACT OF ANTIMICROBIAL RESISTANCE

Antimicrobials are medicines used to treat bacterial (antibiotics), viral (antivirals), fungal (antifungals), or parasitic (antiparasitics) infections by killing or blocking the growth of microorganisms causing these infections.[2]

Antibiotics are the most frequently discussed antimicrobials. A 2019 publication on antibiotic use in Canada reported that the most common infections treated with antibiotics are respiratory tract infections, urinary tract infections, and ear infections.[3] Antibiotics are also important components of modern cancer treatment, organ and joint transplants, and surgery such as caesarean births.[4]

Beyond human health care, antimicrobials are also used in the veterinary and agricultural sectors to support the health of animals and plants.[5] Many antimicrobials used in animals are closely related or identical to those used in humans.[6] As Dr. Isaac Bogoch (Infectious Diseases Specialist at the Toronto General Hospital and a Professor of Medicine at the University of Toronto, appearing as an individual) testified, "about 70% of the global antibiotic consumption is in agricultural animals, with only about 30% of use in humans."[7]

Dr. John Conly (Professor of Medicine at the University of Calgary, appearing as an individual) described the extent of antibiotic use as humans "using an estimated 34.8 billion antibiotic doses per year with a 65% increase between 2000 and 2015. In

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2 World Health Organization (WHO), *GLASS manual for antimicrobial resistance surveillance in common bacteria causing human infection*, 31 August 2023, p. 1; Government of Canada, *Antibiotic use in Canada: Preserving antibiotics now and in the future*; Government of Canada, *Canadian Antimicrobial Resistance Surveillance System (CARSS): Antimicrobial resistance*; Government of Canada, *Tackling Antimicrobial Resistance and Antimicrobial Use: A Pan-Canadian Framework for Action*, 5 September 2017; Government of Canada, *Antimicrobial Resistance and Use in Canada: A Federal Framework for Action*; Council of Canadian Academies (CCA), *Overcoming Resistance: The Expert Panel on Antimicrobial Availability*, 7 September 2023; WHO, *Antimicrobial resistance*, 21 November 2023; World Organisation for Animal Health, *Antimicrobial resistance*; and House of Commons, Standing Committee on Health, *A Study on the Status of Antimicrobial Resistance in Canada and Related Recommendations*, Sixteenth report, May 2018.

3 Government of Canada, *Antibiotic use in Canada: Preserving antibiotics now and in the future*.

4 Government of Canada, *Mary's story: How antibiotic resistance impacts lives*; and Government of Canada, *Pan-Canadian Action Plan on Antimicrobial Resistance*, 22 June 2023.

5 SRSR, *Evidence*, 6 October 2025, 1105 (Isaac Bogoch, Infectious Diseases Specialist, Toronto General Hospital and Professor of Medicine, University of Toronto, As an individual); and François Arès, Caroline Raymond and François M. Castonguay, *The Socio-Economic Impacts of Antimicrobial Resistance in Quebec by 2050*, Brief submitted to SRSR, 3 November 2025, p. 3.

6 SRSR, *Evidence*, 6 October 2025, 1100 (Dr. Herman Barkema, Professor, Epidemiology of Infectious Diseases, Faculty of Veterinary Medicine, University of Calgary, As an individual).

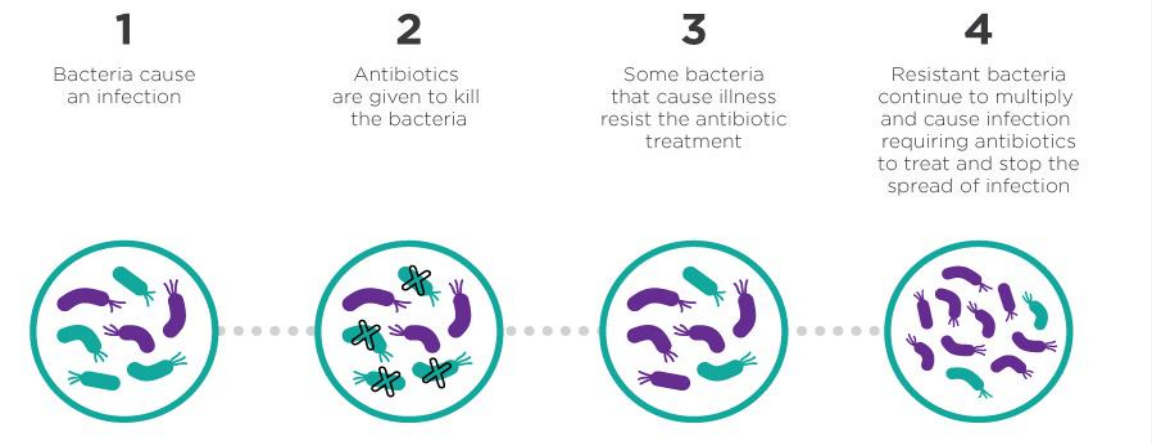
7 SRSR, *Evidence*, 6 October 2025, 1105 (Isaac Bogoch).

animal and agricultural use, it ranged between 63,000 to 240,000 tonnes per year."[8] According to Jenna Sauve (Antimicrobial Stewardship Pharmacotherapy Specialist, appearing as an individual), "[a]ntimicrobials are critical tools in modern medicine, required by most Canadians at least once in their lifetime."[9]

Scope of Antimicrobial Resistance

As Dr. Kevin Stinson (Program Manager in Infection Prevention and Control with the Waterloo Regional Health Network and Infection Prevention and Control Canada) wrote in a brief submitted to the Committee, "[i]n 2019, the World Health Organization (WHO) released a list of the top 10 threats to global health, including antimicrobial resistance (AMR). AMR is when microorganisms, including bacteria, viruses, parasites, and fungi, become resistant to one or more classes of antimicrobial agents used to treat them."[10] Figure 1 illustrates this process.

Figure 1—How Antimicrobial Resistance Develops



Source: Government of Canada, *Tackling Antimicrobial Resistance and Antimicrobial Use: A Pan-Canadian Framework for Action*, 5 September 2017.

8 SRSR, *Evidence*, 6 October 2025, 1105 (John Conly, Professor of Medicine, University of Calgary, As an individual).

9 SRSR, *Evidence*, 8 October 2025, 1740 (Jenna Sauve, Antimicrobial Stewardship Pharmacotherapy Specialist, As an individual).

10 Kevin J. Stinson, *Evidence Brief: Antimicrobial Resistance (AMR) in Canada, with a focus on research needs in human healthcare systems*, Brief submitted to SRSR, 20 October 2025, p. 3.

This process makes infections harder to treat and increases the risk of disease spread, severe illness, disability, and death.[11] Antimicrobial resistance can pass between humans, animals, crops and the environment, as resistant microorganisms are transmitted through direct contact, contact with bodily fluids, or through contaminated food or water.[12]

Witnesses described AMR as a very serious challenge currently facing Canada and the world, calling it a "silent pandemic,"[13] "one of the most pressing public health challenges of our time,"[14] and "an existential threat to Canadian health and prosperity."[15]

Dr. Sameeh Salama (Chair of the Canadian Antimicrobial Innovation Coalition and Chief Scientific Officer of Fedora Pharmaceuticals Inc.) testified to the scope of AMR, saying that "[r]ight now, in Canada, we're seeing one in four patients presenting with a resistant infection. By 2050, this number is projected to be 40%, so we're looking roughly about one in two patients having infections that are resistant to standard treatment."[16] As Dr. Bettina Hamelin (President and Chief Executive Officer of Innovative Medicines Canada) said, "[a]ntimicrobial resistance is not a future threat; it's a present crisis."[17]

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11 SRSR, *Evidence*, 20 October 2025, 1120 (Kim Neudorf, Patient Partner, Patients for Patient Safety Canada); SRSR, *Evidence*, 20 October 2025, 1125 (Dr. Kevin Stinson, Program Manager, Infection Prevention and Control, Waterloo Regional Health Network, Infection Prevention and Control Canada); SRSR, *Evidence*, 22 October 2025, 1720 (Prof. Kevin Outterson, Founding Executive Director, CARB-X); SRSR, *Evidence*, 22 October 2025, 1750 (Dr. Dao Nguyen, Founder and Director, McGill AMR Centre); AntiMicrobial Resistance Québec Network, *Brief for the House of Commons Standing Committee on Science and Research Study on Antimicrobial Resistance*, 3 November 2025, p. 3; and SRSR, *Evidence*, 8 October 2025, 1740 (Jenna Sauve).

12 Government of Canada, *Antimicrobial resistance: Healthy Canadians podcast episode 3*; Government of Canada, *Tackling Antimicrobial Resistance and Antimicrobial Use: A Pan-Canadian Framework for Action*, 5 September 2017; Government of Canada, *Antimicrobial Resistance and Use in Canada: A Federal Framework for Action*; Government of Canada, *Antibiotic resistance research and surveillance;* Government of Canada, *Pan-Canadian Action Plan on Antimicrobial Resistance*, 22 June 2023; and SRSR, *Evidence*, 20 October 2025, 1105 (Dr. Kevin Stinson).

13 SRSR, *Evidence*, 20 October 2025, 1105 (Dr. Kevin Stinson).

14 SRSR, *Evidence*, 6 October 2025, 1210 (Dr. Rita Dhami, Adjunct Clinical Assistant Professor, School of Pharmacy, University of Waterloo, As an individual).

15 SRSR, *Evidence*, 22 October 2025, 1635 (Dr. Gerry Wright, Professor, Michael G. DeGroote Institute for Infectious Disease Research, McMaster University, As an individual).

16 SRSR, *Evidence*, 6 October 2025, 1235 (Dr. Sameeh Salama, Chair and Chief Scientific Officer, Canadian Antimicrobial Innovation Coalition, Fedora Pharmaceuticals Inc.).

17 SRSR, *Evidence*, 20 October 2025, 1110 (Bettina Hamelin, President and Chief Executive Officer, Innovative Medicines Canada).

Dr. Kevin Stinson explained to the Committee that resistance is often developed and spread between individuals before an infection even develops, a spread which can be exacerbated by overcrowded living conditions, poor sanitation, and other environmental factors:

> Certainly, the drug and opioid epidemic and the associated homelessness or underhoused challenges that that's creating… You have people being crammed into very poor living conditions, often with poor states of sanitation, poor overall states of health and poor access to health care facilities themselves. It ends up being an area that's really unexplored but highly concerning for transmission within that population. You imagine one person going back into that population or into that encampment, for example, and the challenges. If they are colonized with an [antibiotic resistant organism (ARO)], they can now start to transmit to those around them. Again, it's not necessarily an infection at that point; it's colonization. Now, though, the person has resistant bacteria as part of their normal microflora. If the person gets, let's say, a bacterium from injecting opioids, that now has a risk of being a resistant bacterium, which has significant impacts on their health.[18]

Socio-Economic Burden of Antimicrobial Resistance

Witnesses presented data on the current and expected future loss of life associated with AMR, and subsequent costs to the healthcare system.[19] Dr. Isaac Bogoch testified to a recent study published in *The Lancet* that estimated that, globally, there are "about 1.27 million annual deaths directly caused by AMR, with 4.7 million deaths where AMR played some role. Now, that's more deaths—4.7 million—per year than HIV, tuberculosis and malaria combined."[20] In Canada, Dr. Gerry Wright (Professor at the Michael G. DeGroote Institute for Infectious Disease Research at McMaster University, appearing as an individual) reported that AMR "cost Canada $1.4 billion in direct health care expenses and caused 5,400 deaths in 2018 alone."[21] Dr. Sameeh Salama estimated that "[t]his

18 SRSR, *Evidence*, 20 October 2025, 1145 (Dr. Kevin Stinson).

19 SRSR, *Evidence*, 20 October 2025, 1110 (Bettina Hamelin); SRSR, *Evidence*, 6 October 2025, 1105 (Isaac Bogoch); SRSR, *Evidence*, 22 October 2025, 1635 (Dr. Gerry Wright); SRSR, *Evidence*, 6 October 2025, 1235 (Dr. Sameeh Salama); AntiMicrobial Resistance Québec Network, *Brief for the House of Commons Standing Committee on Science and Research Study on Antimicrobial Resistance*, 3 November 2025, p. 3; SRSR, *Evidence*, 6 October 2025, 1110 (Dr. François M. Castonguay, Assistant Professor of Health Economics, School of Public Health, Université de Montréal, As an individual); SRSR, *Evidence*, 6 October 2025, 1115 (John Conly); François Arès et al., *Leveraging Economics and the One Health Approach to Unlock the Full Potential of the Pan-Canadian Action Plan Antimicrobial Resistance*, Brief submitted to SRSR, 9 October 2025, pp. 1–2; SRSR, *Evidence*, 20 October 2025, 1120 (Kim Neudorf); Sepsis Alliance, "Sepsis and Health Equity Fact Sheet," Written submission to SRSR, November 2025, p. 1; and François Arès, Caroline Raymond and François M. Castonguay, *The Socio-Economic Impacts of Antimicrobial Resistance in Quebec by 2050*, Brief submitted to SRSR, 3 November 2025, p. 1.

