

ANTIMICROBIAL USE AND ANTIMICROBIAL RESISTANCE

Strategies for Animal Agriculture

September 18, 2014



NFAHW 
COUNCIL

This document was prepared by the National Farmed Animal Health and Welfare Council. The Council was formed in 2010 to advise governments and the animal-source food industries on all aspects of the health and welfare of farmed animals in Canada, in support of Canada's *National Farmed Animal Health and Welfare Strategy*. The Council is funded jointly by Canada's animal production sector, the federal government, and provincial-territorial governments. It consists of members drawn principally from government and the animal production sector. Members are appointed because of broad expertise in farmed animal health and welfare and related fields including public health.

The National Farmed Animal Health and Welfare Council would like to thank Dr. Michel Major for his leadership and the working group for their contributions to the development of this document.

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Executive summary

Antimicrobial Use (AMU) and Antimicrobial Resistance (AMR) are current issues affecting both human and animal health. Current media coverage reports that AMR is outstripping the pace of development of new antimicrobial products.

The use of antimicrobials in animal health is under scrutiny globally. The sheer volume of antimicrobial products used in animal production puts the practice under scrutiny globally.

There is much activity in the areas of AMU and AMR, with many players in government and industry taking responsibility or providing support to those taking responsibility. Some issues apply to both human and animal health. Some of these organizations and activities are discussed in the background information but this is not intended to be complete.

The Council discussion leading to the recommendations focused on the issue of AMU and AMR in food animal production, while being aware of and interacting with work being done in the human health sector; influencing policy decisions; and areas the Council could influence such as basic research, applied research, regulatory changes, economic modelling, economic tools, support for the pharmaceuticals sector, development of alternatives to antimicrobials as related to the use of antimicrobials in farmed animals.

The Council will maintain AMU/AMR in the context of One Health in its work plan. The Council will initiate, in partnership with other stakeholders, a forum to address the issue of AMU/AMR in animal agriculture in 2015.

Recommendations:

The NFAHW Council believes:

- That the consideration of AMU and AMR is an urgent issue;
- that all stakeholders in Canada's animal agriculture have a responsibility for the prudent use of antimicrobials when they are required, respecting issues of both animal and human concern;
- that Canada should recognize the universality of responsibility for management of the problems resulting from the use, both domestically and internationally, of antimicrobials in humans, animal agriculture, companion animals and other uses; and
- that Canada should demonstrate leadership in domestic and international forums on this issue to create global recognition and change.

1. **NFAHW Council recommends that stakeholders in Canada's animal agriculture industry support in principle the collaborative initiative announced April 10, 2014 by Health Canada and Canadian Animal Health Institute to work with other implicated stakeholders to:**
 - **Remove growth promotion and/or production claims of medically-important antimicrobial drugs**
 - **Develop options to strengthen the veterinary oversight of antimicrobial use in food animals.**

The press releases for Health Canada and CAHI can be found at:

<http://www.hc-sc.gc.ca/dhp-mps/vet/antimicrob/amr-notice-ram-avis-20140410-eng.php>

<http://www.cahi->

[icsa.ca/uploads/UserFiles/files/CAHI%20Press%20Release%20Veterinary%20Antimicrobials%20April%2011.pdf](http://www.cahi-icsa.ca/uploads/UserFiles/files/CAHI%20Press%20Release%20Veterinary%20Antimicrobials%20April%2011.pdf)

2. **The NFAHW Council recommends the stakeholders in Canada's animal agriculture industry support the regulatory modernization of Health Canada which was originally announced in May 2012.**

<http://www.hc-sc.gc.ca/ahc-asc/activit/strateg/mod/index-eng.php>

3. **The NFAHW Council recommends that the animal agriculture industry stakeholders follow the lead of the poultry sector in supporting the position of Health Canada on the ELDU of Category 1 drugs for preventative use.**
4. **The NFAHW Council recommends that a national committee including all the main stakeholders be created under the lead of federal champions such as the Public Health Agency of Canada and Agriculture and Agri-Food Canada. This committee will hold at least one annual meeting designed to encourage cross engagement of all stakeholders and will be responsible to coordinate the actions to be taken toward improvement of the use of antimicrobials, with an objective of achieving synchronization, complementarity and synergy of all the stakeholders initiatives related to the use of antimicrobials in animal and human medicine.**
5. **The NFAHW Council recommends that research priorities and funding programs include innovation in alternatives to the use or need for antimicrobials in animal agriculture.**

