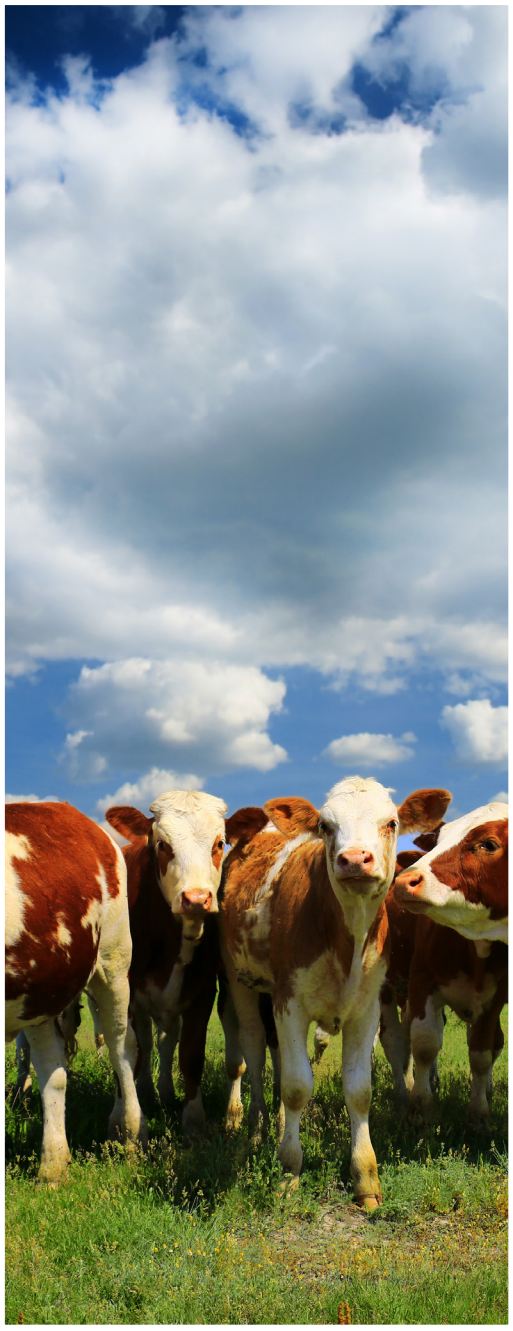
Alberta's One Health Antimicrobial Resistance Framework for Action



Alberta

The Government of Alberta contracted the University of Calgary from 2017-2022 to support the development of Alberta's One Health AMR Framework for Action.

This publication is available online at https://open.alberta.ca/publications/albertas-one-health-antimicrobial-resistance-framework-for-action
Alberta's One Health Antimicrobial Resistance Framework for Action | Alberta Health
 | November 2024 | ISBN 978-1-4601-5897-5

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Ministers' Message

As Alberta's Ministers of Health, Agriculture and Irrigation, and Environment and Protected Areas, we are pleased to release Alberta's One Health Antimicrobial Resistance (AMR) Framework for Action.

Alberta's One Health AMR Framework for Action sets out the fundamental structure of the provincial response to AMR and will guide our collective efforts to address the growing threat of AMR in Alberta. AMR is one of the most pressing crises worldwide, with implications across the One Health domains of human, animal, and environmental health.

Antimicrobials may easily be taken for granted since they are so fully integrated into human health, animal health, and agriculture. Many medical conditions and interventions are associated with infections, including organ transplants, chronic diseases, dialysis, and surgical procedures such as joint replacements. These interventions become more challenging and more expensive as the antimicrobials used to prevent and treat infectious complications lose their effectiveness, which may result in lengthier hospital stays, longer courses of treatment, and other expenses attributable to AMR. Antimicrobials are similarly important for preventing and treating infectious diseases in companion and food production animals. Maintaining the effectiveness of antimicrobials is critical to the sustainability of the agri-food industries that feed Alberta and our neighbours. There is a growing concern over contamination of water and soil with antimicrobials and resistant organisms. Within this complex web of interactions, the development and spread of AMR presents a direct threat to health and food security, with far-reaching impacts on our economy and quality of life.

The threat from AMR is significant. There are international and national action plans that reinforce the importance of action and set out the goals in broad strokes, but to be effective these must be adapted and tailored to local resources and challenges. With this provincial AMR Framework, Alberta aligns with the global outlook and has taken a key step towards applying the broad international principles to our specific provincial context. With Alberta's existing expertise, infrastructure, and a clear framework to leverage this foundation, we are well-positioned to meet this challenge and address AMR in Alberta.

The release of Alberta's One Health AMR Framework for Action is an important milestone and a visible signal that the Government of Alberta is committed to addressing the threat. Importantly, though, the government cannot do it alone. Achieving our common vision will require the enthusiastic, innovative, and intentional involvement of AMR partners within the sectors of human health, animal health and agriculture, and the environment. This document is our roadmap for action, and so we call on Albertans to join us in a collaborative effort that will preserve the effectiveness and availability of antimicrobials and safeguard our collective future.

Adriana LaGrange
Minister of Health

Rebecca Schulz
Minister of Environment
and Protected Areas

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Acknowledgements

The Government of Alberta recognizes the significant contributions of many partners throughout the process that culminated in this document, Alberta's One Health AMR Framework for Action.

Over the years, many people have invested significant time and effort to develop the AMR Framework. These AMR partners represent the diversity of expertise, experience and stakeholder interests throughout Alberta, including professional associations and licensing bodies, human and animal health professionals, agriculture and agri-food industries, and academia. The Government of Alberta would like to thank all those whose intentional, enthusiastic participation was invaluable in identifying, shaping, revising, and validating the values and actions that comprise Alberta's One Health AMR Framework for Action.