20 SRSR, *Evidence*, 6 October 2025, 1105 (Isaac Bogoch).

21 SRSR, *Evidence*, 22 October 2025, 1635 (Dr. Gerry Wright).

translates to roughly 400,000 Canadians dying every year from AMR by 2050, at a cost of $120 billion to the hospitals and $380 billion in [Gross Domestic Product (GDP)] loss."[22] In a brief submitted to the Committee by François Arès, Caroline Raymond and François M. Castonguay, they situated it further within the Québec context, writing that:

> [T]aking into account its demographic weight (21.75% of Canada's population) and age structure, AMR could lead to between 1,500 and 3,000 deaths per year in the province by 2050. Assuming a case profile and hospital unit costs comparable to the Canadian average, this would represent annual expenditures of approximately $1.2 to $1.7 billion for Quebec's health care system by 2050. In terms of overall economic impact, adjusting GDP losses according to Quebec's demographic weight and the Quebec/Canada GDP per capita ratio (0.89), the annual loss to Quebec's GDP could be between $2.6 and $4.2 billion per year in 2050.[23]

To illustrate, Kim Neudorf (Patient Partner at Patients for Patient Safety Canada) presented the following example:

> A healthy 70-year-old had a simple fracture of her foot. Two days later, there was pain in the cast, and her vital signs and cognition were worrisome. When the cast was removed, the foot looked terrible. Sepsis was eventually diagnosed. MRSA, an AMR pathogen, was identified. There were 419 consecutive days of hospital care. She lost her foot and averted amputation of her arm by two hours. Sepsis returned a second time and, in the end, MRSA and sepsis cost her her life.
>
> Health care costs were estimated at $750,000. She never received a prosthesis, but a prosthetic foot can cost $15,000. For a hand, it's potentially $250,000. Her devoted husband was at her side each of those 419 days, incurring hotel, food and fuel costs. He did not go to work.[24]

These deaths emerge out of an inability to treat resistant infections with available antibiotics. As Dr. Herman Barkema (Professor of Epidemiology of Infectious Diseases in the Faculty of Veterinary Medicine at the University of Calgary, appearing as an individual) testified, "[w]ithout effective antibiotics, many easily treatable infections in humans and animals would be fatal. Some routine medical procedures, like hip and knee replacements and certain types of chemotherapy, would pose unacceptable risks to patients."[25]

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22 SRSR, *Evidence*, 6 October 2025, 1235 (Dr. Sameeh Salama).

23 François Arès, Caroline Raymond and François M. Castonguay, *The Socio-Economic Impacts of Antimicrobial Resistance in Quebec by 2050*, Brief submitted to SRSR, 3 November 2025, p. 2.

24 SRSR, *Evidence*, 20 October 2025, 1120 (Kim Neudorf).

25 SRSR, *Evidence*, 6 October 2025, 1100 (Dr. Herman Barkema).

Beyond human health, witnesses also noted that AMR is a threat to animal health and agricultural output.[26] Dr. Scott Weese (Professor at the University of Guelph and the Director of the Centre for Public Health and Zoonoses, appearing as an individual) noted that "[t]he World Organisation for Animal Health has estimated that by 2050, if AMR is unchecked, food animal production losses will be equivalent to the food needs of 750 million to two billion people."[27]

More broadly, the negative health outcomes of AMR—both human and animal—have further effects on the economy.[28] As Dr. François M. Castonguay (Assistant Professor of Health Economics at the Université de Montréal's School of Public Health, appearing as an individual) testified:

> AMR is not just a health care problem; it's also affecting the broader economy. The negative impact on GDP could grow to $21 billion by 2050, and the impact on non-health care sectors is expected to grow significantly. It represents about 30% today, but by 2050, about two-thirds of costs would be attributable to non-health care sectors, driven mostly by sectors like animal product manufacturing and labour-intensive industries.[29]

While AMR is a universal issue, the committee heard that there are also certain populations that can be more at risk of developing resistant infections, including First Nations peoples, people undergoing chemotherapy and people using drugs.[30] Background research conducted as part of this study identified the following populations as being at increased risk for AMR infections:

- infants, particularly neonatal patients;

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26 SRSR, *Evidence*, 8 October 2025, 1745 (Dr. Scott Weese, Professor, University of Guelph and Director, Centre for Public Health and Zoonoses, As an individual); and SRSR, *Evidence*, 6 October 2025, 1100 (Dr. Herman Barkema).

27 SRSR, *Evidence*, 8 October 2025, 1745 (Dr. Scott Weese).

28 SRSR, *Evidence*, 20 October 2025, 1110 (Bettina Hamelin); SRSR, *Evidence*, 6 October 2025, 1110 (Dr. François M. Castonguay); SRSR, *Evidence*, 6 October 2025, 1115 (John Conly); SRSR, *Evidence*, 6 October 2025, 1235 (Dr. Sameeh Salama); Kevin J. Stinson, *Evidence Brief: Antimicrobial Resistance (AMR) in Canada, with a focus on research needs in human healthcare systems*, Brief submitted to SRSR, 20 October 2025, p. 3; and François Arès et al., *Leveraging Economics and the One Health Approach to Unlock the Full Potential of the Pan-Canadian Action Plan Antimicrobial Resistance*, Brief submitted to SRSR, 9 October 2025, p. 2.

29 SRSR, *Evidence*, 6 October 2025, 1110 (Dr. François M. Castonguay).

30 SRSR, *Evidence*, 6 October 2025, 1145 (Dr. Herman Barkema); SRSR, *Evidence*, 22 October 2025, 1820 (Dr. Henry Skinner, Chief Executive Officer, AMR Action Fund GP); Sepsis Alliance, "Sepsis and Health Equity Fact Sheet," Written submission to SRSR, November 2025; SRSR, *Evidence*, 20 October 2025, 1145 (Dr. Kevin Stinson); and SRSR, *Evidence*, 8 October 2025, 1740 (Jenna Sauve).

- older people, particularly residents of long-term care facilities;
- people who do work that involves contact with agricultural animals;
- people with a chronic illness or serious injury;
- people who have previously received antimicrobial treatment;
- people who have limited access to health care;
- people who participate in sports that involve physical contact;
- people with pets;
- gay, bisexual and other men who have sex with men;
- people who inject drugs;
- people born outside of Canada;
- Indigenous people;
- sex workers;
- people who live in communities with low access to primary health care;
- people whose living conditions involve overcrowding; and
- unhoused populations.[31]

Regarding drug use and homelessness in particular, the Committee notes the scope of those challenges and the associated impact on antimicrobial resistance. A 2025 report on *Opioid- and Stimulant-related Harms in Canada* found, for example, that "[t]here were 208,615 reported opioid-related poisoning emergency department visits reported between January 2016 to June 2025."[32] The *Everyone Counts* report for 2024,

31 Government of Canada, *Canadian Antimicrobial Resistance Surveillance System (CARSS): 2024 Key findings*, 20 November 2024; CCA, *When Antibiotics Fail: The Expert Panel on the Potential Socio-Economic Impacts of Antimicrobial Resistance in Canada*, 12 November 2019; CCA, *Overcoming Resistance: Expert Panel on Antimicrobial Availability*, 7 September 2023; Government of Canada, *Pan-Canadian Action Plan on Antimicrobial Resistance*, 22 June 2023; and Government of Canada, *Tackling Antimicrobial Resistance and Antimicrobial Use: A Pan-Canadian Framework for Action*, 5 September 2017.

32 Government of Canada, *Opioid- and Stimulant-related Harms in Canada*, 11 December 2025.

meanwhile, found that "nearly 60,000 people in 74 communities across Canada were identified as experiencing homelessness" during the night data was collected.[33]

The risk factors identified above can also be distributed unevenly across Canada, resulting in different levels of community vulnerability to AMR. For example, a brief submitted to the Committee by François Arès, Caroline Raymond and François M. Castonguay noted that:

> Quebec has a number of factors that make it vulnerable to AMR. Its population, which is older than the Canadian average (20% aged 65 and over, a proportion that is expected to reach 26% by 2041), is therefore more exposed to resistant infections, the burden of which–hospital stays, mortality, costs–increases significantly with age. Canadian hospital analyses show that the majority of deaths attributable to AMR occur among seniors, for whom the costs per case are also higher. A simple demographic adjustment suggests that Quebec could face additional costs of approximately 3.4% compared to the Canadian average.[34]

DRIVERS OF ANTIMICROBIAL RESISTANCE

AMR happens naturally as a result of antimicrobial use, but the process can be accelerated.[35] The following sections outline drivers of increased AMR identified by witnesses.

33 Government of Canada, *Everyone Counts 2024—Highlights Report Part 1—Enumeration of Homelessness*.

34 François Arès, Caroline Raymond and François M. Castonguay, *The Socio-Economic Impacts of Antimicrobial Resistance in Quebec by 2050*, Brief submitted to SRSR, 3 November 2025, p. 3.

35 Government of Canada, *About antimicrobial resistance*; Government of Canada, *Canadian Antimicrobial Resistance Surveillance System (CARSS): 2024 Key findings*, 20 November 2024; House of Commons, Standing Committee on Health, *A Study on the Status of Antimicrobial Resistance in Canada and Related Recommendations*, Sixteenth report, May 2018; CCA, *When Antibiotics Fail: The Expert Panel on the Potential Socio-Economic Impacts of Antimicrobial Resistance in Canada*, 12 November 2019; CCA, *Overcoming Resistance: The Expert Panel on Antimicrobial Availability*, 7 September 2023; Government of Canada, *Pan-Canadian Action Plan on Antimicrobial Resistance*, 22 June 2023; and Government of Canada, *Evaluation of the Coordination of Antimicrobial Resistance (AMR) Activities*, March 2019.

Misuse and Overuse of Antimicrobials

The misuse and overuse of antimicrobials was identified as one of the key drivers of increased AMR.[36] Jenna Sauve explained that "[w]hile resistance occurs naturally, it's accelerated by the misuse and overuse of antimicrobials across the different sectors. […] An estimated 15% to 25% of antibiotic prescriptions in Canada are considered unnecessary."[37]

Beyond human health, witnesses and briefs also discussed the widespread use of prophylactic antibiotics in animal agriculture, as a way to prevent disease, which can also contribute to increased AMR.[38] Dr. Herman Barkema noted that, to address this issue, "Quebec has taken the lead on this recently, four years ago, by not letting agricultural producers use class I antimicrobials anymore–the antimicrobials that need to be reserved for human infections–and that is working very well."[39] Leanne McConnachie also noted the Quebec policy, as well as identifying similar policies in the European Union and Denmark.[40]

Health Care System Capacity

Health care systems operating under resource constraints was another driver identified during the study, as such constraints can lead to increased infections and the overprescribing of antimicrobials.[41] As Gregory Rose (Infectious Diseases and Infection Control Consultant with Infection Prevention and Control Canada) testified, shared

36 SRSR, *Evidence*, 6 October 2025, 1105 (Isaac Bogoch); SRSR, *Evidence*, 8 October 2025, 1740 (Jenna Sauve); SRSR, *Evidence*, 6 October 2025, 1235 (Dr. Sameeh Salama); SRSR, *Evidence*, 6 October 2025, 1210 (Dr. Rita Dhami); SRSR, *Evidence*, 6 October 2025, 1115 (John Conly); and François Arès et al., *Leveraging Economics and the One Health Approach to Unlock the Full Potential of the Pan-Canadian Action Plan Antimicrobial Resistance*, Brief submitted to SRSR, 9 October 2025, p. 1.

37 SRSR, *Evidence*, 8 October 2025, 1740 (Jenna Sauve).

38 Leanne McConnachie, *Submission to the House of Commons Standing Committee on Science and Research*, Brief submitted to SRSR, 24 October 2025, p. 2; SRSR, *Evidence*, 6 October 2025, 1210 (Dr. Rita Dhami); François Arès et al., *Leveraging Economics and the One Health Approach to Unlock the Full Potential of the Pan-Canadian Action Plan Antimicrobial Resistance*, Brief submitted to SRSR, 9 October 2025, p. 1; and Dr. Kevin Stinson, "Response to SRSR Questions Re: Research priorities on AMR," Written submission to SRSR, 27 October 2025, p. 3.

39 SRSR, *Evidence*, 6 October 2025, 1130 (Dr. Herman Barkema).

40 Leanne McConnachie, *Submission to the House of Commons Standing Committee on Science and Research*, Brief submitted to SRSR, 24 October 2025, pp. 2–3.

41 SRSR, *Evidence*, 8 October 2025, 1830 (Jenna Sauve); SRSR, *Evidence*, 6 October 2025, 1230 (Gregory Rose, Infectious Diseases and Infection Control Consultant, Infection Prevention and Control Canada); and Results Canada, *Antimicrobial Resistance*, Brief submitted to SRSR, October 2025, p. 2.

hospital rooms and washroom facilities, often driven by capacity constraints, can contribute to AMR:

> For 30 years now we've had Canadian Standards Association recommendations that there not be any rooms in any hospitals in Canada where there is more than one patient or there is less than one toilet per patient, because we know that being in the same environment and, particularly, sharing the same washroom facilities, is a risk of transmission of a wide variety of pathogens: in particular, gram-negative organisms. These are bacteria that live in our gut, that cause a wide variety of infections and that in fact are one of the chief concerns when we think about antimicrobial resistance.[42]

Global Mobility

Witnesses also identified increased global mobility as a driver of AMR, as people and resistant organisms travel more widely.[43] As Dr. Sameeh Salama explained, "[t]ravel across the world has made it very easy for antibiotic-resistant bugs to travel between countries."[44]

The global spread of COVID-19 was used as an example of the power of this effect.[45] As Dr. John Conly testified:

> In 2024, there were one billion people who took airline flights across the world. You can see how rapidly—and just from the pandemic that we had with COVID-19—in such a shrunken world how AMR can spread so readily. COVID has had a major impact.
>
> The [Centers for Disease Control and Prevention (CDC)] released a study just recently, and showed that there was a statistically significant increase in both bacteria and fungi related to this. There was also a systematic review in which Dr. Barkema and I were involved. It was published in 2022. It showed a markedly increased prevalence of antibiotic-resistant microbes associated with the COVID pandemic.[46]

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42 SRSR, *Evidence*, 6 October 2025, 1230 (Gregory Rose).