- 6. The NFAHW Council recommends that CgFARAD receive committed funding from the federal government, the industry and public stakeholders to support the work of CgFARAD in residue avoidance as part of food safety and explore expansion of its scope to include consultation and recommendation on the use of antimicrobials in consideration of the potential for AMR.**
- 7. The NFAHW Council recognizes the good work done by the Public Health Agency of Canada (PHAC) with the Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS). Still, the Council recommends that the surveillance of the use of antimicrobials be enhanced to improve quantification of the antimicrobials used in animal agriculture through additional mechanisms with the purpose of adequately assessing use by animal species, to help in implementing initiatives to reduce usage or to enhance better use. The data collected should be publicly accessible.**
- 8. The NFAHW Council recommends the creation of a joint human and veterinary lexicon related to all aspects of “antibiosurveillance” to help achieve better public communication.**

Background

Antimicrobial Use and Antimicrobial Resistance are current issues affecting both human and animal health. Current media coverage reports that AMR is outstripping the pace of development of new antimicrobial products. The use of antimicrobials in animal health is under scrutiny globally.

It is not uncommon for agriculture to be identified as having uncontrolled antimicrobial usage. The sheer volume of antimicrobial products used in animal production puts the practice under scrutiny globally.

A 2013 media release from the **Ontario Medical Association**, recognized the need for increased management of the use of antimicrobial products in both human and animal health. Of the key recommendations, some applied to both animal and human use and others were specific to either animal or human use. The recommendations which applied to animal health included:

- the need for a system to track the identity and quantity of antibiotics being used;
- surveillance for antibiotic use; a ban on the use of prophylactic or growth promoting use of antibiotics;
- veterinary prescription only access;
- closing of the “own use” importation;
- increased research, surveillance and education; and
- responsible and prudent use.

There are varied approaches by different countries to the use of antimicrobials and antibiotics in animals, so there are potential trade impacts for Canadian producers related to antimicrobial use in animal agriculture in Canada. There is growing momentum to reduce usage in animal production.

Health Canada’s Veterinary Drug Directorate (VDD) has responsibility for approval of pharmaceutical products. The VDD is part of the Health Products and Food Branch of Health Canada. The VDD evaluates and monitors the safety, quality and effectiveness, sets standards and promotes the prudent use of veterinary drugs administered to food producing and companion animals.

In 2011, an **Antimicrobial Stewardship Conference** was held in Toronto. The delegates came from every province of Canada and from a variety of backgrounds, including agriculture, veterinary medicine, medicine, public health, the pharmaceutical and animal health industry, regulatory agencies, provincial Ministries of Agriculture, and journalism. The conference was a follow-up to earlier conferences held in 1999 and 2005, but expanded its scope from a focus on the human health effects of the use of antimicrobials (antibiotics and their derivatives) in food animals to a more nuanced understanding of antimicrobial resistance in all animals in which

they are used. The conference was designed largely to promote the concept of antimicrobial stewardship, to discuss the many facets of stewardship, and to identify the factors that stand in the way of good stewardship of antimicrobials in animals in Canada. It was organized to address good stewardship by different themes. (<http://antimicrobialcanada.com>). Feedback from the sessions included:

- there was a need for uniform, national monitoring of antimicrobial use and resistance in veterinary medicine and agriculture;
- importation and use of non-approved drug loopholes need to be closed;
- consideration should be given to making antimicrobials prescription only;
- regulatory systems need to be enabling of alternatives to antimicrobials; and,
- best practices at the production level, and within clinical practice for the management of diseases, need to be targeted and made part of educational outreach programs.

The **Public Health Agency of Canada (PHAC)** uses the Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS) to monitor trends in antimicrobial use and antimicrobial resistance in selected bacterial organisms from human, animal and food sources across Canada. The program is based on several representative and methodologically unified surveillance components which can be linked to examine the relationship between antimicrobials used in food-animals and humans and the associated health impacts. This information supports: the creation of evidence-based policies to control antimicrobial use in hospital, community, and agricultural settings and thus prolong the effectiveness of these drugs, and the identification of appropriate measures to contain the emergence and spread of resistant bacteria between animals, food, and people in Canada. <http://www.phac-aspc.gc.ca/cipars-picra/index-eng.php>

The Canadian Animal Health Institute (CAHI), the industry organization for the animal pharmaceutical industry is active in its involvement with this issue on behalf of their members. For some time CAHI has been working to address the submission review process and modernization of the veterinary drug program to ensure Canada's food safety standards are equivalent to other developed countries. This includes the need for greater oversight of importation and use of non-approved products. The CAHI is documenting the volume of antimicrobials by families sold by its members and these are reported to the Public Health Agency of Canada for inclusion in the Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS) annual reporting. As of last year, this information is broken down provincially and by companion and production animal antibiotics.