The Government of Alberta acknowledges the work undertaken by the AMR Executive Implementation Committee (EIC). Co-chaired by Alberta's Chief Medical Officer of Health and Chief Provincial Veterinarian, the EIC included Assistant Deputy Minister representation from Ministries of Health, Agriculture, and Environment, that provided oversight and critical direction for this work.

Executive Summary

The use of antimicrobials is integral to our systems of healthcare and food production, in Alberta and around the world. Antimicrobial resistance (AMR) occurs when microbes, such as bacteria or fungi, are no longer inhibited or killed by the antimicrobials that are available to control them. AMR is a complex problem, influenced by a multitude of factors and with multi-sectorial impacts. It is a serious threat to human and animal health, food security, and the economy.

Alberta's One Health AMR Framework for Action (the "AMR Framework") sets out the fundamental structure of Alberta's response to AMR. The AMR Framework describes our core values and is built around three pillars: stewardship, surveillance, and infection prevention and control. These are essential for tackling AMR and to ensure Alberta's actions coordinate with national and international responses to AMR. Within the three main pillars, there are two cross-cutting themes, nine key objectives, and fifteen priority areas for action.

The AMR Framework rests on the vision of "A future in which Alberta employs its collective resources to prevent and contain the threat of antimicrobial resistance". To bring this vision to fruition, our mission statement declares that "Albertans will work collaboratively within and across sectors, and in alignment with federal efforts, to take actions to mitigate the spread of AMR and promote the stewardship of antimicrobials in order to preserve their effectiveness, to protect the health of humans, animals, and the environment".

The AMR Framework was developed through a process characterized by extensive engagement with diverse AMR partners representing a wide range of expertise and interest, who participated in all stages of the process. Furthermore, the AMR Framework was developed using a One Health approach, which recognizes that the health of humans, wild and domestic animals, plants, and the shared environment are closely linked and interdependent. The Government of Alberta acknowledges that each sector may require its own unique approach to address AMR and is further committed to continuing to engage with all partners during implementation of the areas for action identified in the AMR Framework.

Insofar as the AMR Framework is a definitive statement of our common goals and the components for success, it provides clarity for the leadership role of the Government of Alberta, and enlists the coordinated efforts of all Albertans. It provides a roadmap for Alberta's actions to preserve the availability and effectiveness of antimicrobials for future generations.

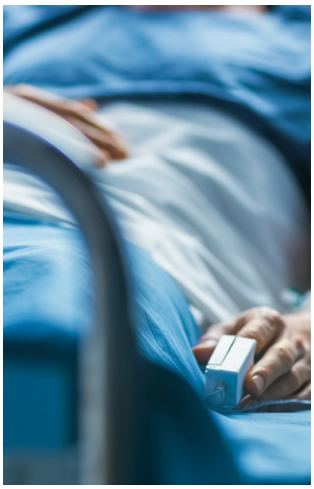
The Need for a Provincial Framework for Action

Antimicrobial resistance (AMR) is one of the most pressing global health crises, with serious implications for Albertans and Alberta's economy. Since antimicrobials are a critical tool for health protection in humans, animals and agriculture, the loss incurred through AMR will have wide-reaching economic effects, for example, through decreases in work force productivity and in the food production system. The development of AMR can be avoided or delayed, but it is much more difficult to reverse, so the time for action is now. The AMR Framework is intended to spur immediate action and support the coordination of Alberta's long-term, sustainable efforts to address the threat of AMR.

Antimicrobial Resistance

Antimicrobials are natural or synthetic substances that kill or inhibit the growth of microbes, namely bacteria, viruses, fungi, and parasites. Antimicrobials are administered to humans, animals, and plants to treat or prevent infection and disease. Antimicrobials may also be included in disinfectants and antiseptics.

Antimicrobial resistance occurs when microbes are no longer susceptible to the effects of antimicrobials. The mechanisms of resistance are diverse and are typically present in low levels in any given population of microbes. Antimicrobial use always contributes to an increase in AMR because, while the susceptible microbe population is reduced, the microbes that contain the resistance mechanism survive the antimicrobial treatment and will pass down the resistance traits as they multiply. The genes that encode the mechanisms for AMR may also spread by being picked up by, or transferred into, microbes that were previously susceptible. Microbes that are resistant to treatment spread among people, animals, and the environment like other disease-causing microbes. Importantly, the infections and infectious diseases caused by AMR microbes are more difficult and costly to treat.



VIGNETTE: An AMR infection spreads and harms other hospitalized patients

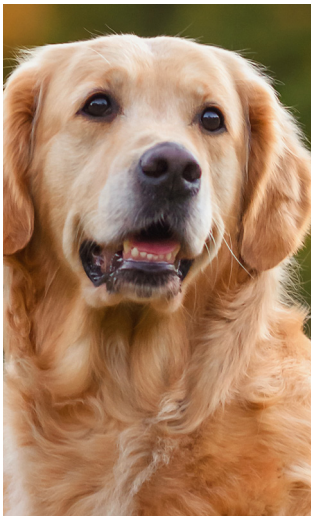
A young woman was in an accident while vacationing outside of Canada and broke her elbow. She was admitted to hospital to undergo surgery for the fracture, but the surgical site became infected and did not respond to treatment. When she returned to her home in Alberta, she was directly admitted to hospital again. Her attending physician sent a sample of infected tissue for lab testing, which confirmed the infection was caused by *K. pneumoniae*, and that this bacterial strain was resistant to all but the "last resort" antibiotics. Despite hospital infection prevention precautions, the resistant bacteria from the woman's infected arm spread to eight other patients on her unit, who then spread it to four other surgical units before the outbreak was contained. Unfortunately, the infection spread to one patient who had recently undergone abdominal surgery and resulted in their death from organ failure and septic shock.