43 SRSR, *Evidence*, 6 October 2025, 1240 (Dr. Sameeh Salama); SRSR, *Evidence*, 6 October 2025, 1210 (Dr. Rita Dhami); SRSR, *Evidence*, 6 October 2025, 1115 (John Conly); SRSR, *Evidence*, 22 October 2025, 1700 (Dr. Louis-Patrick Haraoui, Associate Professor, Faculty of Medicine and Health Sciences, Université de Sherbrooke, As an individual); Results Canada, *Antimicrobial Resistance*, Brief submitted to SRSR, October 2025, p. 2; and SRSR, *Evidence*, 6 October 2025, 1105 (Isaac Bogoch).

44 SRSR, *Evidence*, 6 October 2025, 1240 (Dr. Sameeh Salama).

45 SRSR, *Evidence*, 6 October 2025, 1115 (John Conly); and SRSR, *Evidence*, 22 October 2025, 1820 (Dr. Henry Skinner).

46 SRSR, *Evidence*, 6 October 2025, 1115 (John Conly).

Two witnesses further identified armed conflict and modern urban warfare as a driver of AMR.[47] Dr. Louis-Patrick Haraoui (Associate Professor in the Faculty of Medicine and Health Sciences at the Université de Sherbrooke, appearing as an individual) testified that:

> Armed conflicts were among the first settings in which AMR was recognized as a novel phenomenon in the 1940s. Although research has since largely shifted toward peacetime and civilian contexts, resistant pathogens continue to emerge and spread rapidly in war zones. This trend has intensified as warfare increasingly unfolds in densely populated urban areas and targets civilian populations, including vulnerable groups such as children.[48]

Dr. Isaac Bogoch further discussed how, in the ongoing war in Ukraine, "up to 80% of combat wound infections are resistant to conventional first line antibiotics."[49]

CURRENT STATE OF ANTIMICROBIAL RESISTANCE MITIGATION IN CANADA

In Canada, several initiatives are in place to help better understand and mitigate AMR, stewarded at the national level by the Pan-Canadian Action Plan on Antimicrobial Resistance.[50] Launched in June 2023, the Pan-Canadian Action Plan on Antimicrobial Resistance is structured around five central pillars:

1) surveillance, or detecting and tracking the spread of AMR;

2) stewardship, or efforts to conserve and protect the efficacy of existing antimicrobials;

3) infection prevention and control, or reducing the rate and spread of infections;

4) research and innovation into new antimicrobials, alternatives to antimicrobials and other research-driven mitigation efforts for AMR; and

47 SRSR, *Evidence*, 22 October 2025, 1630 (Dr. Louis-Patrick Haraoui); and SRSR, *Evidence*, 6 October 2025, 1105 (Isaac Bogoch).

48 SRSR, *Evidence*, 22 October 2025, 1630 (Dr. Louis-Patrick Haraoui).

49 SRSR, *Evidence*, 6 October 2025, 1105 (Isaac Bogoch).

50 Government of Canada, *Antimicrobial resistance: What Canada's doing*; Canadian Institutes of Health Research (CIHR), Antimicrobial Resistance—Featured Research; Government of Canada, *Antimicrobial resistance: Healthy Canadians podcast episode 3*; and Government of Canada, *Pan-Canadian Action Plan on Antimicrobial Resistance*, 22 June 2023.

5) leadership, including coordination between various partners and drawing increased attention to AMR and the need to address it.[51]

Some of the programs that fall within the scope of the action plan include:

- the Antimicrobial Resistance Network (AMRNet) and AMRNet-Vet, surveillance systems for human and animal AMR data, respectively;
- the Canadian Animal Health Surveillance Network, which coordinates the collection of animal surveillance data across Canada;
- the Canadian Antimicrobial Resistance Surveillance System (CARSS), which collects and reports data on antimicrobial resistance and use in Canada;
- the Gonococcal Antimicrobial Surveillance Program;
- the Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS), a program that collects, analyzes and communicates trends in antimicrobial use and AMR;
- the Canadian Nosocomial Infection Surveillance Program (CNISP), which collects data on resistant organisms and monitors antimicrobial use in hospitalized patients;
- the Canadian Tuberculosis Laboratory Surveillance System, which monitors tuberculosis spread and resistance in Canada;
- the Enhanced Surveillance of Antimicrobial-Resistant Gonorrhea program; and

51 CIHR, Antimicrobial Resistance—Featured Research; Government of Canada, *Antimicrobial resistance: Healthy Canadians podcast episode 3*; Government of Canada, *Tackling Antimicrobial Resistance and Antimicrobial Use: A Pan-Canadian Framework for Action*, 5 September 2017; Government of Canada, *Pan-Canadian Action Plan on Antimicrobial Resistance*, 22 June 2023; and Government of Canada, *Evaluation of the Coordination of Antimicrobial Resistance (AMR) Activities*, March 2019.

- the Genomics Research and Development Initiative, which includes funding for research into AMR.[52]

Federal departments and agencies engaged in AMR-related initiatives include:

- Agriculture and Agri-Food Canada, which supports the development and adoption of animal care, biosecurity, and on-farm food safety assurance systems;

- the Canadian Food Inspection Agency, which enforces regulatory requirements for the health and safety of animals and the food supply through inspection, surveillance, and licensing programs;

- the Canadian Institutes of Health Research, which funds and promotes research related to the emergence and spread of antimicrobial resistance, new antimicrobials, alternatives to antimicrobials, the development of diagnostic tests, antimicrobial stewardship, and surveillance;

- Health Canada, which regulates the approval of antimicrobial drugs for sale in Canada, and establishes policies and standards related to food safety; and

52 Government of Canada, *Antimicrobial resistance: What Canada's doing*; Government of Canada, *Antimicrobial resistance: Healthy Canadians podcast episode 3*; CIHR, Antimicrobial Resistance—Featured Research; Government of Canada, *Canadian Antimicrobial Resistance Surveillance System (CARSS): 2024 Key findings*, 20 November 2024; Government of Canada, *Canadian Antimicrobial Resistance Surveillance System (CARSS): Antimicrobial resistance*; Government of Canada, *CIPARS: Working with others*, 30 August 2023; Government of Canada, *CIPARS 2020 Highlights*, 6 September 2022; Government of Canada, *Tackling Antimicrobial Resistance and Antimicrobial Use: A Pan-Canadian Framework for Action*, 5 September 2017; Government of Canada, *Antimicrobial Resistance and Use in Canada: A Federal Framework for Action*; Government of Canada, *Reducing antibiotic use in poultry industry key goal for federal genomics researchers*, 16 July 2019; Government of Canada, *Antimicrobial resistance (the AMR project)*; Government of Canada, *Antimicrobial Resistance—One Health (AMR-OH project)*; CCA, *When Antibiotics Fail: The Expert Panel on the Potential Socio-Economic Impacts of Antimicrobial Resistance in Canada*, 12 November 2019; Government of Canada, *Antibiotic resistance research and surveillance*; Government of Canada, *Pan-Canadian Action Plan on Antimicrobial Resistance*, 22 June 2023; and Government of Canada, *Evaluation of the Coordination of Antimicrobial Resistance (AMR) Activities*, March 2019.

- the Public Health Agency of Canada, which works in areas related to surveillance, laboratory analysis, infectious disease outbreaks, awareness, and public health guidance.[53]

INNOVATION AND RESEARCH ECOSYSTEM CHALLENGES

Witnesses discussed challenges related to the innovation and research ecosystem around AMR, including underfunding and the structure of research funding in Canada, a loss of AMR talent to other fields and jurisdictions, the need for new therapies and diagnostics, and challenges commercializing promising innovations, all discussed in more detail in the sections below.

Underfunding and Structural Challenges

While witnesses mentioned research on AMR financed through funding from the Canadian Institutes of Health Research (CIHR), the Natural Sciences and Engineering Council of Canada (NSERC), and the Canada Foundation for Innovation (CFI), they also suggested that Canada was not sufficiently funding AMR-related research.[54] As Dr. Rita Dhami (Adjunct Clinical Assistant Professor with the School of Pharmacy at the University of Waterloo, appearing as an individual) stated, "Canada does have the scientific talent and potentially some infrastructure to lead in this field, but our research efforts remain fragmented and underfunded compared to the scale of the threat."[55]

Dr. Dao Nguyen (Founder and Director of the McGill AMR Centre) further highlighted the importance of university research, testifying that "when it comes to innovation, we

53 Government of Canada, *Antimicrobial Resistance and Use in Canada: A Federal Framework for Action*; Government of Canada, *Antibiotic resistance research and surveillance*; and Government of Canada, *Pan-Canadian Action Plan on Antimicrobial Resistance*, 22 June 2023.

54 SRSR, *Evidence*, 6 October 2025, 1135 (Isaac Bogoch); SRSR, *Evidence*, 6 October 2025, 1210 (Dr. Rita Dhami); SRSR, *Evidence*, 6 October 2025, 1230 (Dr. Sameeh Salama); SRSR, *Evidence*, 22 October 2025, 1645 (Dr. Gerry Wright); SRSR, *Evidence*, 20 October 2025, 1110 (Dr. Kevin Stinson); SRSR, *Evidence*, 6 October 2025, 1105 (Dr. Herman Barkema); SRSR, *Evidence*, 6 October 2025, 1220 (Gregory Rose); SRSR, *Evidence*, 8 October 2025, 1645 (Dr. Simon Otto, Associate Professor, University of Alberta, As an individual); SRSR, *Evidence*, 8 October 2025, 1800 (Dr. Scott Weese); SRSR, *Evidence*, 20 October 2025, 1135 (Bettina Hamelin); SRSR, *Evidence*, 22 October 2025, 1700 (Dr. Louis-Patrick Haraoui); SRSR, *Evidence*, 22 October 2025, 1715 (Prof. Kevin Outterson); SRSR, *Evidence*, 22 October 2025, 1750 (Dr. Dao Nguyen); Dr. Makeda Semret et al, *Driving Innovation: The Strategic Role of Academic Research in Combating AMR*, Brief submitted to SRSR, November 2025, p. 1; Results Canada, *Antimicrobial Resistance*, Brief submitted to SRSR, October 2025, p. 3; and Sepsis Alliance, "Sepsis and Health Equity Fact Sheet," Written submission to SRSR, November 2025, p. 1.

55 SRSR, *Evidence*, 6 October 2025, 1210 (Dr. Rita Dhami).

often forget that the seed is planted at university. […] [T]here are a huge number of innovations that originate in universities, in all sectors, including health. However, there's not enough water to make them sprout."[56]

Professor Kevin Outterson (Founding Executive Director of CARB-X) situated Canada's funding of AMR within the context of a paper he published recently:

> Earlier this year, with colleagues, I published a paper in one of the *Lancet* journals, talking about the fair share gap in antimicrobial innovation. It calls for each member of the G7 to pay their fair share of the innovation costs without free-riding. Currently, only two countries across the EU and G7 have achieved fair share: the United Kingdom and Italy. Canada, I'm afraid to say, came in last place, because the two drugs evaluated are not available here in Canada yet. The paper calls for Canada to contribute its fair share, which I calculated, in that paper, to be approximately $13 million U.S. in revenue per new drug, per year, in Canada, out of the global total of $363 million U.S.[57]

Dr. Sameeh Salama also referenced this paper, noting that the "Canadian government has already signed up to the AMR commitments, but the fair share number has been in discussion over the years. Reduced funding right now is going in the opposite direction."[58]

To increase funding, witnesses made several recommendations, with Dr. Isaac Bogoch, for example, recommending "tapping into security-related funding"[59] to address AMR, and Gregory Rose recommending "a carve-out of CIHR funding for small-cap grants of $100,000 or less for people who are not in academic centres to work on best practices in antimicrobial stewardship and infection control."[60] In a brief submitted to the Committee by Dr. Makeda Semret and colleagues, they recommended that the Government:

> Increase targeted funding for academic research programs focused on novel antimicrobial agents and non-traditional therapeutic approaches. Recognize academia's unique role in early-stage innovation, where high-risk, high-reward ideas are most likely to emerge.
>
> Support public-private incubators for AMR translation. Create new incubators or expand the mandate of existing ones—such as adMare—to include AMR-focused technologies.

56 SRSR, *Evidence*, 22 October 2025, 1815 (Dr. Dao Nguyen).

57 SRSR, *Evidence*, 22 October 2025, 1640 (Prof. Kevin Outterson).

58 SRSR, *Evidence*, 6 October 2025, 1230 (Dr. Sameeh Salama).

59 SRSR, *Evidence*, 6 October 2025, 1135 (Isaac Bogoch).

60 SRSR, *Evidence*, 6 October 2025, 1220 (Gregory Rose).

> Establish dedicated funding streams for academic spin-offs and small biotech firms working on antimicrobial solutions.
>
> Strengthen fundamental research funding. Support basic science through Tri-Council funding to underpin long-term innovation in AMR. Invest in training highly qualified personnel who will become the future workforce of Canada's pharmaceutical and biotech sectors.[61]

Beyond funding levels, witnesses also discussed how the structure of research funding in Canada, including the distinction between areas of study in the granting councils, can be a challenge for AMR research.[62] As Dr. Scott Weese testified, "I think the other issue we have is when we try to do interdisciplinary work. We don't have systems that are set up for that very well. We have NSERC, which looks at the animal, engineering and agricultural side. We have CIHR, which looks at the human side."[63]

Therefore, the Committee recommends:

Recommendation 1

That the Government of Canada increase funding for AMR research in line with established international practices among G7 partners.