Canadian commodity organizations are actively engaged in sponsoring research, participating in Health Canada forums and communicating with their members on the appropriate use of antimicrobials. Antimicrobial use is part of the On Farm Food Safety Programs of the various commodity organizations. The importance of a Veterinary – Client – Patient Relationship is recognized in these programs, recognizing the importance of veterinary advice and oversight in

responsible use. The poultry industry has recently made it a policy to eliminate the preventative use of category 1 antimicrobials, i.e. the most important ones for human health according to Health Canada's classification. Enforcement is within their quality assurance programs. Since there are no label claims for category 1 antimicrobials in poultry, this use would all be ELDU.

Veterinarians have the privilege of both prescribing and selling antimicrobials in Canada and also have the privilege of extra-label drug use (ELDU). Veterinarians are regulated provincially in Canada. The Canadian Veterinary Medical Association has published prudent use guidelines for veterinarians.

The **Canadian Veterinary Medical Association** held a Summit of Veterinary Leaders in July 2014. The summit brought together veterinarians and medical doctors and other experts on the topic of AMR. Following the summit, CVMA President, Dr. Jean Gauvin said "Information shared during the Summit reaffirmed that Canada must implement an all-species, all-sector strategy that includes agriculture, veterinary medicine and human medicine in order to address the growing concerns surrounding antibiotic use and the risks of resistance,".

At the CVMA summit, Dr. John Prescott, University of Guelph, did a presentation which included an assessment of progress on key parameters in AMR which showed Canada was not meeting international standards. The presentation ended with a call to action. Dr. Prescott's assessment was published in the Canadian Veterinary Journal / Vol 55 / March 2014, pages 273-274-275-276 : "Stewardship of antimicrobial drugs in animals in Canada: How are we doing?"

Canadian gFARAD operated from University of Saskatchewan and the University of Guelph provides information on drug residue avoidance for veterinary practitioners and producers. Canadian gFARAD responses also support requirements of commodity organization quality assurance programs. Pharmaceutical companies, veterinary medical associations and livestock and poultry producer organizations, the feed industry and the meat processing industries provide support to allow Canada to join gFARAD (global Food Animal Residue Avoidance Database). This program is referenced in the CFIA Meat Hygiene Manual of Procedures. Secure sustainable funding for Canadian gFARAD is being sought.

Antimicrobials are categorized by Health Canada based on their importance in human medicine (http://www.hc-sc.gc.ca/dhp-mps/vet/antimicrob/amr_ram_hum-med-rev-eng.php). The categorization process is not a risk assessment per se but denotes the severity of consequence as part of the hazard characterization step of the risk assessment, category 1 antibiotics being the most important ones in human medicine. The particular antimicrobials used in the various production species varies. Some may have less relationship with resistance in humans. A large percentage of the antimicrobials used in animal production are not from those categories of high importance in human health. While this is viewed by industry as prudent use, of concern is the potential for co-selection for resistance to category 1

antimicrobials when exposed to category 3 antimicrobials. An example is tetracycline selecting for ceftiofur resistance as described in:

<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0080575#pone-0080575-g009> and <http://www.nature.com/srep/2014/140529/srep05100/full/srep05100.html>

In the case of **small ruminants, there is limited approval of antimicrobials**, purportedly due to the size of the market vs pre and post marketing regulatory costs and a market that permits ELDU, OUI and API product use. Canadian gFARAD recommendations are a backbone for minor species use of medications in the Canadian marketplace.

Canadian drug policy permits importation and use of non-approved drugs. The policy was developed to accommodate human medicine but over the years has been used in animal medicine. **Own Use Importation (OUI)** gives animal owners the ability to import finished, over the counter drugs for their own use on a quarterly basis for as many animals as they own. Health professionals such as veterinarians and pharmacists can import and use **active pharmaceutical ingredients (API)** for animal medicine. While these uses may be driven mainly by market forces and a lack of approval of a product in Canada it is difficult for the industry and the health profession to justify a risk management system that allows for use of products outside a regulated system.