Vignettes are based on true events in Alberta. Identifying information has been altered to protect patient and organization confidentiality.

The Scope of the AMR Problem

Prevalence of AMR is increasing worldwide, and the effects extend beyond human and animal health to include social and economic impacts.

The most apparent health effects of infections with AMR pathogens include prolonged illnesses and hospital stays, increased mortality, and dramatic reductions in the ability of healthcare providers to contain and treat infectious diseases. As more strains of resistant microbes emerge, infections and injuries that were once easily treated may become increasingly dangerous or potentially fatal, and require treatments that have more severe side effects. Medical procedures such as chemotherapy, organ transplants, and surgery also take on elevated levels of risk, because antimicrobials help to defend a compromised immune system or combat post-operative infections. These procedures may eventually become too dangerous to perform.



VIGNETTE: An AMR bacterial infection has permanent consequences for a pet

Bailey, a golden retriever certified in pet therapy, used to visit the local hospital once a week to provide support and comfort for recovering patients. During her most recent visit she spent time in a room previously quarantined for methicillin-resistant *Staphylococcus aureus* (MRSA) – a common antibiotic-resistant bacteria that can infect both humans and animals. A few days later, her owner noticed Bailey showing signs of fever and a swollen, red lesion on her left front paw. Bailey's veterinarian sent a sample of the paw tissue to the lab, which confirmed she had an MRSA infection. Several courses of antibiotic treatments were ineffective, and Bailey's owner was left with no choice but to agree to the amputation of Bailey's paw in order to save her life. The golden retriever survived because of the successful amputation but she has been permanently affected by the ordeal and, due to the risk of spreading bacteria to patients, she can no longer serve as a therapy dog.

Vignettes are based on true events in Alberta. Identifying information has been altered to protect patient and organization confidentiality.

Throughout the food production system, antimicrobials are used to treat and prevent infection in individual animals and herds. Antimicrobials may also provide protection against disease losses in agricultural crops and aquaculture. Antimicrobial resistance also poses a direct threat to food safety and to the economic viability of food production industries that depend on healthy animals and crops. The presence of resistant microorganisms in the food supply increases the risk of human infection as well as contributing to the spread of AMR across borders via the transportation of animals and food products.

The true extent of the potential economic impacts of AMR are difficult to calculate, but the estimated costs are immense because they include direct healthcare system costs, the burden placed upon healthcare providers, lost labour force productivity due to protracted worker illness, and intense market and production pressures upon agriculture and food industries. By 2050, the global economic impact of AMR is projected to reach $100 trillion USD annually, approximately 3.5% of global gross domestic product[1]. The global livestock industry in particular is under threat from AMR, with an estimated 2–5% decline in production by 2050[2]. The 2019 report from the Council of Canadian Academies projected that by 2050, if resistance to first-line antimicrobials remains at 26% or increases to 40%, Canada's GDP would decrease by $13 to $21 billion per year, respectively[3].

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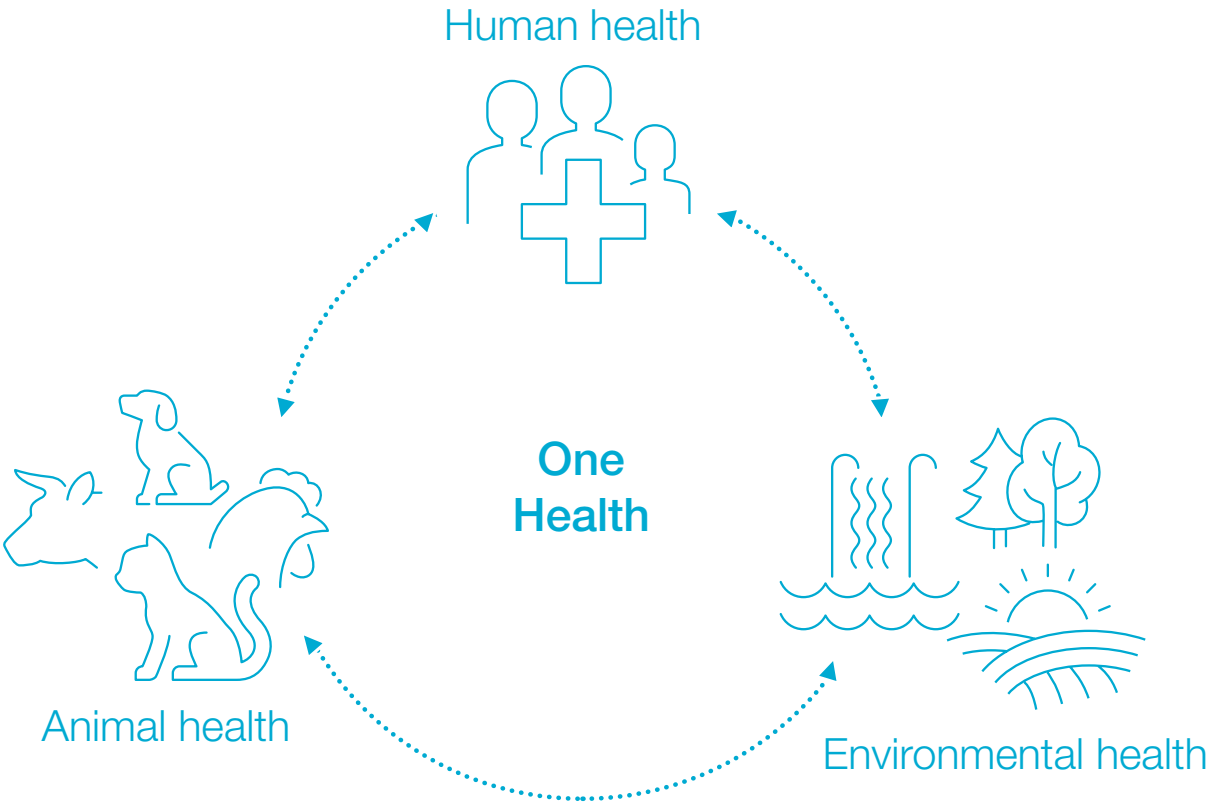
[1] O'Neill, J. (2016) Tackling Drug-Resistant Infections Globally: Final Report and Recommendations. The Review on Antimicrobial Resistance. Available at: 160518_Final paper with cover.pdf (amr-review.org)