Recommendation 2

That the Government of Canada create an interdisciplinary AMR research funding stream.

Loss of Talent

Witnesses noted the lack of opportunities for graduates and young researchers to develop AMR expertise in Canada, driving them to either leave the country or pursue other specializations.[64] As Dr. Sameeh Salama explained, "[o]ur graduates don't have an opportunity to work on the innovations they worked on through their grad studies.

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61 Dr. Makeda Semret et al., *Driving Innovation: The Strategic Role of Academic Research in Combating AMR*, Brief submitted to SRSR, November 2025, p. 2–3.

62 SRSR, *Evidence*, 8 October 2025, 1820 (Dr. Scott Weese); and SRSR, *Evidence*, 6 October 2025, 1135 (Isaac Bogoch).

63 SRSR, *Evidence*, 8 October 2025, 1820 (Dr. Scott Weese).

64 SRSR, *Evidence*, 6 October 2025, 1300 (Dr. Sameeh Salama); SRSR, *Evidence*, 8 October 2025, 1800 (Dr. Scott Weese); and SRSR, *Evidence*, 22 October 2025, 1720 (Dr. Gerry Wright).

What happens is that they either go to work in other disease areas, such as oncology, or they leave the country. That brain drain is something that we see in AMR."[65]

Dr. Gerry Wright testified that the solution is to "have sufficient resources so that people can have careers here, whether those are in the academic sector or in the biotech or pharma sectors."[66]

New Therapies and Diagnostics

Witnesses also emphasized research and development (R&D) needs, including new therapies, antibiotics and diagnostic tools.[67] Beyond developing new antimicrobials, witnesses discussed a diverse array of other options, including developing antimicrobials for specific agricultural uses,[68] bacteriophage treatments (viruses that attack specific bacteria),[69] the use of whole genome sequencing to help develop antimicrobials and diagnostic tests,[70] and the development of wearable and smart phone technology to support health monitoring.[71]

As Dr. Dao Nguyen testified:

> [W]e are in dire need of innovative solutions. We need new treatments to deal with the drug-resistant bacteria; we need diagnostic tests that are much faster and more accessible to know when we are dealing with drug-resistant infections and what antibiotics to use, and we need surveillance systems that are more comprehensive and

65 SRSR, *Evidence*, 6 October 2025, 1300 (Dr. Sameeh Salama).

66 SRSR, *Evidence*, 22 October 2025, 1720 (Dr. Gerry Wright).

67 SRSR, *Evidence*, 6 October 2025, 1235 (Dr. Rita Dhami); Dr. Kevin Stinson, "Response to SRSR Questions Re: Research priorities on AMR," Written submission to SRSR, 27 October 2025, p. 3; Dr. Makeda Semret et al., *Driving Innovation: The Strategic Role of Academic Research in Combating AMR*, Brief submitted to SRSR, November 2025, p. 1; SRSR, *Evidence*, 6 October 2025, 1150 (Dr. François M. Castonguay); François Arès et al., *Leveraging Economics and the One Health Approach to Unlock the Full Potential of the Pan-Canadian Action Plan Antimicrobial Resistance*, Brief submitted to SRSR, 9 October 2025, p. 2; and SRSR, *Evidence*, 20 October 2025, 1120 (Kim Neudorf).

68 Dr. Kevin Stinson, "Response to SRSR Questions Re: Research priorities on AMR," Written submission to SRSR, 27 October 2025, p. 3.

69 Dr. Makeda Semret et al., *Driving Innovation: The Strategic Role of Academic Research in Combating AMR*, Brief submitted to SRSR, November 2025, p. 1; and SRSR, *Evidence*, 6 October 2025, 1150 (Isaac Bogoch).

70 SRSR, *Evidence*, 6 October 2025, 1150 (Dr. François M. Castonguay); and François Arès et al., *Leveraging Economics and the One Health Approach to Unlock the Full Potential of the Pan-Canadian Action Plan Antimicrobial Resistance*, Brief submitted to SRSR, 9 October 2025, p. 2.

71 SRSR, *Evidence*, 20 October 2025, 1120 (Kim Neudorf).

> timely. To get there, research and innovation done in a collaborative manner are essential to the solutions to addressing the AMR crisis.[72]

François M. Castonguay further noted that while the development of new therapies and diagnostics (he spoke to whole genome sequencing in particular) would have an associated cost, "these measures should not be seen as investments, because in reality, they will save us money. They are actually policies that will result in cost savings."[73]

Commercialization Challenges

Witnesses further noted innovation challenges related to commercializing new products emerging out of AMR research.[74] As Dr. Sameeh Salama testified:

> Advancing the research pipeline is essential, but so too is addressing market barriers that hinder domestic innovation. Without a viable market, these life-saving products will never reach patients. The need to champion domestic AMR innovation has never been more urgent. Canada was home to a number of promising companies engaged in AMR R&D and commercialization. Now Fedora, my company, is one of the very last companies still standing. The global shortage of new antibiotics, and the even scarcer number launched in Canada, illustrates a clear market failure. Overcoming this challenge requires collaboration amongst government, industry, academia and the health care sector.
>
> As with other areas of biopharmaceutical development, the key weaknesses in Canada's AMR ecosystem are limited access to capital and challenges in moving discoveries from preclinical development to commercial launch.[75]

MARKET BARRIERS, ACCESS AND INCENTIVES

The committee heard that the need for new therapies and the commercialization challenges discussed above are further challenged by regulatory and market disincentives that can limit the availability of novel antibiotics in Canada, and changes that could facilitate greater access.

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72 SRSR, *Evidence*, 22 October 2025, 1750 (Dr. Dao Nguyen).

73 SRSR, *Evidence*, 6 October 2025, 1135 (Dr. François M. Castonguay).

74 SRSR, *Evidence*, 6 October 2025, 1215 (Dr. Sameeh Salama); SRSR, *Evidence*, 20 October 2025, 1125 (Bettina Hamelin); and SRSR, *Evidence*, 22 October 2025, 1635 (Dr. Gerry Wright).

75 SRSR, *Evidence*, 6 October 2025, 1215 (Dr. Sameeh Salama).

Regulatory and Market Disincentives

The regulatory approval process was described by witnesses as a challenging and time-consuming requirement that discourages pharmaceutical companies from pursuing antimicrobial distribution in Canada.[76] As Dr. Sameeh Salama explained, the approval process can take years at both the federal and provincial levels, and:

> What you need to understand is that by the time a drug reaches the market the 20-year patent has already used at least 10 years of its lifetime. For a product developer to produce a drug into the market, they basically have another 10 years of exclusivity. If it takes another six or seven years for the approval in Canada, basically what you're telling the developer is that they have three years to make up their investment, which is really very small.[77]

Beyond regulatory processes, witnesses discussed market disincentives that discouraged the release of antimicrobials in Canada, such as the fact that stewardship principles encourage restraint in prescribing antimicrobials in order to reduce AMR, limiting revenue from antimicrobial sales.[78] As Dr. Henry Skinner (Chief Executive Officer of the AMR Action Fund GP) testified:

> In all other therapeutic areas, the market rewards innovation through sales volume, which means delivering cholesterol pills, cancer medicines or obesity shots to every patient who could benefit. Due to the way bacteria and fungi evolve, though, clinicians are instructed to use new antimicrobials only when absolutely necessary in order to preserve the drug's effectiveness, and they hope that resistance takes longer to build. This is necessary for public health, but it makes it exceedingly difficult for investors and companies to justify spending money on antibiotic research and development. Antibiotics are not blockbusters. Sales of the top 10 antibacterial products don't even add up to $1 billion. In comparison, a single cancer drug can generate more than $20 billion in sales in a single year.[79]

Professor Kevin Outterson further explained the consequences of this on pharmaceutical companies developing antimicrobials:

> In most therapeutic areas, like cancer or something, the best new drugs are rapidly and widely used by doctors and patients. That leads to robust sales, because people want to use the new, innovative drug, but for antibiotics, we take a very different approach. We

76 Ibid., 1225; and Kevin J. Stinson, *Evidence Brief: Antimicrobial Resistance (AMR) in Canada, with a focus on research needs in human healthcare systems*, Brief submitted to SRSR, 20 October 2025, p. 2.

77 SRSR, *Evidence*, 6 October 2025, 1225 (Dr. Sameeh Salama).

78 SRSR, *Evidence*, 22 October 2025, 1740 (Dr. Henry Skinner); and SRSR, *Evidence*, 22 October 2025, 1640 (Prof. Kevin Outterson).

79 SRSR, *Evidence*, 22 October 2025, 1740 (Dr. Henry Skinner).

> keep the best new drugs on the shelf for the first five to 10 years, so resistance is delayed. We prioritize preserving their precious power through stewardship. Now, this is excellent for public health, and it's the right thing to do, but it drives the companies behind these drugs into bankruptcy if we pay them based on only the volumes used, especially in those early years.[80]

Witnesses also discussed physical obstacles in Canada's antibiotic supply chains, which could lead to challenges accessing sufficient antibiotics during a global health crisis.[81] Dr. Henry Skinner noted that damage to a single factory could result in loss of access to a particular drug, given how centralized the development of some antimicrobials is, testifying:

> That is the challenge we see with some frequency in shortages around the world for antibiotics, due to a number of factors. It could be a storm that damages a factory in the U.S., Europe or Canada, and that may be one of two factories that produce this drug for the world. If we damage one, the supply chain is fractured, and it can take months or years to rebuild that.[82]

As Dr. Sameeh Salama explained, this can pose a huge risk in Canada:

> Currently, all [A]ctive [P]harmaceutical [I]ngredients, or APIs, for antibiotics are produced overseas, predominantly in Asia. Given that antibiotics underpin all modern medicine, this represents not only an innovation challenge but also a national security risk. As Canada increases defence innovation spending to meet NATO obligations, investments in AMR R&D should also be recognized as contributing to both national and global health security.[83]

Lack of Access to Novel Antibiotics

The committee heard that the regulatory and market disincentives discussed above lead to a lack of access to novel antibiotics in Canada.[84] This was particularly noted as a challenge Canada is facing in comparison with other G7 countries. As Dr. Victor Leung (physician appearing as an individual) testified: "When it comes to access to antimicrobials, we know that Canada, compared to other G7 countries, is falling

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80 SRSR, *Evidence*, 22 October 2025, 1640 (Prof. Kevin Outterson).

81 SRSR, *Evidence*, 6 October 2025, 1215 (Dr. Sameeh Salama); SRSR, *Evidence*, 22 October 2025, 1820 (Dr. Henry Skinner); and SRSR, *Evidence*, 6 October 2025, 1125 (Isaac Bogoch).

82 SRSR, *Evidence*, 22 October 2025, 1820 (Dr. Henry Skinner).

83 SRSR, *Evidence*, 6 October 2025, 1215 (Dr. Sameeh Salama).

84 Ibid.; SRSR, *Evidence*, 8 October 2025, 1740 (Jenna Sauve); SRSR, *Evidence*, 20 October 2025, 1110 (Bettina Hamelin); SRSR, *Evidence*, 22 October 2025, 1705 (Dr. Gerry Wright); and SRSR, *Evidence*, 8 October 2025, 1635 (Dr. Victor Leung, Physician, As an individual).

behind."[85] Professor Kevin Outterson further noted, in reference to a report from the Council of Canadian Academies (CCA) on AMR, that "[t]he consensus from that report is that without new incentives, the antibiotic innovation pipeline remains perilously thin, and Canadians will lack access to new antibiotics[,]worse than any other G7 country."[86] Bettina Hamelin further contextualized Canada's lack of access to novel antibiotics within the larger pharmaceutical sector, saying that:

> We are the last in the G7 when it comes to providing access to medicines in Canada. That's across all medicines. For antibiotics, where every minute counts, as we just heard from Ms. Neudorf, we just don't have two and a half years to go through all the red tape that we have to go through in Canada to bring these medicines to Canada.[87]

Bettina Hamelin further explained that:

> At its core, this crisis is about innovation and access. We are running out of effective antibiotics, and we're not replacing them fast enough. Development is scientifically complex, economically unrewarding and, in Canada, slowed by regulatory and reimbursement processes that, in fact, deter innovation.[88]

Dr. Allison McGeer (Professor in the Department of Laboratory Medicine and Pathobiology at the University of Toronto, appearing as an individual) emphasized the resulting negative impacts on patients, saying that "for every pathogen, AMR is increasing. We are losing ground, and AMR is accelerating. It's now harming patients."[89]

While the ways in which witnesses counted and classified novel antibiotics varied, they broadly agreed that Canada had access to only two or three of the antibiotics introduced into other markets in recent years, of which there were 13 to 18.[90] Dr. Sameeh Salama testified that this has led to Canada to ranking "last in the developed world in the introduction of antimicrobial agents."[91]

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85 SRSR, *Evidence*, 8 October 2025, 1635 (Dr. Victor Leung).

86 SRSR, *Evidence*, 22 October 2025, 1640 (Prof. Kevin Outterson).

87 SRSR, *Evidence*, 20 October 2025, 1125 (Bettina Hamelin).

88 Ibid., 1110.

89 SRSR, *Evidence*, 8 October 2025, 1640 (Dr. Allison McGeer, Professor, Department of Laboratory Medicine and Pathobiology, University of Toronto, As an individual).

90 SRSR, *Evidence*, 6 October 2025, 1215 (Dr. Sameeh Salama); SRSR, *Evidence*, 8 October 2025, 1740 (Jenna Sauve); SRSR, *Evidence*, 20 October 2025, 1110 (Bettina Hamelin); SRSR, *Evidence*, 22 October 2025, 1705 (Dr. Gerry Wright); Kevin J. Stinson, *Evidence Brief: Antimicrobial Resistance (AMR) in Canada, with a focus on research needs in human healthcare systems*, Brief submitted to SRSR, 20 October 2025, p. 5.