In Canada, there are many initiatives related to AMU and AMR. Through a survey in late 2012, the Council AMR working group solicited input of both human and animal sectors in developing a database of initiatives. The report of that survey was approved by Council in April 2013 and has since been prepared for further distribution. In 2012, the Council of Chief Veterinary Officers (CCVO) created the Antimicrobial Use in Animal Agriculture Committee. The committee established in 2013 is a working group to provide advice to the CCVO regarding future directions for non-human antimicrobial use surveillance in Canada.

In considering the AMU/AMR issue, Council needs to recognize the following groups who have direct influence on this topic:

- Producers and their organizations
- Federal and provincial governments
- Provincial licencing bodies – especially veterinary and pharmacy
- Food processors
- Food service and retail
- Pharmaceutical and alternative medication industries
- international standards organizations
- Advocates/media

AMR is a One Health issue, with potential impact on animal, human, environmental and economic health. AMU and AMR are a responsibility for all users in human and animal health.

Council Focus

The council discussion includes AMU as well as AMR. The Council discussion leading to the recommendations focused on the issue of AMU and AMR in food animal production, while being aware of and interacting with work being done in the human health sector; influencing policy decisions; and areas the Council could influence such as basic research, applied research, regulatory changes, economic modelling, economic tools, support for the pharmaceuticals sector, development of alternatives to antimicrobials as related to the use of antimicrobials in farmed animals.

Concerns and Themes

The working group notes that:

- AMR is a large issue with a high level of public attention relating animal and human health concerns
- There is no clear national lead on the issue
- Animal agriculture is often identified as the source of AMR through uncontrolled AMU
- There are regulatory gaps with the existing provisions for Own Use Importation of veterinary drugs and Importation of veterinary Active Pharmaceutical Ingredients

The working group reviewed work being done on AMR as known by the working group members and the NFAHW Council survey “Antimicrobial Resistance and Antimicrobial Use Initiatives in Humans and Animals in Canada (2012)

(http://www.ahwcouncil.ca/pdfs/amr/AMU_AMR%20Final%20Report.pdf).

The main themes derived from the review are:

- National Leadership
- Surveillance
- Management/husbandry practices
- Research
- Education
- Regulation/Oversight

It is not possible to manage all of the components of each of these at one time, however, it is possible to strategically select areas for advice which will provide leadership in managing this issue. When the draft recommendations were developed, consideration was given to addressing as many of the themes as possible. Some recommendations address several themes.

Recommendations

The NFAHW Council believes:

- That the consideration of AMU and AMR is an urgent issue;
- that all stakeholders in Canada's animal agriculture have a responsibility for the prudent use of antimicrobials when they are required, respecting issues of both animal and human concern;
- that Canada should recognize the universality of responsibility for management of the problems resulting from the use, both domestically and internationally, of antimicrobials in humans, animal agriculture, companion animals and other uses; and
- that Canada should demonstrate leadership in domestic and international forums on this issue to create global recognition and change.

The Council will maintain AMU/AMR in the context of One Health in its work plan. The Council will initiate, in partnership with other stakeholders, a forum to address the issue of AMU/AMR in animal agriculture in 2015.

1. NFAHW Council recommends that stakeholders in Canada's animal agriculture industry support in principle the collaborative initiative announced April 10, 2014 by Health Canada and Canadian Animal Health Institute to work with other implicated stakeholders to:

- **Remove growth promotion and/or production claims of medically-important antimicrobial drugs**
- **Develop options to strengthen the veterinary oversight of antimicrobial use in food animals.**

The press releases for Health Canada and CAHI can be found at:

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2. The NFAHW Council recommends the stakeholders in Canada's animal agriculture industry support the regulatory modernization of Health Canada which was originally announced in May 2012.

<http://www.hc-sc.gc.ca/ahc-asc/activit/strateg/mod/index-eng.php>

Modernization of the regulation will involve a comprehensive review, with emphasis on work that will deliver the clearest value to Canadians and the health care and food

safety systems, as well as greatest efficiency by cutting through unsustainable administrative requirements. Modernizing the health product and food frameworks will result in an efficient, sustainable, transparent and flexible system, including common principles that apply across product lines. This will include regulatory activities being proportional to the risk and having greater oversight on importation and use of non-approved products through OUI and API policies.