[2] World Bank (2017) "Drug-Resistant Infections: A Threat to Our Economic Future." Washington, DC: World Bank. Available at: World Bank Document

[3] Council of Canadian Academies (2019) When Antibiotics Fail: The Expert Panel on the Potential Socio-Economic Impacts of Antimicrobial Resistance in Canada. Available at: When-Antibiotics-Fail-1.pdf (cca-reports.ca)



A One Health Approach

The AMR Framework was developed using a One Health approach, which recognizes that the health of humans, wild and domestic animals, plants, and the shared environment are closely linked and interdependent. The One Health perspective is the most effective way to understand and address the multi-sectorial consequences of antimicrobial use and resistance. This approach focuses on cooperation and collaboration between people, organizations, and government ministries that represent all three sectors.

Importantly, Alberta's One Health approach aligns with international and federal strategies, which ensures that our provincial activities will synergize with global AMR initiatives. The World Health Organization (WHO), Food & Agricultural Organization of the United Nations, World Organization for Animal Health, and United Nations have issued One Health AMR action plans and adopted resolutions, as have many national governments. The Canadian federal government outlined the national response to AMR in the Federal Framework for Action (2014), followed by development of the Pan-Canadian Framework for Action (2017) and the Pan-Canadian Action Plan (2023) on AMR.

Alberta: The Urgent Need for Action

The impacts of AMR cannot be contained by provincial or national borders. Alberta must be prepared with a long-term plan for action to protect the future of Albertans. Within Canada and within the global community, we must do our part to preserve antimicrobial effectiveness as a front-line defense against many life-threatening infections, recognizing that antimicrobials are a shared resource.

The AMR Framework sets out the fundamental structure of Alberta's response to AMR: it describes our core values and clearly lays out the three main pillars, two cross-cutting themes, nine key objectives, and fifteen areas for action.

Vision

A future in which Alberta employs its collective resources to prevent and contain the threat of antimicrobial resistance

Mission

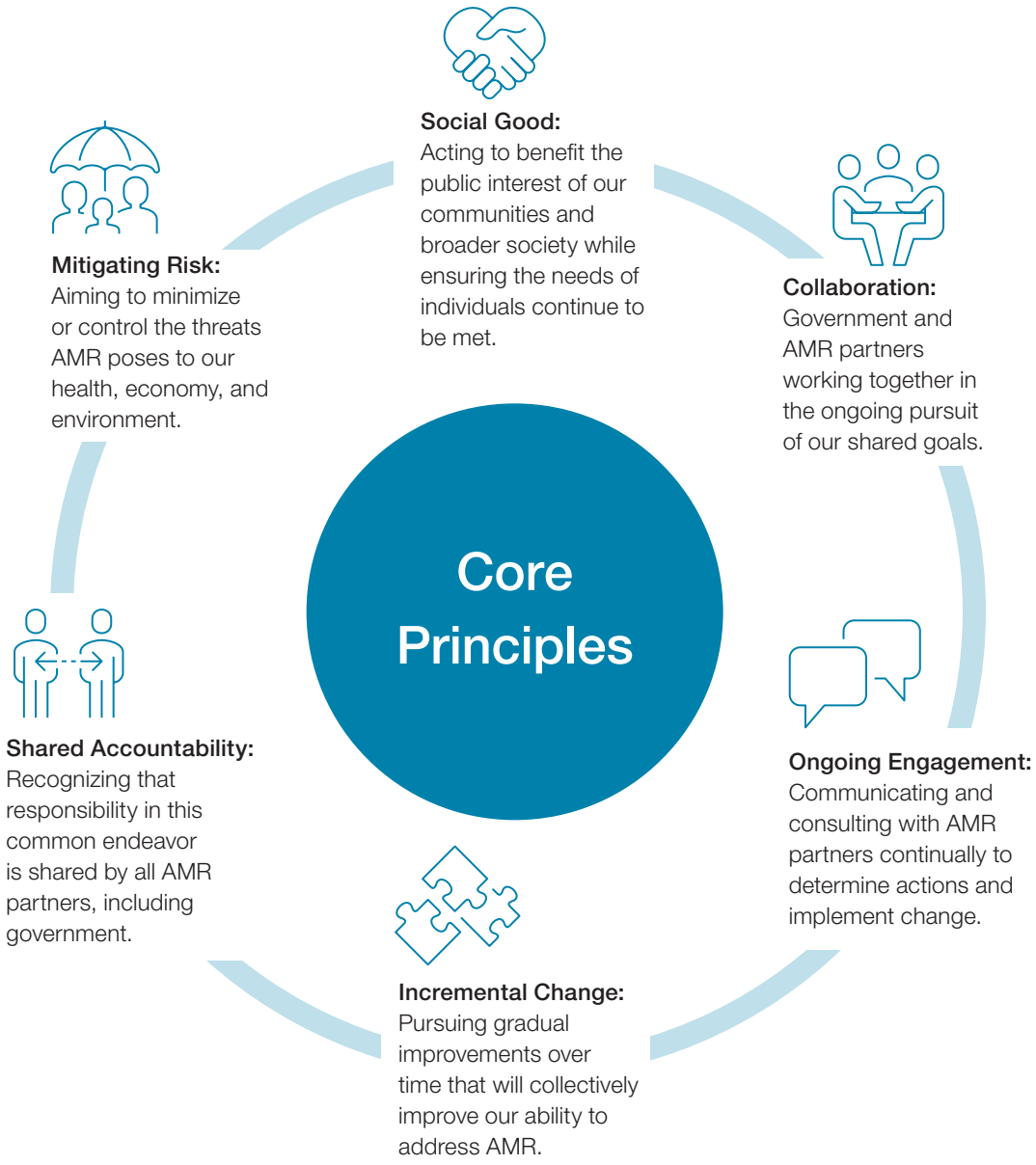
Albertans will work collaboratively within and across sectors, and in alignment with federal efforts to take actions to mitigate the spread of AMR and promote the stewardship of antimicrobials in order to preserve their effectiveness, to protect the health of humans, animals, and the environment