91 SRSR, *Evidence*, 6 October 2025, 1215 (Dr. Sameeh Salama).

Dr. Gerry Wright discussed how these access challenges are partly driven by the size of the Canadian market, as:

> I think we have to remember that Canada is a very small market for these drug companies. The barriers to entry for bringing an antibiotic that has received approval by the [United States Food and Drug Administration (FDA)], say, or the [European Medicines Agency (EMA)], for example, into Health Canada involve some bureaucracy. That bureaucracy, I think, has to be measured against the potential market size in Canada and the distribution across this great, vast country. That is part of the issue that's being faced. Of course, what we want to do is ensure that all the barriers to getting these medicines to Canadians are reasonably removed, so that we're not artificially stacking the cards against ourselves.[92]

Push and Pull Incentives

Witnesses promoted the use of both push and pull incentives to promote the commercialization and distribution of antimicrobials.

Push incentives provide funding to bridge the divide between academic discoveries and commercialization. As Dr. Sameeh Salama explained:

> The push incentive is for Canadian innovators to be able to take their innovations at their universities and produce them. There are mechanisms that apply. We mentioned [Health Emergency Readiness Canada (HERC)]. In the United States there's small business innovation research (SBIR). We need those mechanisms for Canadian innovators.[93]

Dr. Sameeh Salama further noted that, "[i]f you want to start a new business with a new antibiotic, and you want to take it into the market eventually, there needs to be a funding mechanism."[94]

Dr. Gerry Wright also recommended emulating the SBIR program to "foster biotech entrepreneurship, create jobs and accelerate AMR innovation."[95] The SBIR program provides non-dilutive[96] seed funding to companies to help them develop their

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92 SRSR, *Evidence*, 22 October 2025, 1705 (Dr. Gerry Wright).

93 SRSR, *Evidence*, 6 October 2025, 1240 (Dr. Sameeh Salama).

94 Ibid.

95 SRSR, *Evidence*, 22 October 2025, 1635 (Dr. Gerry Wright).

96 Non-dilutive funding refers to the fact that the funding is not contingent on the funder receiving equity or IP ownership in the funded company. The SBIR program does not take an ownership stake in any funded company.

innovations and move towards commercialization.[97] Funding is provided for three stages of development: proof of concept, technology development and commercialization.[98] The U.S. Small Business Administration, which coordinates the program, reports funding an average of 4,000 companies per year, with annual investments of $4 billion.[99]

Pull incentives provide guaranteed revenue for pharmaceutical companies to incentivize them to bring antibiotics to market. As Professor Kevin Outterson testified:

> It would be a revenue guarantee. Canada would say that if you come to Canada, you will receive at least $13 million U.S. per year for this drug for making it practically available here. In the first year, maybe there are small sales. By year six, the projections are that the sales in Canada would exceed that number, so the revenue guarantee wouldn't cost the federal government any money whatsoever. It's a federal guarantee. The drug is still available and used in the provinces and territories, and it's paid for in the ordinary way that happens in those areas.[100]

Witnesses did point out that a government pull incentive pilot was being considered, but they were unsure of its progress.[101] Dr. Sameeh Salama also said that Canada is "becoming known as the country of pilots, where pilots are adopted, but they take a long time."[102] He recommended that successful pilots be done in consultation with industry to ensure the incentives and processes are appropriate.[103] As he testified during the study, "[w]e cannot introduce a pilot that's going to make it even more complicated for the company to bring the product, because they will never do that. That's what we're seeing."[104]

Bettina Hamelin further noted the adoption of pull incentives in other jurisdictions, including the United Kingdom and Italy, and her expectation that "France will make AMR a priority in its upcoming G7 leadership."[105]

Therefore, the Committee recommends:

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97 U.S. Small Business Administration, *About SBIR and STTR*.

98 U.S. Small Business Administration, *America's Seed Fund*.

99 Ibid.

100 SRSR, *Evidence*, 22 October 2025, 1715 (Prof. Kevin Outterson).

101 Ibid.; SRSR, *Evidence*, 6 October 2025, 1240 (Dr. Sameeh Salama); SRSR, *Evidence*, 20 October 2025, 1110 (Bettina Hamelin); and SRSR, *Evidence*, 22 October 2025, 1745 (Dr. Henry Skinner).

102 SRSR, *Evidence*, 6 October 2025, 1240 (Dr. Sameeh Salama).

103 Ibid.

104 Ibid.

105 SRSR, *Evidence*, 20 October 2025, 1110 (Bettina Hamelin).

Recommendation 3

That the Government of Canada create a dedicated push incentive to bridge the divide between academic discoveries and the commercialization of new antimicrobials.

Recommendation 4

That the Government of Canada accelerate implementation of a pull incentive for antimicrobial medicines, in consultation with industry partners.

Regulatory Changes

In addition to push and pull incentives, some witnesses and written submissions also recommended changes to federal regulations, such as Canada's pharmaceutical pricing and approval processes.[106] As Bettina Hamelin testified, "[i]ncentives alone aren't enough. Regulatory and reimbursement systems remain duplicative and slow. Health Canada must rely on efforts by trusted international reviews, a key step towards faster approvals without compromising safety."[107] Bettina Hamelin discussed several jurisdictions in this context, including the United States and the European Union, noting that:

> Health Canada is currently considering novel pathways to rely on regulatory decisions from other jurisdictions that are faster in their review process and get to the files earlier than Health Canada. The FDA used to be the fastest. We'll see how that evolves with the changes there. The EMA also approves more quickly than Health Canada. Health Canada is looking at reliance mechanisms.[108]

In addition to using approvals in trusted international jurisdictions to accelerate the Canadian approval processes, Dr. Sameeh Salama also discussed increased coordination between federal, provincial and territorial governments to reduce duplication in approval processes, saying that "a unified approval process is what we're looking for, where you don't have to go through two."[109] Dr. Victor Leung further discussed the issue

106 Ibid.; Fedora Pharmaceuticals Inc, "Canadian Antimicrobial Innovation Coalition Submission: PMPRB Phase 2 Consultations on New Guidelines," Written submission to SRSR, 11 September 2024, p. 2; and SRSR, *Evidence*, 20 October 2025, 1150 (Jennifer Buckley, Senior Director, Regulatory Affairs and Clinical Research Transformation, Innovative Medicines Canada).

107 SRSR, *Evidence*, 20 October 2025, 1110 (Bettina Hamelin).

108 Ibid., 1150.

109 SRSR, *Evidence*, 6 October 2025, 1300 (Dr. Sameeh Salama).

of coordinated federal, provincial and territorial approvals as an issue of equal access across Canada.[110] As Bettina Hamelin testified:

> There's a way we need to find in Canada to tackle the fragmentation. In the industry, we are at the ready to work with the federal government and the provincial governments to tackle that, because it's just not sustainable with everything that goes on geopolitically, particularly in disease areas, where every hour counts.[111]

A document submitted by Fedora Pharmaceuticals also recommended that the Patented Medicines Prices Review Board change the valuation process for medications, favouring a "more holistic valuation, where antimicrobials are assessed for their value to society."[112] They argue that this would:

> [H]elp to avoid a scenario where current routine procedures are no longer viable because resistance has developed to currently available microbials and new drugs have not been developed. Comparator products will likely be generics, which will have significantly lower prices than a new product; however, the new product may be able to treat infections that are resistant to those comparator products. The current system would not reflect the additional societal value the new product would add. As such, second or third-line oncology products or rare disease products may be better comparators for pricing than older antimicrobials.[113]

The submission later noted that this type of change to identifying comparators for pricing could help encourage greater investment in AMR R&D, as currently "[n]ew antibiotics are not priced to encourage R&D in the same way as rare disease treatments have been, leading to a lack of new antimicrobials making it to market."[114]

Therefore, the Committee recommends:

Recommendation 5

That the Government of Canada explore alternative approval paths for new antimicrobials that have already been approved in international jurisdictions with equivalent approval standards.

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110 SRSR, *Evidence*, 8 October 2025, 1635 (Dr. Victor Leung).

111 SRSR, *Evidence*, 20 October 2025, 1130 (Bettina Hamelin).

112 Fedora Pharmaceuticals Inc, "Canadian Antimicrobial Innovation Coalition Submission: PMPRB Phase 2 Consultations on New Guidelines," Written submission to SRSR, 11 September 2024, p. 2.

113 Ibid.

114 Ibid., p. 3.

Recommendation 6

That the Government of Canada cooperate with provincial and territorial governments to improve coordination of antimicrobial approvals at the national, provincial and territorial levels.

Recommendation 7

That the Government of Canada review valuation procedures for new antimicrobials to ensure that pricing reflects the full value of new antimicrobials and does not discourage antimicrobial pharmaceutical development.

SURVEILLANCE, PREVENTION AND STEWARDSHIP

Witnesses discussed efforts to mitigate AMR within three overarching categories: surveillance of AMR, infection prevention and control, and stewardship, or the careful and responsible use of antimicrobials. Each of these categories is discussed in more detail in the sections below.

Surveillance Gaps and Needs

While witnesses did call attention to Canada's efforts in AMR surveillance and the work done by the World Health Organization (WHO), they also noted ongoing gaps in current surveillance systems, including the ability to track AMR in community and long-term care facilities, agricultural and veterinary settings, as well as the environment more broadly. As Dr. Simon Otto (Associate Professor at the University of Alberta, appearing as an individual) noted, "we cannot manage what we do not measure."[115] He described the current situation as follows:

> What we've seen with surveillance budgets over the last 10 to 15 years is that they have continually been decreased, to the point that the programs are being run by a relatively small number of experts in the space without a lot of supporting cast there. There needs to be investment in the personnel to support the programs and also to expand their coverage.[116]

Several witnesses specifically pointed to the need to enhance surveillance activities outside of acute care and hospital settings, into community care and long-term care

115 SRSR, *Evidence*, 8 October 2025, 1645 (Dr. Simon Otto).

116 Ibid., 1725.

facilities.[117] As Dr. Simon Otto testified, "[l]ong-term care is a great example where we have huge gaps in surveillance and where we really don't know what's going on in terms of AMR surveillance."[118] As Dr. Kevin Stinson explained, community surveillance can help better understand how AMR is spreading before it reaches hospital settings and emergency health situations:

> [R]ight now—in southern Ontario for example—multiple hospitals, including our own, are seeing this trend of one particular pathogen increasing dramatically. If it's multiple hospitals all seeing the same trend, it's clearly not purely a hospital problem. There's a community element to that, but we really don't have any data looking at community transmission.[119]

Regarding the environmental spread of AMR, specifically the spread of AMR in water, Dr. Herman Barkema testified that:

> A lot of the drugs in animals and humans are shed through urine and feces. They end up in [wastewater] or in runoff of farms and end up in the rivers, but we don't measure that at all. We don't look at antimicrobials, at antimicrobial resistance or antimicrobial resistance genes in water.[120]

Allison McGeer, however, noted the challenges of tracking AMR in wastewater, explaining that:

> Tracking from hospital through other pathways into [wastewater] treatment plants is also relatively complicated. In Toronto our water doesn't always go where you think it goes in the system, as I'm sure you know. Figuring out how to do that tracing is actually difficult. I'm not aware that there are people who are doing it really well at the moment.[121]

117 SRSR, *Evidence*, 8 October 2025, 1700 (Dr. Simon Otto); and SRSR, *Evidence*, 20 October 2025, 1155 (Dr. Kevin Stinson); Dr. Kevin Stinson, "Response to SRSR Questions Re: Research priorities on AMR," Written submission to SRSR, 27 October 2025, pp. 1–2; and Gregory Rose, "Written response to questions," Written submission to SRSR, 6 October 2025, p. 1.

118 SRSR, *Evidence*, 8 October 2025, 1700 (Dr. Simon Otto).

119 SRSR, *Evidence*, 20 October 2025, 1155 (Dr. Kevin Stinson).

120 SRSR, *Evidence*, 6 October 2025, 1145 (Dr. Herman Barkema).

121 SRSR, *Evidence*, 8 October 2025, 1700 (Dr. Allison McGee).

Witnesses also identified gaps in our timely aggregation of data across these different settings.[122] As Dr. Victor Leung explained, "[a]lthough we have multiple surveillance systems throughout Canada that are used, the problem is that the information is fragmented. It's not utilizing the information that's available from all different settings to be aggregated in a way that's timely."[123]

To improve, witnesses recommended increased surveillance and coordination across a variety of areas, including outside of acute care and hospital settings, as mentioned previously.[124] In a written brief submitted to the Committee, Dr. Kevin Stinson wrote that "Canada must improve AMR surveillance through an integrated, multi-sector approach, with a specific focus on identifying ways to control transmission, both in and out of healthcare settings."[125] He explained that currently:

> Our data is at best generalized. It gives us trends, but it does not really map transmission. In order to take that and to implement something that makes sense for a

122 SRSR, *Evidence*, 8 October 2025, 1700 (Dr. Simon Otto); SRSR, *Evidence*, 6 October 2025, 1145 (Dr. Herman Barkema); SRSR, *Evidence*, 8 October 2025, 1635 (Dr. Victor Leung); SRSR, *Evidence*, 20 October 2025, 1155 (Dr. Kevin Stinson); SRSR, *Evidence*, 6 October 2025, 1105 (Isaac Bogoch); SRSR, *Evidence*, 6 October 2025, 1210 (Dr. Rita Dhami); SRSR, *Evidence*, 8 October 2025, 1745 (Dr. Scott Weese); Kevin J. Stinson, *Evidence Brief: Antimicrobial Resistance (AMR) in Canada, with a focus on research needs in human healthcare systems*, Brief submitted to SRSR, 20 October 2025, pp. 7–8; François Arès et al., *Leveraging Economics and the One Health Approach to Unlock the Full Potential of the Pan-Canadian Action Plan Antimicrobial Resistance*, Brief submitted to SRSR, 9 October 2025, p. 2; Fedora Pharmaceuticals Inc., "Health Technology Assessment for Antimicrobials, Diagnostics and Other Products to Combat Antimicrobial Resistance (AMR): Considerations for Canada," Written submission to SRSR, October 2025, p. 5; Dr. Kevin Stinson, "Response to SRSR Questions Re: Research priorities on AMR," Written submission to SRSR, 27 October 2025, pp. 1–2; SRSR, *Evidence*, 22 October 2025, 1810 (Dr. Henry Skinner); SRSR, *Evidence*, 22 October 2025, 1835 (Dr. Maud de Lagarde, Assistant Professor, Faculty of Veterinary Medicine, Université de Montréal, Deans Council—Agriculture, Food and Veterinary Medicine); and Results Canada, *Antimicrobial Resistance*, Brief submitted to SRSR, October 2025, pp. 3–4.