3 The NFAHW Council recommends that the animal agriculture industry stakeholders follow the lead of the poultry sector in supporting the position of Health Canada on the ELDU of Category 1 drugs for preventative use.

Health Canada's position is that Category 1 antimicrobials should not be used in an extra label (ELDU) manner for mass medication in animal production.

The poultry industry has implemented a policy to eliminate the ELDU use Category 1 antimicrobials for preventative use. This policy is enforced through their on-farm food safety programs.

Veterinarians and their licensing bodies will need to be engaged in achieving this commitment.

4. The NFAHW Council recommends that a national committee including all the main stakeholders be created under the lead of federal champions such as the Public Health Agency of Canada and Agriculture and Agri-Food Canada. This committee will hold at least one annual meeting designed to encourage cross engagement of all stakeholders and will be responsible to coordinate the actions to be taken toward improvement of the use of antimicrobials, with an objective of achieving synchronization, complementarity and synergy of all the stakeholders initiatives related to the use of antimicrobials in animal and human medicine.

The objective of this recommendation is to build understanding of animal and human use of antimicrobial products and to recognize the concept of One Health among a broad range of human medicine and animal agriculture stakeholders. At the present time, it is felt there are many misunderstandings about the use of antimicrobial products in agriculture, such as the relevancy to include (or not) ionophores in the total drugs used.

There are concerns about co-selection of resistance between some antimicrobials, thus impacting category 1 antimicrobial resistance.

It is important to find common ground, using common facts when working in a One Health environment and communicating with media. However, we must also recognize that everyone has responsibility for managing AMU/AMR on a global societal level.

- 5. The NFAHW Council recommends that research priorities and funding programs include innovation in alternatives to the use or need for antimicrobials in animal agriculture.**

This might include considerations of infection prevention and control through management practices such as biosecurity, stress reduction, use of vaccines and probiotics.

- 6. The NFAHW Council recommends that CgFARAD receive committed funding from the federal government, the industry and public stakeholders to support the work of CgFARAD in residue avoidance as part of food safety and explore expansion of its scope to include consultation and recommendation on the use of antimicrobials in consideration of the potential for AMR.**

This does *not consider full funding through federal sources but shared funding* using a sharing formula developed with current participants and funders. It is apparent there is both a public and private good to the services provided by CgFARAD.

It will be necessary to have full discussion and understand the scientific criteria and expertise, as well as budget and any other implications of the portion of the recommendation focused on consideration of AMR. Consultation will be required with a full range of stakeholders.

- 7. The NFAHW Council recognizes the good work done by the Public Health Agency of Canada (PHAC) with the Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS). Still, the Council recommends that the surveillance of the use of antimicrobials be enhanced to improve quantification of the antimicrobials used in animal agriculture through additional mechanisms with the purpose of adequately assessing use by animal species, to help in implementing initiatives to reduce usage or to enhance better use. The data collected should be publicly accessible.**
- 8. The NFAHW Council recommends the creation of a joint human and veterinary lexicon related to all aspects of “antibiosurveillance” to help achieve better public communication.**

Appendices

Article from CFIA Website

<http://www.inspection.gc.ca/animals/cvo-international-standards/cvo-statements/antimicrobial-resistance/eng/1340892416015/1340892503050>

The following article by Dr. Brian Evans, past Chief Veterinary Officer for Canada, published in the July 2012, Canadian Veterinary Journal and posted to the CFIA website, outlines the AMR issue, the international involvement of the World Organisation for Animal Health (OIE) and the World Health Organization (WHO) and the role of federal, provincial and veterinary regulatory bodies in Canada.

Antimicrobial resistance

Since their introduction some 60 years ago, antimicrobials have revolutionized both veterinary practice and human medicine. When used appropriately, antimicrobials - including antibacterials, antifungals and antivirals - continue to play an important role in animal and human health. They reduce suffering and help farmers raise healthy animals, which in turn provide safe meat, milk and eggs for human consumption. They are also critical tools in human medicine.

However, the misuse of antimicrobials in both human and animal health contributes to the development of resistant bacteria, thereby posing a risk to people and animals.

It's a complex, multifactorial problem that requires veterinarians to work closely with professionals in public health and animal owners to find solutions from both animal and human health perspectives.