The Government of Alberta's Role

The Government of Alberta recognizes the significance of the threat from AMR, and the urgency of addressing it through concrete steps that will prevent and contain its spread and preserve antimicrobial effectiveness. The AMR Framework demonstrates a commitment to action and outlines the collaborative, One Health approach required to secure a safer, healthier future for Alberta. The Government of Alberta has demonstrated ongoing leadership as well as a commitment to multi-sectorial stakeholder engagement in striving to achieve our common goal.

The Government of Alberta can provide leadership to harness the expertise of Albertans and guide a coordinated response to AMR as the many sectors and industries across human, animal, and environmental health impacted by this threat work together to confront it.

Early in the engagement process, AMR partners and expert groups identified the core principles that are foundational to the AMR Framework. As we work together, we will continue to look to these principles for guidance:



How We Got Here

Framework Development

The AMR Framework is the result of rigorous research and collaboration at provincial, national, and international levels, as well as engagement with AMR partners across Alberta's human and animal health sectors.

Internationally, the WHO's Global Action Plan on Antimicrobial Resistance (2016) is a call to action for all nations to adopt measures to address AMR. Nationally, beginning in 2014, the Government of Canada has produced a series of strategic initiatives. In 2017, Tackling Antimicrobial Resistance and Antimicrobial Use: A Pan-Canadian Framework for Action was issued, while in October 2021, a new Public Health Agency of Canada AMR taskforce was launched. In June 2023, the Pan-Canadian Action Plan on AMR was released and was subsequently endorsed by the Government of Alberta.

During this time, Alberta has worked to develop a provincial AMR Framework that is tailored to Alberta's local context and agrees with national efforts. At the outset, the government contracted a comprehensive review of international guidelines and priorities for addressing AMR, alongside a systematic engagement process with participation from AMR partners across Alberta's human and animal health sectors. This work revealed that, while sectors differ in their unique needs and challenges, there is broad consensus for a framework that would guide a collaborative response to the threat of AMR for Alberta.

Alberta's AMR partners were clearly supportive of the development of a provincial framework. The AMR partners agreed upon the following broad, key areas to determine where Alberta needs to take action or strengthen existing actions:

1. **Stewardship:** to promote appropriate antimicrobial usage so that use does not unduly accelerate AMR, and to preserve the effectiveness of currently available antimicrobials.
2. **Surveillance:** to monitor antimicrobial use and AMR across different sectors.
3. **Infection Prevention & Control:** to prevent and manage infections, in both human and veterinary medicine, without drawing upon antimicrobials unless absolutely necessary.

4. **Education & Awareness:** to increase knowledge and understanding of antimicrobial use and AMR, and awareness that antimicrobials are a common good/shared resource; targeting both professionals and the general public.
5. **Research & Innovation:** to develop new techniques, agents, and practices to prevent and treat infectious disease, and to better understand antimicrobial resistance.

These key areas align with the federal Pan-Canadian Framework for Action and are the backbone of the AMR Framework. Within this broad structure, there are nine objectives and fifteen areas for action that can be targeted for phased implementation.

In 2022, the entire AMR Framework was reviewed, revised, and validated through the input of key AMR partners across the province, using a modified policy Delphi survey process. Survey participants provided feedback on desirability, feasibility, prioritization, duration, and measures for success for each Area for Action. The AMR partners also provided input on the current and future activities for addressing AMR in their respective sectors.