123 SRSR, *Evidence*, 8 October 2025, 1635 (Dr. Victor Leung).

124 SRSR, *Evidence*, 6 October 2025, 1105 (Dr. Herman Barkema); Dr. Kevin J. Stinson, *Evidence Brief: Antimicrobial Resistance (AMR) in Canada, with a focus on research needs in human healthcare systems*, Brief submitted to SRSR, 20 October 2025, p. 2; SRSR, *Evidence*, 22 October 2025, 1805 (Dr. Jospeh Rubin, Professor, Department of Veterinary Microbiology, Western College of Veterinary Medicine, University of Saskatchewan, and Deans Council for Agriculture, Food and Veterinary Medicine); SRSR, *Evidence*, 22 October 2025, 1835 (Dr. Maud de Lagarde); SRSR, *Evidence*, 8 October 2025, 1635 (Dr. Victor Leung); SRSR, *Evidence*, 20 October 2025, 1110 (Dr. Kevin Stinson); SRSR, *Evidence*, 8 October 2025, 1745 (Dr. Scott Weese); Fedora Pharmaceuticals Inc., "Health Technology Assessment for Antimicrobials, Diagnostics and Other Products to Combat Antimicrobial Resistance (AMR): Considerations for Canada," Written submission to SRSR, October 2025, p. 5; and SRSR, *Evidence*, 22 October 2025, 1820 (Dr. Henry Skinner).

125 Dr. Kevin J. Stinson, *Evidence Brief: Antimicrobial Resistance (AMR) in Canada, with a focus on research needs in human healthcare systems*, Brief submitted to SRSR, 20 October 2025, p. 2.

> community, for a small subsection, we need to have a better sense on the granular level.[126]

Dr. Jospeh Rubin (Professor in the Department of Veterinary Microbiology at the Western College of Veterinary Medicine in the University of Saskatchewan, representing the Deans Council for Agriculture, Food and Veterinary Medicine) testified that:

> With respect to surveillance, having standardized methods allows us to directly compare what's done in my lab with what's done in a lab on the other side of the country. We know that both researchers or both diagnosticians would get the same result if working with the same organism when using standardized conditions. It really facilitates the use of routinely generated diagnostic data, which is paid for by someone else. It's paid for by the end-user, the client who has requested those tests or the veterinarian who has requested those tests. It gives us a window into what's going on from a resistance perspective without having to put in as many financial resources as are required for active surveillance.[127]

Dr. Joseph Rubin was speaking specifically to standardized testing among veterinarians and within the animal companion sector.[128] He noted that "[i]n veterinary medicine, more data is needed to support stewardship in companion animal practice."[129]

Dr. Herman Barkema recommended increased surveillance of reference lab data, hospital and municipal wastewater, the contribution of international travel to AMR, agricultural AMR and its contribution to human infections, and AMR in companion animals and wildlife.[130] Dr. Maud de Lagarde (Assistant Professor in the Faculty of Veterinary Medicine at the Université de Montréal, representing the Deans Council—Agriculture, Food and Veterinary Medicine) also recommended adding environmental aspects to surveillance programs.[131]

Therefore, the Committee recommends:

126 SRSR, *Evidence*, 20 October 2025, 1155 (Dr. Kevin Stinson).

127 SRSR, *Evidence*, 22 October 2025, 1805 (Dr. Jospeh Rubin).

128 Ibid., 1745.

129 Ibid.

130 SRSR, *Evidence*, 6 October 2025, 1105 (Dr. Herman Barkema).

131 SRSR, *Evidence*, 22 October 2025, 1835 (Dr. Maud de Lagarde).

Recommendation 8

That the Government of Canada cooperate with provincial and territorial governments to increase surveillance of antimicrobial resistance in community and environmental settings and increase coordination across antimicrobial resistance surveillance systems.

Infection Prevention and Control

Infection prevention and control (IPAC) was identified as an important tool for reducing the spread of AMR.[132] Gregory Rose defined the IPAC approach to AMR as including "broadly acting measures, like hand hygiene and environmental cleaning, as well as specific measures, such as identification and contact precautions for patients who are colonized."[133]

As Dr. Simon Otto explained, "[p]reventing infections will reduce the need to use antimicrobial drugs. We will never prevent them all, but we can reduce the transmission of infectious diseases in humans, food animals and companion animals through management strategies."[134] Dr. Allison McGeer compared it to the COVID-19 pandemic, saying that:

> We didn't get out of the COVID pandemic because we had treatment. We got out of the COVID pandemic because we have vaccines and public health information. Getting out of the AMR pandemic, and it is a pandemic, even if it's not the same as COVID, has to involve prevention.[135]

Witnesses recommended a variety of ways to strengthen IPAC processes. Several witnesses recommended strengthening vaccine programs targeting resistant

132 SRSR, *Evidence*, 8 October 2025, 1645 (Dr. Simon Otto); SRSR, *Evidence*, 6 October 2025, 1220 (Gregory Rose); SRSR, *Evidence*, 8 October 2025, 1640 (Dr. Allison McGeer); SRSR, *Evidence*, 6 October 2025, 1100 (Dr. Herman Barkema); Kevin J. Stinson, *Evidence Brief: Antimicrobial Resistance (AMR) in Canada, with a focus on research needs in human healthcare systems*, Brief submitted to SRSR, 20 October 2025, pp. 5–7; SRSR, *Evidence*, 6 October 2025, 1210 (Dr Rita Dhami); SRSR, *Evidence*, 8 October 2025, 1635 (Dr. Victor Leung); Leanne McConnachie, *Submission to the House of Commons Standing Committee on Science and Research*, Brief submitted to SRSR, 24 October 2025, pp. 2–3; François Arès et al., *Leveraging Economics and the One Health Approach to Unlock the Full Potential of the Pan-Canadian Action Plan Antimicrobial Resistance*, Brief submitted to SRSR, 9 October 2025, p. 2; and SRSR, *Evidence*, 20 October 2025, 1120 (Kim Neudorf).

133 SRSR, *Evidence*, 6 October 2025, 1220 (Gregory Rose).

134 SRSR, *Evidence*, 8 October 2025, 1645 (Dr. Simon Otto).

135 SRSR, *Evidence*, 8 October 2025, 1640 (Dr. Allison McGeer).

infections,[136] with Dr. Allison McGeer noting the importance of "vaccine development and manufacturing within Canada but also one that ensures that we deliver publicly funded vaccines to Canadians."[137] As Dr. Simon Otto testified:

> We need to focus on the messaging that vaccines do work—they are not going to prevent infection from happening, but they're going to reduce disease and transmission at the population level—and on reinforcing the messaging about vaccine safety. This isn't just for human medicine: Vaccines are incredibly important for veterinary medicine, the animal health side, as well.
>
> I am going to reiterate my point about research around the social science piece, because it's not just the political side. The human population is now quite reluctant because of messaging around vaccines and misinformation. I think we need to fill that void with the scientific evidence, but we need to do it in a way that's digestible for people as opposed to reverting to the stats and technical pieces. In the research piece around siloing, and "one health" as well, our research agencies, federally, are set up to fund human medical research, science, STEM, animal health and social science, and it creates a split, making it difficult for some of that one health research across those spaces to tackle some of these problems.[138]

As explained in a brief submitted to the Committee, the CCA report *When Antibiotics Fail* quantified potential savings resulting from IPAC and vaccination measures:

> An infection prevention and control (IPC) program, which could save between $23.5 and $35.5 billion in Quebec's GDP between 2020 and 2050 depending on the extent of the resistance; and (ii) the introduction of a hypothetical *C. difficile* (CDI) vaccine, which could generate savings of between $1.4 and $7.5 billion for Quebec's GDP by 2050, also depending on the AMR level.[139]

In a brief submitted to the Committee by François Arès and his colleagues, they highlighted the importance of "non-pharmaceutical interventions, such as rapid [Polymerase Chain Reaction (PCR)] testing for MRSA (*methicillin-resistant Staphylococcus aureus*)."[140] The brief went on to say that fast and reliable diagnostic testing can ensure that antimicrobials are

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136 Ibid.; François Arès et al., *Leveraging Economics and the One Health Approach to Unlock the Full Potential of the Pan-Canadian Action Plan on Antimicrobial Resistance*, Brief submitted to SRSR, 9 October 2025, p. 2; and SRSR, *Evidence*, 8 October 2025, 1720 (Dr. Simon Otto).

137 SRSR, *Evidence*, 8 October 2025, 1640 (Dr. Allison McGeer).

138 SRSR, *Evidence*, 8 October 2025, 1720 (Dr. Simon Otto).

139 François Arès, Caroline Raymond and François M. Castonguay, *The Socio-Economic Impacts of Antimicrobial Resistance in Quebec by 2050*, Brief submitted to SRSR, 3 November 2025, p. 2; and CCA, *When Antibiotics Fail: The Expert Panel on the Potential Socio-Economic Impacts of Antimicrobial Resistance in Canada*, 12 November 2019.

140 François Arès et al., *Leveraging Economics and the One Health Approach to Unlock the Full Potential of the Pan-Canadian Action Plan on Antimicrobial Resistance*, Brief submitted to SRSR, 9 October 2025, p. 2.

only used when necessary, as they "play a key role in preventing bacterial and viral infections, thereby reducing antimicrobial use and, consequently, the occurrence of subsequent complications that can promote the emergence of resistant strains."[141]

Dr. Victor Leung, meanwhile, recommended a "treatment-as-prevention" approach similar to what was used to control HIV, such as "a program to address different syndemics, like homelessness, opioid use and antimicrobial resistance, that can have an impact on targeted disease elimination and health care sustainability."[142] Dr. Leung also endorsed changes to hospital infrastructure, what he described as:

> [E]ngineered infection prevention and control measures, which don't rely, necessarily, on the individual health care worker being aware of some of the ways that infection is transmitted—for example, infections that are transmitted through the air or infections that are transmitted through surfaces. There is an increasing number of useful, cost-effective, engineered infection prevention and control measures that can be incorporated in new hospital builds and also retrofitted into some older facilities.[143]

Therefore, the Committee recommends:

Recommendation 9

That the Government of Canada provide support for enhanced infection prevention and control measures in healthcare settings, including increased Canadian vaccination research and supply chain development, and support for healthcare infrastructure.

141 Ibid.

142 SRSR, *Evidence*, 8 October 2025, 1635 (Dr. Victor Leung).

143 Ibid., 1715.

Antimicrobial Stewardship

Stewardship, or the promotion of proper antimicrobial use, was emphasized by witnesses as an important measure for reducing the growth of AMR.[144] As noted in a written submission to the Committee by François Arès and colleagues, "[g]iven this accelerating trend, it is vitally important to promote the cautious and rational use of antimicrobials in order to preserve their effectiveness, ensure their sustainability and prevent a major health crisis."[145]

In addition to human health, witnesses also noted the importance of antimicrobial stewardship in agriculture and veterinary medicine.[146] As Dr. Scott Weese testified, "I don't want new drugs for our food animals. I want to make sure we can keep using the drugs we have. I have a limited need for new drugs dealing with companion animals, and I want to use them as little as possible."[147]

Beyond simply the decision of whether or not to prescribe and use an antimicrobial, Gregory Rose noted other important stewardship decisions, such as the duration of prescriptions.[148]

However, witnesses discussed the challenge of proper antimicrobial stewardship across geographic and sectoral boundaries.[149] As an example, Gregory Rose discussed how a "recommendation on the appropriate choice of antibiotic for a skin infection would be

144 François Arès et al., *Leveraging Economics and the One Health Approach to Unlock the Full Potential of the Pan-Canadian Action Plan on Antimicrobial Resistance*, Brief submitted to SRSR, 9 October 2025, p. 1; SRSR, *Evidence*, 6 October 2025, 1220 (Gregory Rose); SRSR, *Evidence*, 8 October 2025, 1745 (Dr. Scott Weese); SRSR, *Evidence*, 6 October 2025, 1100 (Dr. Herman Barkema); Leanne McConnachie, *Submission to the House of Commons Standing Committee on Science and Research*, Brief submitted to SRSR, 24 October 2025, p. 3; Fedora Pharmaceuticals Inc., "Health Technology Assessment for Antimicrobials, Diagnostics and Other Products to Combat Antimicrobial Resistance (AMR): Considerations for Canada," Written submission to SRSR, October 2025, p. 5; SRSR, *Evidence*, 6 October 2025, 1120 (John Conly); SRSR, *Evidence*, 6 October 2025, 1150 (Isaac Bogoch); SRSR, *Evidence*, 6 October 2025, 1210 (Dr. Rita Dhami); SRSR, *Evidence*, 8 October 2025, 1645 (Dr. Simon Otto); SRSR, *Evidence*, 8 October 2025, 1740 (Jenna Sauve); SRSR, *Evidence*, 22 October 2025, 1745 (Dr. Jospeh Rubin); Dr. Makeda Semret et al, *Driving Innovation: The Strategic Role of Academic Research in Combating AMR*, Brief submitted to SRSR, November 2025, p. 3; and Results Canada, *Antimicrobial Resistance*, Brief submitted to SRSR, October 2025, pp. 3–4.