Earlier this year, the World Organisation for Animal Health (OIE) identified the fight against antimicrobial resistance as one of its priorities for 2012. The OIE also advocated for good veterinary control of the registration, import, distribution and on-farm use of antimicrobials.

The OIE's call for better control of antimicrobials echoes last year's statement from the World Health Organization (WHO), which warned that the world is on the brink of losing these "miracle cures" due to the emergence and spread of drug-resistant pathogens.

As the WHO noted, the development of resistance is a natural process that eventually happens with every drug. However, a number of factors in both human medicine and veterinary practice have accelerated this process.

According to the WHO, in human medicine, drugs are sometimes dispensed too readily, "just to be on the safe side" - often in response to patient demand. In other cases, patients do not complete the full course of treatment. In some countries, substandard products are sold and individual pills are available over-the-counter.

On the animal side, antimicrobials are routinely used in livestock feed for growth promotion and to prevent infections in food-producing animals. Some drugs can be purchased without a veterinary prescription, or used outside the approved levels with a veterinary prescription.

Some of the drugs commonly used in livestock production are medically important for human health. For example, macrolides and tetracyclines are often incorporated into feed for growth promotion or disease prevention, and fluoroquinolones and cephalosporins are frequently used to treat and prevent infections. Pathogens and commensal organisms resistant to these drugs in animals can be transmitted to humans, and the management of animal health then becomes a human health issue. The reverse can also be true.

Further exacerbating the situation is the fact that new drugs are not being developed quickly enough to replace existing drugs that are failing in the face of emerging drug-resistant pathogens.

Internationally, the OIE and WHO are raising awareness of the issue. In Canada, federal, provincial and territorial government departments continue to work together on surveillance, prevention and education.

Federally, the Public Health Agency of Canada works with Health Canada and the Canadian Food Inspection Agency (CFIA) to conduct surveillance to monitor antimicrobial resistance through the Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS), which shows that antimicrobial resistance is rising in the food animal sector. The CFIA also monitors drug residues in food and verifies that medicated livestock feeds meet federal standards.

Health Canada encourages the prudent use of antimicrobial drugs by healthcare professionals and patients, as well as by veterinarians, farmers and other food producers. As part of its efforts to address concerns about antimicrobial resistance, Health Canada has categorized antimicrobials based on their importance in human medicine and is currently addressing the growth-promotion claims of medically important antimicrobials. It has also developed a policy on the extra-label use of veterinary drugs and recommends against the extra-label use of critically important antimicrobial drugs (e.g., ceftiofur and fluoroquinolones) in mass-medication situations. However, extra-label drug use and prescribing medication is a practice of veterinary medicine and is regulated by the provinces.

At the provincial and territorial level, both veterinary and medical regulatory bodies need to encourage their members to be vigilant in their oversight and to prescribe antimicrobials judiciously.

By recognizing that there are risks as well as benefits associated with antimicrobials and engaging in an informative and frank dialogue with all concerned, we can ensure that these

valuable tools for health professionals are used prudently in order to preserve their efficacy for treating both animals and people. Society expects no less.

Health Canada

<http://www.hc-sc.gc.ca/dhp-mps/vet/antimicrob/index-eng.php>

The following excerpt from the Health Canada website outlines Health Canada's involvement in AMR and provides links to related articles and reports. A broad range of health-related issues need to be taken into consideration in developing effective risk management strategies and policies on AMR. The responsibility for these strategies and policies goes beyond Health Canada. Health Canada has a number of initiatives related to AMR which include surveillance and advice

Antimicrobial resistance (AMR) is an emerging global health issue that, if not addressed, may evolve into one of the most significant public health challenges worldwide.

AMR is a deeply debated subject, not only in Canada, but internationally. There are varied opinions, perceptions and approaches involved in assessing and managing AMR. Health Canada is working with provincial, national and international partners to find solutions to the challenges posed by this issue. Advisory Committees are established to provide expert advice to Health Canada on a number of issues, including AMR. Any decisions taken by the Government of Canada in this regard are based on the most accurate Canadian interpretation of available scientific evidence.

Health Canada's Veterinary Drugs Directorate (VDD) is spearheading a number of activities to deal with this issue including research, surveillance, policy development and educational and outreach activities. For example, the Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS) was developed by the Public Health Agency of Canada in collaboration with Health Canada, the Canadian Food Inspection Agency and provincial partners to monitor trends in the development of AMR in the food chain.