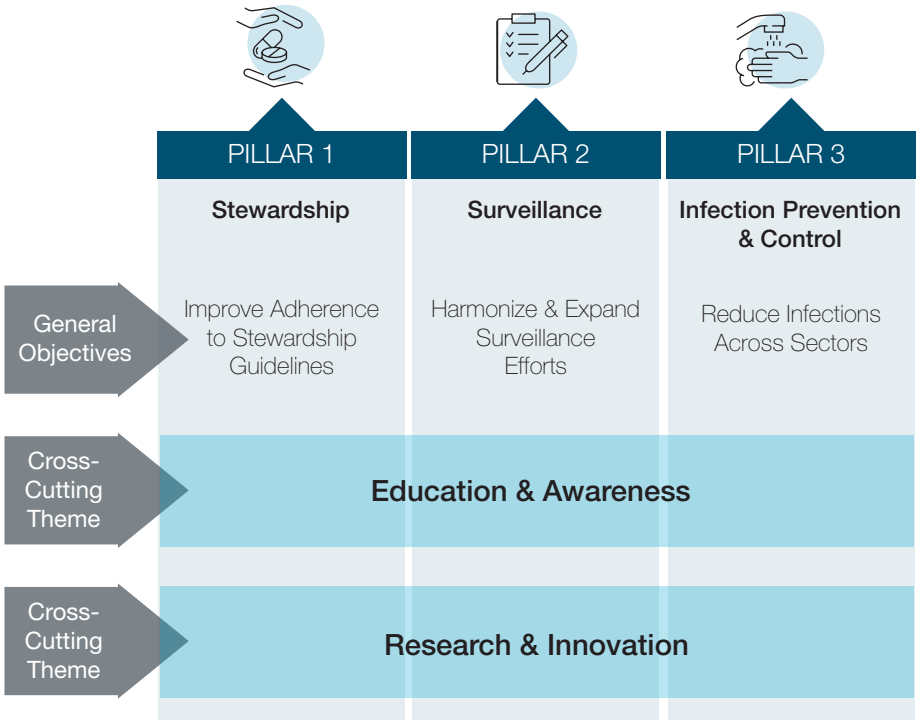
Both the One Health perspective and the intentional ongoing engagement with diverse AMR partners have been foundational to the development of the AMR Framework, and this is expected to continue during the ongoing planning and implementation phases.

What We Plan To Do

Overview of Alberta's AMR Framework

The AMR Framework is built around three pillars that are essential for tackling AMR and will ensure that Alberta's actions coordinate with national and international responses. Within each pillar there are **general objectives** and associated **Areas for Action**. Present across all three pillars are two **cross-cutting themes** that will identify additional components needed for success for the activities within each pillar.

The three pillars are **Stewardship**, **Surveillance**, and **Infection Prevention & Control**. These were chosen because they are distinct and foundational categories of activities that can reduce or prevent AMR.



Pillar 1: Stewardship

Antimicrobial stewardship refers to the careful and appropriate use of antimicrobials in order to reduce the development of resistance and preserve antimicrobial effectiveness.

Antimicrobial prescribing, dispensing, and administration practices are informed by guidelines in human and animal health sectors. Thus, the overarching general objective within this pillar is to **improve adherence to antimicrobial stewardship guidelines**, and develop or update guidelines in sectors where they may be lacking.

Pillar 2: Surveillance

Antimicrobial surveillance refers to the collection of information about antimicrobial usage and AMR, in order to monitor and track trends over time and across locations and regions. Knowing our antimicrobial usage patterns and types of resistant organisms we are facing is essential information that helps us plan, coordinate responses, and design interventions.

The overarching general objective within this pillar is to **expand existing surveillance efforts** and **harmonize surveillance systems** so that this important information can be coordinated and is available with minimal barriers to access.

Pillar 3: Infection Prevention & Control

Infection prevention and control practices aim to prevent infections from occurring and, if they occur, manage their course and spread without exclusively relying upon antimicrobials. In both human and veterinary medicine this includes the use of sanitation, hygiene, facility design, and vaccines, among other sector specific considerations (i.e., animal husbandry).

By preventing and managing infectious disease without antimicrobials, we reserve these important drugs for when they are most essential and contribute to preserving antimicrobial effectiveness. The general objective within this pillar is to **reduce the incidence of infections** across human and animal health sectors and thereby reduce the need for antimicrobial use.

The cross-cutting themes of **Education & Awareness** and **Research & Innovation** are essential to successfully achieving the general objective in each of the AMR Framework's three pillars. These themes are the common threads which tie together the pillars and objectives, and provide for a coordinated, holistic response to AMR from a One Health perspective.

Cross-cutting Theme 1: Education & Awareness

This ongoing theme will further promote knowledge and understanding of antimicrobial resistance and usage among both professionals and the public. The more informed that our citizens, producers, health practitioners, and industry and governmental leaders are about these issues, the more effectively we will be able to respond.

This cross-cutting theme aims to **sustain AMR partner engagement** across all three pillars by fostering dialogue and understanding in each area.

Cross-cutting Theme 2: Research & Innovation

Alberta's Strategy is dedicated to supporting research and innovation to better understand AMR and develop new or enhanced ways of approaching its challenges. New antimicrobial agents, alternatives, and practices are needed to tackle AMR from many different angles. Research and innovation are essential in each of those areas.

This cross-cutting theme aims to **support collaboration** across all three pillars to deepen our understanding of AMR's challenges and spark innovative solutions. Towards this end, the AMR-One Health Consortium, a pan-Alberta initiative focused on antimicrobial use and resistance research, policy, training, outreach, and commercialization, is a key enabler that has and will continue to mobilize research and innovation across the province.

Areas for Action

The following page provides a more detailed visualization of the relationships between the three pillars, two cross-cutting themes, and nine key objectives. The goal of the AMR Framework is to support action, and this is evidenced by the identification of fifteen Areas for Action at the intersection of the foundational components.

Alberta's One Health AMR Framework for Action

Pillars, objectives, themes and areas for action

Pillars	Stewardship	Surveillance	Infection Prevention & Control (IPC)
General Objectives	Improve adherence to antimicrobial stewardship guidelines	Harmonize and expand surveillance efforts	Reduce infections across sectors
Areas for Action	1. Identify and develop strategies for the implementation of existing relevant local, national, and/or international antimicrobial stewardship guidelines in both human and animal health sectors 2. Identify and fill gaps in species- and syndrome-specific evidence-based guidelines on the use of antimicrobials in the human and animal health sectors through collaboration at the national and international levels	5. Implement standardized methods of surveillance for AMR/U within each sector in the One Health spectrum, and identify indicators that can be compared between sectors 6. Harmonize existing AMR/U surveillance data and programs to create a One Health AMR/U surveillance system across acute care, long-term care, and community care settings, and animal health, in alignment with national surveillance efforts 7. Develop a province-wide initiative for environmental surveillance of antibiotics and antibiotic resistant pathogens in wastewater systems to identify areas for action	11. Identify priority areas to implement initiatives to improve vaccination rates in both human health and animal health sectors 12. Continue to develop targeted initiatives to promote adoption of evidence-based best practices in all food animal production that reduce the need for antimicrobials
Cross Cutting Theme: Education & Awareness			
Objectives	Create a culture of stewardship	Improve awareness of prescribing practices	Create awareness of IPC best practice
Areas for Action	3. Engage in ongoing research and professional education on factors driving prescribing practices among practitioners in animal and human health, including user-prescriber dynamics 4. Enhance public education and awareness of the issue of antimicrobial resistance, its impact and relationship to antimicrobial use	8. Implement audit and feedback systems of prescribing practices and make comparative metrics available to the prescribers and their professional associations	13. Identify targets for Knowledge to Action initiatives on IPC best practices within human and animal healthcare delivery
Cross Cutting Theme: Research & Innovation			
Existing Enabler: AMR – One Health Consortium, Alberta's collaborative research and innovation platform			
Objectives	Enhance our knowledge of, and approaches towards, stewardship	Collect AMR/U data that is relevant, accurate, and actionable	Embrace innovative approaches to prevent and control infections
Areas for Action		9. Expand AMR/U data collection to include indication of use, prescribing, dispensing, and sales tracking of antimicrobials 10. Make de-identified aggregate AMR/U surveillance data accessible across organizations and sectors	14. Facilitate research and innovation in the area of diagnostics in both the human and animal health sectors 15. Promote research and evaluation of new and existing technologies and methods aimed at infection prevention within human and animal health settings, including vaccine development and improvement

Pillar 1: Stewardship

General Objective: Improve Adherence to Stewardship Guidelines

Stewardship practices are essential for managing antimicrobial use and resistance, but these practices are informed by attitudes and training that may differ across professions and sectors. We recognize that unique needs of different groups will require responses tailored to their context. Therefore, the AMR Framework sets out to foster a culture of antimicrobial stewardship across Alberta and to improve adherence to antimicrobial stewardship guidelines. This will ensure our diverse population, professionals, and industries are well equipped to tackle AMR in the ways most effective for their sector.

General Areas for Action

- Identify and develop strategies for the implementation of existing relevant local, national, and/or international antimicrobial stewardship guidelines in both human and animal health sectors
- Identify and fill gaps in species- and syndrome- specific evidence-based guidelines on the use of antimicrobials in the human and animal health sectors through collaboration at the national and international levels

Education Areas for Action

- Engage in ongoing research and professional education on drivers of prescribing practices among practitioners in animal and human health including user-prescriber dynamics
- Enhance public education and awareness of the issue of antimicrobial resistance, its impact and its relationship to antimicrobial use

Pillar 2: Surveillance

General Objective: Harmonize and Expand Surveillance Efforts

To respond to AMR effectively, we need to know resistance trends and antimicrobial usage patterns (AMR/U). This requires access to high quality, up-to-date surveillance data. Alberta's AMR partners acknowledged that timely collection and accessibility of surveillance data is one of the most pressing gaps Alberta must address. Therefore, the AMR Framework aims to expand Alberta AMR/U surveillance, monitor the quality and suitability of the data, and harmonize surveillance systems so this vital information can be accessed rapidly and shared efficiently.

General Areas for Action

- Implement standardized methods of surveillance for AMR/U within each sector in the One Health spectrum, and identify indicators that can be compared between sectors
- Harmonize existing AMR/U surveillance data and programs to create a One Health AMR/U surveillance system across acute care, long-term care, and community care settings, and animal health, in alignment with national surveillance efforts
- Develop a province-wide initiative for environmental surveillance of antibiotics and antibiotic resistant pathogens in wastewater systems to identify areas for action

Education Areas for Action

- Implement audit and feedback systems of prescribing practices and make comparative metrics available to the prescribers and their professional associations

Research Areas for Action

- Expand AMR/U data collection to include indication of use, prescribing, dispensing, and sales tracking of antimicrobials
- Make de-identified aggregate AMR/U surveillance data accessible across organizations and sectors

Pillar 3: Infection Prevention & Control

General Objective: Reduce Infections Across Sectors

Preventing and controlling infections with minimal reliance on antimicrobials are an effective strategy to reduce antimicrobial usage. We need to encourage the widespread implementation of infection prevention and control practices, and develop new practices and techniques for managing infections in human and animal settings that are not dependent on antimicrobials. Therefore, the goal is to reduce infections across sectors and incorporate the use of antimicrobial alternatives.

General Areas for Action

- Identify priority areas to implement initiatives to improve vaccination rates in both human heath and animal health sectors
- Continue to develop targeted initiatives to promote adoption of evidence-based best practices in all food animal production that reduce the need for antimicrobials

Education Areas for Action

- Identify targets for Knowledge to Action initiatives on IPC best practices within human and animal healthcare delivery

Research Areas for Action

- Facilitate research and innovation in the area of diagnostics in both the human and animal health sectors
- Promote research and evaluation of new and existing technologies and methods aimed at infection prevention within human and animal health settings, including vaccine development and improvement

The Way Forward

Alberta's One Health Antimicrobial Resistance Framework for Action provides a blueprint for coordination of strategies and activities that address the threat from AMR. The AMR Framework will guide our collective actions to optimize existing practices and develop new solutions, targeting key areas across all three pillars of Stewardship, Surveillance, and Infection Prevention & Control. This goal will be supported by efforts in Education & Awareness for professionals and the public, and Research & Innovation initiatives in multiple fields. Albertans are more than capable of rising to this challenge. Our province is home to strong industries, cutting-edge innovation, and world leaders in human and animal medicine who are already working together and with experts around the world to address the global threat of AMR.

The AMR Framework is more than this document: it is the collective effort of Albertans coming together to harness Alberta's strengths and investments. Alberta's AMR partners across all sectors are already involved in a broad range of activities that can be capitalized on to help achieve our objectives. By increasing and facilitating collaboration, cohesion, and leadership to align ongoing activities and expand where needed, we can channel this work toward our collective goal.

The Government of Alberta is committed to providing leadership, governance, direction, and tangible support for the work of AMR partners across Alberta as we tackle this challenge together. Given the complexity of the challenge and the scope extending beyond the direct control of government, effectively responding to AMR will require a coordinated effort across the human health, animal health and agriculture, and environmental sectors. Continuous engagement between partners and policymakers is central to the AMR Framework and its plan for implementation.

The AMR Framework will be implemented through a phased approach, with some actions moving forward immediately, followed by medium- and longer-term actions. The Government of Alberta looks forward to working closely with physicians, pharmacists, health care administrators, veterinarians, agricultural organizations and producers, environmental experts, researchers and scientists, industry, Indigenous partners, front-line practitioners, and service providers. Collectively we can secure the continued health of Alberta's people, animals, environment, and economy.

AMR is a complex issue, with enormous and potentially dire implications across the One Health domains of human, animal, and environmental health. There is no simple, easy, or short-term solution to these challenges, and effective change will require the ongoing commitment of government and industry. With Alberta's existing expertise, infrastructure, and a clear AMR Framework to leverage this foundation, we are well-positioned to meet this challenge and establish Alberta as a leading province in addressing the global threat of AMR.

Glossary

Antibiotic

Antibiotics are medicines used to prevent and treat bacterial infections. Antibiotics specifically target bacteria and are included within the broader definition of antimicrobial compounds.

Antimicrobial

Any compound that kills or inhibits the growth of microbes or microorganisms such as bacteria, fungi, viruses and parasites. Different classes of antimicrobials have specific targets, for example, antibiotics and antibacterial agents target bacteria, while anti-fungals target fungal pathogens, and anti-virals target viruses.

Antimicrobial Resistance (AMR)

The ability of a microbe/microorganism to survive, persist, grow, and/or multiply in the presence of therapeutic levels of an antimicrobial compound or agent.

Antimicrobial Stewardship

Coordinated interventions designed to promote the optimal, appropriate use of antimicrobials, while restricting or preventing their misuse and overuse. Specifically, this includes factors such as optimal selection, dose, and duration of treatment. The goal is to prevent or slow the emergence of AMR and maintain or preserve the effectiveness of the available antimicrobials.

Antimicrobial Surveillance

Systematic collection, validation, analysis, interpretation, and dissemination of the data on antimicrobial use and antimicrobial resistance.

Antimicrobial Use (AMU)

How antimicrobials are used in terms of the goal of use (e.g., treatment, prevention), duration of use, route of administration, and species administered to (e.g., human, animal, plant).

Biosecurity

Practices aimed to prevent, reduce, or eliminate introduction and/or spread of disease among human and animal populations. Biosecurity contributes to infection prevention and control.

Infection Prevention & Control (IPC)

A practical, evidence-based approach that reduces or prevents the occurrence and/or spread of avoidable infections, without relying upon antimicrobial agents. Examples in human healthcare include hand hygiene, protective clothing, and isolation procedures. Practices in animal health are geared toward reducing the risk of introducing new infections into a herd and limiting transmission of infections within a herd. Examples in animal health include proper herd management practices, facility design, and biosecurity procedures. Vaccines are also important tools for preventing infections.

Knowledge to Action

A framework for synthesizing available knowledge on a topic to contextualize that knowledge in ways that are meaningful for the needs of local users. The aim is to produce tools, strategies, processes, and procedures tailored for the needs of users in their specific setting. Knowledge to Action processes are frequently used in Canadian healthcare to bridge the gap between research and practice.

One Health

One Health recognizes that the health of people, the health of animals, and the health of the environment are inter-connected. Because of this, activities and practices in any of those domains will inevitably affect the others. The goal of One Health is to encourage the collaborative efforts of AMR partners in all three domains to achieve the best health outcomes possible for humans, animals, and the environment we live in.

Selected Resources

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World Bank (2017) "Drug-Resistant Infections: A Threat to Our Economic Future." Washington, DC: World Bank. Available at: World Bank Document

World Health Organization (2016) Global Action Plan on Antimicrobial Resistance. Available at: Global action plan on antimicrobial resistance (who.int)