145 François Arès et al., *Leveraging Economics and the One Health Approach to Unlock the Full Potential of the Pan-Canadian Action Plan on Antimicrobial Resistance*, Brief submitted to SRSR, 9 October 2025, p. 1.

146 SRSR, *Evidence*, 8 October 2025, 1745 (Dr. Scott Weese); and SRSR, *Evidence*, 22 October 2025, 1745 (Dr. Jospeh Rubin).

147 SRSR, *Evidence*, 8 October 2025, 1745 (Dr. Scott Weese).

148 SRSR, *Evidence*, 6 October 2025, 1220 (Gregory Rose).

149 Ibid.; and SRSR, *Evidence*, 6 October 2025, 1100 (Dr. Herman Barkema).

very different in a busy emergency room in Vancouver from what it would be in a family medicine clinic in the Saguenay."[150] Dr. Herman Barkema, meanwhile, illustrated the challenge by explaining that, while "antimicrobial stewardship programs are siloed within either human or animal health and do not consider environmental reservoirs," "microbes don't respect these jurisdictional boundaries."[151] Dr. Joseph Rubin testified that:

> What might work in a large human hospital may or may not be appropriate in the diverse environments or for the patient populations that veterinarians care for. An individually owned dog is quite different from a dairy cow, a barnful of broiler chickens or a hive of bees. The stewardship approach to each of those situations is necessarily different.[152]

Witnesses recommended strengthening antimicrobial stewardship programs and education, both in Canada and abroad, to ensure a coordinated approach across different care settings and in both human and animal use.[153] Jenna Sauve, for instance, discussed mandatory requirements for antimicrobial stewardship programs in hospitals, but noted that "[w]e need to invest more and work more toward expanding that to things like long-term care and community or primary care practices."[154] Dr. Simon Otto, meanwhile, recommended that "[s]tewardship should focus on reducing unnecessary and improper use, such as in areas where we revert to drug use in the place of making management changes that could reduce infections."[155]

Gregory Rose recommended a specific form of antimicrobial stewardship called prospective audit with intervention and feedback. As he explained:

> Stewardship is the way. Stewardship, of course, is a broad category of different interventions. We believe the most effective is a fairly labour-intensive intervention called prospective audit with intervention and feedback. Antimicrobial orders in hospital are reviewed by a specialized team, typically consisting of a pharmacist and often an infectious disease physician in larger hospitals or another physician. There is a conversation with prescribing physicians and nurse practitioners about the reasons for the antibiotic prescription that was given and suggestions of alternative options. The long-term effect of this[:] small iterative nudges toward a more appropriate

150 SRSR, *Evidence*, 6 October 2025, 1220 (Gregory Rose).

151 SRSR, *Evidence*, 6 October 2025, 1100 (Dr. Herman Barkema).

152 SRSR, *Evidence*, 22 October 2025, 1745 (Dr. Jospeh Rubin).

153 SRSR, *Evidence*, 6 October 2025, 1255 (Gregory Rose); SRSR, *Evidence*, 8 October 2025, 1805 (Jenna Sauve); SRSR, *Evidence*, 8 October 2025, 1645 (Dr. Simon Otto); and SRSR, *Evidence*, 22 October 2025, 1830 (Dr. Maud de Lagarde).

154 SRSR, *Evidence*, 8 October 2025, 1805 (Jenna Sauve).

155 SRSR, *Evidence*, 8 October 2025, 1645 (Dr. Simon Otto).

> prescribing and a more educated health care workforce with better overall usage data.[156]

Accurate and rapid diagnostic tools were also identified as an important driver for stewardship, as they allow for more appropriate prescribing practices.[157]

Furthermore, Jenna Sauve recommended enhancing the curriculum in pharmacy programs related to AMR, "in order to enhance their education on antimicrobial resistance and antimicrobial stewardship, so that our next generation of pharmacists are not only aware of this issue but also have the skills and the knowledge they need to be able to impart change."[158] Continuous learning for infection control professionals and long-term care staff was also identified by Kevin Stinson and Kim Neudorf as a way to minimize the transmission of resistant infections.[159]

Therefore, the Committee recommends:

Recommendation 10

That the Government of Canada further support the adoption of antimicrobial stewardship practices in long-term care facilities and primary care practices.

Recommendation 11

That the Government of Canada work with the provinces and territories, and post-secondary institutions, to further support the integration of antimicrobial stewardship into post-secondary health curriculum and continuing medical education.

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156 SRSR, *Evidence*, 6 October 2025, 1255 (Gregory Rose).

157 SRSR, *Evidence*, 8 October 2025, 1830 (Jenna Sauve); SRSR, *Evidence*, 22 October 2025, 1750 (Dr. Dao Nguyen); SRSR, *Evidence*, 6 October 2025, 1105 (Isaac Bogoch); SRSR, *Evidence*, 20 October 2025, 1120 (Kim Neudorf); SRSR, *Evidence*, 22 October 2025, 1700 (Dr. Louis-Patrick Haraoui); SRSR, *Evidence*, 22 October 2025, 1820 (Dr. Henry Skinner); Results Canada, *Antimicrobial Resistance*, Brief submitted to SRSR, October 2025, pp. 3–4; SRSR, *Evidence*, 6 October 2025, 1105 (Dr. Herman Barkema); SRSR, *Evidence*, 8 October 2025, 1645 (Dr. Simon Otto); Fedora Pharmaceuticals Inc., "Health Technology Assessment for Antimicrobials, Diagnostics and Other Products to Combat Antimicrobial Resistance (AMR): Considerations for Canada," Written submission to SRSR, October 2025, p. 6; SRSR, *Evidence*, 20 October 2025, 1205 (Bettina Hamelin); Dr. Makeda Semret et al, *Driving Innovation: The Strategic Role of Academic Research in Combating AMR*, Brief submitted to SRSR, November 2025, p. 3; and SRSR, *Evidence*, 22 October 2025, 1745 (Dr. Jospeh Rubin).

158 SRSR, *Evidence*, 8 October 2025, 1820 (Jenna Sauve).

159 Kevin J. Stinson, *Evidence Brief: Antimicrobial Resistance (AMR) in Canada, with a focus on research needs in human healthcare systems*, Brief submitted to SRSR, 20 October 2025, p. 2; and SRSR, *Evidence*, 20 October 2025, 1120 (Kim Neudorf).

GOVERNANCE, STRATEGY AND COORDINATION

Limiting the spread of AMR is a shared responsibility between federal, provincial and territorial governments.[160] Provinces and territories are responsible for the delivery of health care, the approval of antimicrobials within their medical coverage systems, and the regulation of antimicrobial use in agricultural and veterinary settings.[161] At the federal level, the Government of Canada focuses on health promotion, disease prevention and control, research and innovation, surveillance, regulating the safety and sale of antimicrobial drugs in Canada, and collaboration with international partners.[162] Witnesses discussed ways in which federal governance, strategy and coordination related to AMR could be strengthened, as presented below.

The Pan-Canadian Action Plan

Witnesses discussed the Pan-Canadian Action Plan on AMR, and the importance of ongoing support for its implementation.[163] The Pan-Canadian Action Plan on AMR, as discussed earlier, was published on 22 June 2023 and included contributions from government representatives of public health, human and animal health, agriculture and agri-food departments of the federal, provincial and territorial governments, as well as the Public Health Agency of Canada AMR Task Force.[164] As noted in the Minister's Message introducing the Action Plan, it "is a five-year (2023 to 2027) blueprint to coordinate an accelerated pan-Canadian response to address antimicrobial resistance (AMR), one of the major health threats of our time."[165]

160 Government of Canada, *Antimicrobial Resistance and Use in Canada: A Federal Framework for Action*, 2014.

161 Ibid.

162 Ibid.

163 SRSR, *Evidence*, 6 October 2025, 1210 (Dr. Rita Dhami); SRSR, *Evidence*, 6 October 2025, 1215 (Dr. Sameeh Salama); SRSR, *Evidence*, 8 October 2025, 1755 (Jenna Sauve); SRSR, *Evidence*, 8 October 2025, 1755 (Dr. Scott Weese); SRSR, *Evidence*, 6 October 2025, 1125 (Dr. Herman Barkema); Fedora Pharmaceuticals Inc., "Health Technology Assessment for Antimicrobials, Diagnostics and Other Products to Combat Antimicrobial Resistance (AMR): Considerations for Canada," Written submission to SRSR, October 2025, pp. 5–6; SRSR, *Evidence*, 20 October 2025, 1200 (Bettina Hamelin); and Gregory Rose, "Written response to questions," Written submission to SRSR, 6 October 2025, p. 1.

164 Government of Canada, *Pan-Canadian Action Plan on Antimicrobial Resistance*, 22 June 2023.

165 Ibid.

Witnesses said that the Pan-Canadian Action Plan on AMR was "essential,"[166] and had "great recommendations."[167] However, they also mentioned the need for "ongoing funding and cross-jurisdictional coordination,"[168] "dedicated programmatic funding and strong leadership,"[169] and that "it needs to be funded."[170]

As Dr. Scott Weese testified, "[w]e're looking for more action. It's an action plan, and we need more of an action component. Yes, it's been sitting there for a while, and it was developed over a long process. It's a bit of an outdated action plan if anything, but it still provides an excellent framework."[171] On the point of datedness, Dr. Henry Skinner further noted the use of 2018 data in the Action Plan, saying that "with data from 2018, it is very difficult to understand what that means today, seven years later."[172]

Jenna Sauve explained that while she was not able to assess where implementation of the Action Plan currently sat, she thought that "if in the five-year target they were to implement everything in that action plan, we would be in a much better place with respect to AMR than we have been in the past or currently."[173]

Therefore, the Committee recommends:

Recommendation 12

That the Government of Canada continue to support the full and timely implementation of the Pan-Canadian Action Plan on Antimicrobial Resistance, which established a timeline of 2023–2027.

Health Canada's Special Access Program

Health Canada's Special Access Program was identified as a way to access antimicrobials that are not formally available in Canada. The Special Access Program allows health care professionals to "request access to drugs that are not currently authorized for sale in

166 SRSR, *Evidence*, 6 October 2025, 1210 (Dr. Rita Dhami).

167 SRSR, *Evidence*, 8 October 2025, 1755 (Jenna Sauve).

168 SRSR, *Evidence*, 6 October 2025, 1210 (Dr. Rita Dhami).

169 SRSR, *Evidence*, 6 October 2025, 1215 (Dr. Sameeh Salama).

170 SRSR, *Evidence*, 8 October 2025, 1755 (Dr. Scott Weese).

171 Ibid.

172 SRSR, *Evidence*, 22 October 2025, 1820 (Dr. Henry Skinner).

173 SRSR, *Evidence*, 8 October 2025, 1755 (Jenna Sauve).

Canada to treat patients with serious or life-threatening conditions. Access to these drugs is only considered when conventional therapies have failed, are unsuitable or are unavailable."[174] The program reports that it receives about 1,000 requests every month and uses a triage system to prioritize requests for processing.[175] For authorized requests, health care professionals are required to report on outcomes, including any adverse reactions, through a follow-up form.[176]

Witnesses expressed concerns around the use of the Special Access Program for antimicrobials, given the potential delays in treatment and the associated costs of the program.[177] Dr. Sameeh Salama, for example, discussed how a lack of formal access to antimicrobials in Canada led to patients needing to use "a complicated process of special access programs in order to access those antibiotics that are available to their counterparts in the United States."[178] Meanwhile, Kevin Stinson noted the challenges of using the program to access antimicrobials during emergency situations, testifying that:

> For many of the drugs where you have to go through the Special Access Program to gain access, there is a delay in getting them into Canada and actually to the patient's bedside. Unfortunately, in that delay, when you are dealing with someone who is critically ill, every minute counts. That delay has the direct risk of impacting lives.[179]

Jenna Sauve said that this process, of using special programs to access antimicrobials not available in Canada, "results in extensive resource utilization to import these drugs from other countries and causes delays in initiating life-saving care for patients."[180]

Further exploring the cost implications of the Special Access Program, Dr. Sameeh Salama shared the following example:

> I always give the example of the hospital administrator who has a patient presenting with an antibiotic-resistant infection. The choice you have is to use the formulary, which is what is available, but if it doesn't work, you have to go through the special access program. The special access program means that the hospital has to pay for that

174 Government of Canada, *Health Canada's special access programs: Overview*.

175 Government of Canada, *Health Canada's special access programs: Request a drug*.

176 Ibid.

177 SRSR, *Evidence*, 6 October 2025, 1215 (Dr. Sameeh Salama); SRSR, *Evidence*, 8 October 2025, 1740 (Jenna Sauve); SRSR, *Evidence*, 8 October 2025, 1635 (Dr. Victor Leung); SRSR, *Evidence*, 20 October 2025, 1200 (Dr. Kevin Stinson); and SRSR, *Evidence*, 20 October 2025, 1200 (Bettina Hamelin).

178 SRSR, *Evidence*, 6 October 2025, 1215 (Dr. Sameeh Salama).

179 SRSR, *Evidence*, 20 October 2025, 1200 (Dr. Kevin Stinson).

180 SRSR, *Evidence*, 8 October 2025, 1740 (Jenna Sauve).

> antibiotic. When it comes to the hospital budget, if the hospital administrator needs to decide between an MRI or an antibiotic, guess which one gets priority?[181]

Dr. Victor Leung summed up the issue as follows:

> In Canada, when we encounter a difficult-to-treat pathogen, we often rely on Health Canada's Special Access Program, but from my experience working with the special access program, there is excessive administrative burden and paperwork that needs to be modernized. The whole system within special access needs to be revamped so that patients can get the antimicrobials when they need them.[182]

Therefore, the Committee recommends:

Recommendation 13

That the Government of Canada review the Health Canada Special Access Program to simplify and modernize the administrative process.

Leadership and Governance

Witnesses emphasized the need for a comprehensive approach to addressing AMR that includes enhanced coordination between the federal government, provincial and

181 SRSR, *Evidence*, 6 October 2025, 1300 (Dr. Sameeh Salama).

182 SRSR, *Evidence*, 8 October 2025, 1635 (Dr. Victor Leung).

territorial governments, foreign governments, and the international community.[183] As Professor Kevin Outterson noted "none of us is capable of doing it by ourselves."[184]

Dr. Herman Barkema presented the following metaphor to demonstrate the importance of coordination to address AMR:

> AMR cannot be solved through half measures or sector-specific strategies. I always compare it to a boat with nine holes; when eight of them are patched, the boat will still sink. A unified, action-oriented approach is required to make meaningful progress in stopping the spread of resistance.[185]

Dr. Allison McGeer mentioned the potential to adopt successful provincial pilots and projects in other areas of the country, although she did say that "sometimes it's more difficult to move things from one province to another."[186] For example, she testified that "[s]ometimes you can see that in prevention Quebec is in many ways ahead of many of the rest of us in other provinces, with a greater value put on prevention and protecting people in health."[187]

Similarly, Jenna Sauve told the Committee that

> [A] cookie-cutter approach is not going to work in every setting; we still need that national-level leadership, bringing people from the various provinces, areas and sectors together so that they can speak to what will work or what might work in their respective

183 SRSR, *Evidence*, 6 October 2025, 1100 (Dr. Herman Barkema); SRSR, *Evidence*, 6 October 2025, 1130 (Isaac Bogoch); SRSR, *Evidence*, 8 October 2025, 1710 (Dr. Allison McGeer); SRSR, *Evidence*, 8 October 2025, 1825 (Jenna Sauve); SRSR, *Evidence*, 22 October 2025, 1655 (Prof. Kevin Outterson); SRSR, *Evidence*, 22 October 2025, 1700 (Dr. Louis-Patrick Haraoui); SRSR, *Evidence*, 8 October 2025, 1750 (Dr. Scott Weese); François Arès et al., *Leveraging Economics and the One Health Approach to Unlock the Full Potential of the Pan-Canadian Action Plan Antimicrobial Resistance*, Brief submitted to SRSR, 9 October 2025, p. 2; SRSR, *Evidence*, 22 October 2025, 1825 (Dr. Dao Nguyen); SRSR, *Evidence*, 6 October 2025, 1250 (Dr. Rita Dhami); Leanne McConnachie, *Submission to the House of Commons Standing Committee on Science and Research*, Brief submitted to SRSR, 24 October 2025, p. 3; Fedora Pharmaceuticals Inc., "Health Technology Assessment for Antimicrobials, Diagnostics and Other Products to Combat Antimicrobial Resistance (AMR): Considerations for Canada," Written submission to SRSR, October 2025, p. 5; SRSR, *Evidence*, 20 October 2025, 1130 (Bettina Hamelin); François Arès, Caroline Raymond and François M. Castonguay, *The Socio-Economic Impacts of Antimicrobial Resistance in Quebec by 2050*, Brief submitted to SRSR, 3 November 2025, p. 3; SRSR, *Evidence*, 22 October 2025, 1730 (Dr. Gerry Wright); SRSR, *Evidence*, 22 October 2025, 1745 (Dr. Jospeh Rubin); and AntiMicrobial Resistance Québec Network, *Brief for the House of Commons Standing Committee on Science and Research Study on Antimicrobial Resistance*, 3 November 2025, pp. 4–5; and SRSR, *Evidence*, 8 October 2025, 1635 (Dr. Victor Leung).

184 SRSR, *Evidence*, 22 October 2025, 1655 (Prof. Kevin Outterson).

185 SRSR, *Evidence*, 6 October 2025, 1100 (Dr. Herman Barkema).

186 SRSR, *Evidence*, 8 October 2025, 1710 (Dr. Allison McGeer).

187 Ibid.

> areas and fields. We still need that forum and coordination of resources, because there are inevitably going to be many similarities and commonalities, but we also need those voices from each area in order to respect the differences and tailor approaches to the local culture and context.[188]

Therefore, the Committee recommends:

Recommendation 14

That the Government of Canada establish and maintain a forum for interjurisdictional collaboration on antimicrobial resistance in cooperation with the provinces and territories.

The One Health Approach

A commonly discussed strategy to develop a comprehensive plan to addressing AMR was One Health, a concept that considers the health of humans, animals and the environment, and the ways in which they interact.[189] As Dr. François M. Castonguay testified:

> 'One [H]ealth' generates measurable economic value. By integrating health, agriculture, fisheries and environmental perspectives in decision-making, we can optimize investments and maximize health and economic returns without necessarily requiring new funding. Combining the '[O]ne [H]ealth' approach with economic tools would strengthen the Pan-Canadian Action Plan on AMR by allowing us to identify priority pillars of action and interventions, improve intergovernmental and intersectoral co-operation and find ways to allocate public resources toward actions with the best return on investment.[190]

As François Arès and his co-authors wrote in a brief submitted to the Committee, "[p]artial or compartmentalized regulations risk being ineffective, while an integrated approach helps design policies that are better suited to collective needs and the

188 SRSR, *Evidence*, 8 October 2025, 1825 (Jenna Sauve).

189 SRSR, *Evidence*, 6 October 2025, 1110 (Dr. François M. Castonguay); François Arès et al., *Leveraging Economics and the One Health Approach to Unlock the Full Potential of the Pan-Canadian Action Plan on Antimicrobial Resistance*, Brief submitted to SRSR, 9 October 2025, p. 3; AntiMicrobial Resistance Québec Network, *Brief for the House of Commons Standing Committee on Science and Research Study on Antimicrobial Resistance*, 3 November 2025, p. 4; Dr. Makeda Semret et al., *Driving Innovation: The Strategic Role of Academic Research in Combating AMR*, Brief submitted to SRSR, November 2025, p. 3; SRSR, *Evidence*, 6 October 2025, 1135 (Dr. Herman Barkema); SRSR, *Evidence*, 8 October 2025, 1645 (Dr. Simon Otto); and Kevin J. Stinson, *Evidence Brief: Antimicrobial Resistance (AMR) in Canada, with a focus on research needs in human healthcare systems*, Brief submitted to SRSR, 20 October 2025, pp. 4–5.

190 SRSR, *Evidence*, 6 October 2025, 1110 (Dr. François M. Castonguay).

missions of each department and government."[191] They followed that statement by discussing how "[c]ombining the One Health approach with economics tools provides a powerful interdepartmental and intergovernmental framework for equitably distributing costs and benefits and prioritizing the pillars and interventions that offer the best return on investment."[192] They write that:

> Using this approach, Canada would be able to (i) save lives; (ii) preserve antimicrobial effectiveness; (iii) protect the sustainability of provincial health systems; and (iv) increase its economic resilience to future health crises, including AMR. It also provides an opportunity for Canada to optimize its public spending, prevent health crises, and strengthen its role as an international leader in integrated health governance, in partnership with the provinces and territories.[193]

To successfully integrate a One Health approach into Canada's strategy to address AMR, a brief submitted by Dr. Makeda Semret and co-authors suggested developing and supporting a National One Health Strategy, which would:

> 3.1 Recognize that drug resistant pathogens routinely move between agricultural, veterinary, medical, and environmental settings. Invest in understanding this flow and elucidating the optimal points and methods for intervention.
>
> 3.2 Appoint a dedicated federal One Health advisor. The role of this individual would be to establish a unified approach to address AMR by removing the barriers that limit collaboration and data sharing between sectors, building a national AMR awareness program (as recommended by the WHO), and advising parliament on One Health effects of public policy.
>
> 3.3 Support collaboration between government agencies, provincial health ministries and academia. Despite the complementary strengths of the Canadian public service and universities, there are currently no mechanisms in place to logistically or financially support collaboration. Doing so would allow innovative academic labs to benefit from the long-term surveillance data collected by their public service counterparts.[194]

Meanwhile, the AntiMicrobial Resistance Québec Network suggested in their brief that the One Health approach "must be supported by two central concepts: strong leadership capable of coordinating efforts across sectors within the cross-sectoral ecosystem and

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191 François Arès et al., *Leveraging Economics and the* One Health *Approach to Unlock the Full Potential of the Pan-Canadian Action Plan on Antimicrobial Resistance*, Brief submitted to SRSR, 9 October 2025, p. 3.

192 Ibid.

193 Ibid.

194 Dr. Makeda Semret et al., *Driving Innovation: The Strategic Role of Academic Research in Combating AMR*, Brief submitted to SRSR, November 2025, p. 3.

the establishment of cross-sectoral bridges to increase the fluidity of collaboration and communication."[195]

Therefore, the Committee recommends:

Recommendation 15

That the Government of Canada take a One Health approach to coordinate federal efforts to address AMR across departmental authorities.

195 AntiMicrobial Resistance Québec Network, *Brief for the House of Commons Standing Committee on Science and Research Study on Antimicrobial Resistance*, 3 November 2025, p. 4.

APPENDIX A:
LIST OF WITNESSES

The following table lists the witnesses who appeared before the committee at its meetings related to this report. Transcripts of all public meetings related to this report are available on the committee's webpage for this study.

Organizations and Individuals	Date	Meeting
As an individual	2025/10/06	7
Dr. Herman Barkema, Professor, Epidemiology of Infectious Diseases, Faculty of Veterinary Medicine, University of Calgary		
Dr. Isaac Bogoch, Infectious Diseases Specialist, Toronto General Hospital and Professor of Medicine, University of Toronto		
Dr. François M. Castonguay, Assistant Professor of Health Economics, School of Public Health, Université de Montréal		
Dr. John Conly, Professor of Medicine, University of Calgary		
Dr. Rita Dhami, Adjunct Clinical Assistant Professor, School of Pharmacy, University of Waterloo		
Fedora Pharmaceuticals Inc.	2025/10/06	7
Dr. Sameeh Salama, Chief Scientific Officer and Chair, Canadian Antimicrobial Innovation Coalition		
Infection Prevention and Control Canada	2025/10/06	7
Dr. Gregory Rose, Infectious Diseases and Infection Control Consultant		
As an individual	2025/10/08	8
Dr. Victor Leung, Physician		
Dr. Allison McGeer, Professor, Department of Laboratory Medicine and Pathobiology, University of Toronto		
Dr. Simon Otto, Associate Professor, University of Alberta		
Jenna Sauve, Antimicrobial Stewardship Pharmacotherapy Specialist		
Dr. Scott Weese, Professor, University of Guelph and Director, Centre for Public Health and Zoonoses		

Organizations and Individuals	Date	Meeting
Infection Prevention and Control Canada	2025/10/20	9
Dr. Kevin Stinson, Program Manager, Infection Prevention and Control, Waterloo Regional Health Network		
Innovative Medicines Canada	2025/10/20	9
Jennifer Buckley, Senior Director, Regulatory Affairs and Clinical Research Transformation		
Dr. Bettina Hamelin, President and Chief Executive Officer		
Patients for Patient Safety Canada	2025/10/20	9
Kim Neudorf, Patient Partner		
As an individual	2025/10/22	10
Dr. Louis-Patrick Haraoui, Associate Professor, Faculty of Medicine and Health Sciences, Université de Sherbrooke		
Dr. Gerry Wright, Professor, Michael G. DeGroote Institute for Infectious Disease Research, McMaster University		
AMR Action Fund GP	2025/10/22	10
Dr. Henry Skinner, Chief Executive Officer		
CARB-X	2025/10/22	10
Prof. Kevin Outterson, Founding Executive Director		
Deans Council - Agriculture, Food and Veterinary Medicine	2025/10/22	10
Dr. Maud de Lagarde, Assistant Professor, Faculty of Veterinary Medicine, Université de Montréal		
Dr. Joseph Rubin, Professor, Department of Veterinary Microbiology, Western College of Veterinary Medicine		
McGill AMR Centre	2025/10/22	10
Dr. Dao Nguyen, Founder and Director		

APPENDIX B:
LIST OF BRIEFS

The following is an alphabetical list of organizations and individuals who submitted briefs to the committee related to this report. For more information, please consult the committee's webpage for this study.

Arès, François

Castonguay, François M.

Haraoui, Louis-Patrick

Infection Prevention and Control Canada

Macia, Nicolas

McGill AMR Centre

Raymond, Caroline

Results Canada

World Animal Protection

REQUEST FOR GOVERNMENT RESPONSE

Pursuant to Standing Order 109, the committee requests that the government table a comprehensive response to this report.

A copy of the relevant *Minutes of Proceedings* (Meetings Nos. 7 to 10, 30 and 34) is tabled.

Respectfully submitted,

Salma Zahid
Chair