VDD will continue its public involvement and consultation efforts to work within government, with multi-stakeholder groups, and with national and international partners to move forward on this issue. New information about AMR and our policies will be posted as it becomes available. A fact sheet For Your Information: Antimicrobial Resistance, Antimicrobial Resistance (AMR) Frequently Asked Questions and Antimicrobial Resistance - Debunking the Myths provide additional details on this issue.

Health Canada – Antimicrobial Categories

Table. Application of criteria for antimicrobial categorization

<i>Category</i>	<i>Preferred option for treatment of serious human infections*</i>	<i>No or limited alternatives available</i>
<i>I – Very High Importance</i>	<i>Yes</i>	<i>Yes</i>
<i>II – High Importance</i>	<i>Yes</i>	<i>No</i>
<i>III – Medium Importance</i>	<i>No</i>	<i>No/Yes</i>
<i>IV – Low Importance</i>	<i>Not applicable</i>	<i>Not applicable</i>

**Serious infections are considered those which if left untreated would lead to significant morbidity requiring emergency care including hospitalization and/or mortality.*

It is noted that for the sake of simplicity, antimicrobial drugs have been ranked according to their chemical class and have been placed in a category where the majority of the drugs within the class may fall. It is understood that some of the individual drugs in a particular class may not fall in the same category as other drugs of the same class and such exceptions will be treated on a case-by-case basis.

1. Category I: Very High Importance

These antimicrobials are considered of very high importance in human medicine as they meet the criteria of being essential for the treatment of serious bacterial infections and limited or no availability of alternative antimicrobials for effective treatment in case of emergence of resistance to these agents. Examples include:

- 1.1 Carbapenems*
- 1.2 Cephalosporins – the third and fourth generations*
- 1.3 Fluoroquinolones*
- 1.4 Glycopeptides*
- 1.5 Glycylcyclines*
- 1.6 Ketolides*
- 1.7 Lipopeptides*
- 1.8 Monobactams*
- 1.9 Nitroimidazoles (metronidazole)*
- 1.10 Oxazolidinones*
- 1.11 Penicillin- β -lactamase inhibitor combinations*
- 1.12 Polymyxins (colistin)*
- 1.13 Therapeutic agents for tuberculosis (e.g., ethambutol, isoniazid, pyrazinamide and rifampin)*

2. Category II: High Importance

Antimicrobials in this category consist of those that can be used to treat a variety of infections including serious infections and for which alternatives are generally available. Bacteria resistant to drugs of this category are generally susceptible to Category I drugs which could be used as the alternatives. Examples include:

- 2.1 *Aminoglycosides (except topical agents)*
- 2.2 *Cephalosporins – the first and second generations (including cephamycins)*
- 2.3 *Fusidic acid*
- 2.4 *Lincosamides*
- 2.5 *Macrolides*
- 2.6 *Penicillins*
- 2.7 *Quinolones (except fluoroquinolones)*
- 2.8 *Streptogramins*
- 2.9 *Trimethoprim/sulfamethoxazole*

3. Category III: Medium Importance

Antimicrobials in this category are used for treatment of bacterial infections for which alternatives are generally available. Infections caused by bacteria resistant to these drugs can, in general, be treated by Category II or I antimicrobials. Examples include:

- 3.1 *Aminocyclitols*
- 3.2 *Aminoglycosides (topical agents)*
- 3.3 *Bacitracins*
- 3.4 *Fosfomycin*
- 3.5 *Nitrofurans*
- 3.6 *Phenicol*s
- 3.7 *Sulphonamides*
- 3.8 *Tetracyclines*
- 3.9 *Trimethoprim*

4. Category IV: Low Importance

Antimicrobials in this category are currently not used in human medicine. Examples include:

- 4.1 *Flavophospholipols*
- 4.2 *Ionophores*

Reports

- Results of Consultation on Health Canada's Revised Document on Antimicrobial Categorization
- Agriculture's Role in Managing Antimicrobial Resistance Conference 2005
- Issue Identification Paper - Antimicrobial Resistance: Developing a Common Understanding
- Current Thinking on Risk Management Measures to Address Antimicrobial Resistance Associated with the Use of Antimicrobial Agents in Food-Producing Animals
- Release of the Final Report of the Advisory Committee on Animal Uses of Antimicrobials and Impact on Resistance and Human Health
- The Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS)