



Advancing antimicrobial stewardship: Summary of the 2015 CIDSC Report

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Abstract

Background: Antimicrobial resistance (AMR) is recognized as an important global public health concern that has a cross-cutting impact on human health, animal health, food and agriculture and the environment. The Communicable and Infectious Disease Steering Committee (CIDSC) of the Pan-Canadian Public Health Network (PHN) created a Task Group on Antimicrobial Stewardship to look at this issue from a Canadian perspective.

Objective: To summarize the key findings of the Task Group Report that identified core components of antimicrobial stewardship programs, best practices, key challenges, gaps and recommendations to advance stewardship across jurisdictions.

Methods: Search strategies were developed to identify scientific literature, grey literature and relevant websites on antimicrobial stewardship. The information was reviewed, and based on this evidence, expert opinion and consensus-building, the Task Group identified core components, best practices, key challenges and gaps and developed recommendations to advance stewardship in Canada.

Results: The four components of a promising antimicrobial stewardship initiative were: leadership, interventions, monitoring/evaluation and future research. Best practices include a multi-sectoral/multipronged approach involving a wide range of stakeholders at the national, provincial/territorial, local and health care organizational levels. Key challenges and gaps identified were: the success and sustainability of stewardship undertakings require appropriate and sustained resourcing and expertise; there is limited evidence about how to effectively implement treatment guidance; and there is a challenge in ensuring accessibility, standardization and consistency of use among professionals.

Recommendations to the CIDSC about how to advance stewardship across jurisdictions included the following: institute a national infrastructure; develop best practices to implement stewardship programs; develop education and promote awareness; establish consistent evidence-based guidance, resources, tools and training; mandate the incorporation of stewardship education; develop audit and feedback tools; establish benchmarks and performance targets for stewardship; and conduct timely evaluation of stewardship programs.

Conclusion: Findings of this report will inform a more systematic approach to addressing antimicrobial stewardship Canada-wide.

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Introduction

Antimicrobial resistance (AMR) is recognized as an increasingly significant global health issue that threatens the effective prevention, control and treatment of a wide spectrum of infections. In Canada, the emergence of antimicrobial resistant organisms has been identified as a major concern in health care settings and among at-risk populations. Since AMR may emerge in bacteria as a response to selective antimicrobial pressure (i.e., when bacteria is in the presence of an antimicrobial drug), there is a potential risk that fewer and fewer antimicrobials will remain

effective in the future. Unnecessary antibiotic treatment has been shown to account for a substantial burden of inappropriate antimicrobial use in Canada (1-4). Due to growing concern about the link between antimicrobial usage (AMU) and AMR, a shift towards more prudent use of antimicrobials has been one of the areas emphasized in combatting the spread of AMR (5-8).

Antimicrobial stewardship is the responsible planning and management of resources in order to prevent and moderate the development of AMR. Antimicrobial stewardship initiatives and related programs typically address issues related to AMU in

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order to limit the spread of AMR and conserve the effectiveness of existing antimicrobials. Stewardship is applied in different settings and can also encompass activities outside the human health sector in a One Health model. The Report recognized that parallel action is needed in veterinary, food animal health and in the agriculture sectors; however, its focus was limited to human health settings.

The Pan-Canadian Public Health Network (PHN) represents Canada’s national public health infrastructure to address such public health concerns. In 2014/2015, the PHN began identifying components of a pan-Canadian public health framework on AMR, focusing its attention on the key elements of stewardship pertaining to AMU in human health. The Communicable and Infectious Disease Steering Committee (CIDSC) Task Group on Antimicrobial Use Stewardship was mandated by the CIDSC under PHN to identify core components of a pan-Canadian stewardship approach, identify key challenges and gaps and recommend ways to promote stewardship across jurisdictions.

The objective of this article is to summarize the *CIDSC Task Group Report on Antimicrobial Use Stewardship* (9), which identifies the core components of antimicrobial stewardship programs and best practices in human health settings in Canada, highlights the challenges and gaps and presents a series of recommendations to advance antimicrobial stewardship in Canada.

Methods

The Antimicrobial Use Stewardship Task Group was composed of infectious disease experts, family and other clinical physicians, epidemiologists, microbiologists and public health experts. Search strategies were developed to identify scientific literature, grey literature and relevant websites on antimicrobial stewardship and were supplemented by additional information provided by members. Material was reviewed, and based on this evidence, expert opinion and consensus-building, the Task Group identified core components, best practices, key challenges and gaps and developed recommendations to advance stewardship in Canada.

Results

The search strategies resulted in over 400 articles which were reviewed and summarized for discussion by the Task Group. For the purposes of the Report, antimicrobial stewardship was defined as “coordinated interventions designed to promote, improve, monitor and evaluate the judicious use of antimicrobials in order to preserve their future effectiveness and promote and protect human health” (9,10).

Core components

Promising stewardship programs suggest that strong interdisciplinary public health action and political engagement can lead to a measurable decrease in AMR and improved optimal AMU in health care settings. While more research is clearly needed to validate this and related findings in community settings, four core components of promising antimicrobial stewardship programs and initiatives emerged: leadership, interventions, monitoring and evaluation and research (Table 1).

Table 1: Description of the four core components of antimicrobial stewardship

Core component	Description
Leadership	Successful stewardship undertakings are grounded in accountability, appropriate and sustained resources and expertise, adequate support and training and involve specialists in an interdisciplinary manner.
Interventions	Effective stewardship interventions are multipronged and comprehensive. They consist of awareness, education and guidance. Furthermore, they include various tools such as diagnostic tools, providing evidence-based timely information and engaging multiple target groups for maximum effect.
Monitoring and evaluation	To establish the appropriate use of antimicrobials, the literature consistently identifies the critical role of benchmarks, audit and evaluation systems.
Future research	Includes knowledge creation, translation and mobilization. Expertise from across research disciplines must be leveraged in order to address information gaps and ensure that evidence is available and applied for greatest impact.

Initiatives and best practices

The Task Group identified successful stewardship programs that had been evaluated both within Canada and from other countries. The Canadian initiatives are summarized in Table 2. After reviewing these programs, the Task Group concluded that strong interdisciplinary public health action and political engagement can lead to a measurable decrease in AMR and improved optimal AMU in health care settings.

Table 2: Examples of best practices for antimicrobial stewardship in Canada¹

Level of intervention and name	Program description	Outcome
Alberta and British Columbia Do Bugs Need Drugs? (Initiated in Grande Prairie, Alberta) (7)	The program has a dual focus: to provide educational resources to physicians, nurses and pharmacists in community hospitals and long-term care facilities; and to provide public education on AMR risk and AMU to the general public.	A multimedia approach using print materials, advertising campaigns and continuing education and awareness for all ages and a variety of health professionals results in a positive reach to many target audiences.
Quebec Multipronged educational strategy on antibiotic prescribing	Guidelines were disseminated using a multidisciplinary and mostly web-based strategy, including having downloadable versions on a dedicated website and promotion by professionals and experts during educational events.	Concise, user-friendly science-based guidelines prepared by credible organizations, endorsed by professional organizations and actively promoted have a significant impact on reducing inappropriate antimicrobial prescribing practices in the community.



Table 2 continued

Level of intervention and name	Program description	Outcome
Ontario Treating respiratory infections in the community	A community-wide, multidisciplinary educational strategy was used in Ontario with the objectives of enhancing adoption of clinical guidelines and improving AMU.	Elements of success were the development of user-friendly and credible materials, education of the public, pharmacists and clinicians and support given to motivated local health professionals in coordinating educational elements.
Ontario Reducing <i>C. difficile</i> in Intensive Care Units (Initiated in Mount Sinai Hospital, Toronto, ON)	The main intervention techniques were the use of an infectious disease physician or pharmacist leader, the distribution of relevant in-hospital educational materials to health care professionals, then prospective audit and feedback in the Intensive Care Units.	Key success factors were appropriate human resources for effective leadership, decision support, prospective audit and feedback, as well as knowledge exchange via peer-to-peer communication.

[†]These are highlights of only some of the programs in Canada. For a more complete list of initiatives in both Canada and abroad, refer to the full Report (9)

Key challenges and knowledge gaps

After identifying the core components of effective stewardship and reviewing successful stewardship programs and initiatives, important challenges and knowledge gaps emerged in the Task Group discussion (Table 3). For example, the success and sustainability of stewardship undertakings require appropriate and sustained resourcing and expertise (something which may not always be possible in a given setting or jurisdiction) and gaps exist concerning treatment guidance, its benefits, how to implement it, as well as ensuring accessibility, standardization and consistency of use among professionals.

Table 3: Current challenges and gaps in antimicrobial stewardship

Challenges
Appropriate resourcing: The success and sustainability of stewardship undertakings requires appropriate and sustained resourcing and, in particular, appropriate expertise (something which may not always be possible in a given setting or jurisdiction).
Access and consistency of guidelines: Canadian physicians have reported difficulty locating relevant resources regarding AMR in general and regarding testing protocols. Different guideline documents are available for different prescribing professionals.
Follow up of effectiveness of treatments/programs: Integration of test-of-cure (re-culturing at the site of infection to determine if infection is still present) into guidance documents. The lack of standardized indicators makes it difficult to determine the effectiveness of the programs/campaigns.
Gaps
Lack of training: Educational and training initiatives regarding stewardship targeted at all prescribing professionals are needed.
Identifying when not to prescribe: More research is required to determine whether producing prescriber guidance on when not to prescribe antibiotics would be beneficial and how to implement it.
Need for rapid diagnosis: Rapid point-of-care diagnostic tools that distinguish bacterial from viral infections and identify and characterize resistant bacteria are needed to guide appropriate use of antimicrobials.

Recommendations

Based on the core components, best practices, current challenges and gaps, the Task Group developed recommendations to advance antimicrobial stewardship in Canada (Table 4). Implementation of the Report recommendations will need to take into account current developments in the policy and program research domains.

Table 4: Recommendations to CIDSC for core components of antimicrobial stewardship practices in Canada

Core component	Recommendation(s) to CIDSC
Leadership	A National infrastructure (e.g., governance, network, resources, etc.) be put in place to support provinces and territories in the development of stewardship programs in both health care and community settings.
Interventions	Best practices, benchmarks or standards for education and awareness activities that require the engagement of multiple prescribers, and have a dual focus on prescribers and users. The consistency and availability of guidance; information, tools and training for prescribing professionals and users be comprehensive, available and consistent to support local prescribers. Universities, colleges and technical schools that train future prescribers incorporate mandatory stewardship education and continuing education curricula for prescribing professionals.
Monitoring and evaluation	Evidence-based audit and feedback tools be developed to support prescribers and that guidance for prescribers be evaluated, adapted and implemented at regional and local levels Benchmarks be established for optimal antimicrobial use by type of infection and populations at greatest risk for infection and that jurisdictions work together to establish performance targets for stewardship in hospital and other settings; and that timely evaluations of stewardship programs be conducted and publicly accessible.
Future research	Further evidence about prescribing behaviours of professionals be collected, shared and mobilized so that specific interventions for these professions can be implemented. Changes be made to health care practitioners' practice regulations and that further evidence will need to be gathered to guide and support such changes.

The Task Group also identified two additional considerations. First, that patient safety, avoidance of unwanted side effects and effective infection prevention and control practices are all important factors further contributing to antimicrobial stewardship initiatives. Second, the Task Group suggested that the evaluation of stewardship programs and initiatives be promoted with granting agencies and be considered for inclusion as part of AMU/AMR priorities for funding.

Conclusion

The Task Group identified that leadership, appropriate interventions, monitoring and evaluation, the need for more knowledge about effective stewardship—and the evidence-base that will advance it—are key components of promising antimicrobial stewardship programs and initiatives. There are a number of key challenges and existing knowledge gaps that can be addressed by the Task Group recommendations that have



been put forward. These are currently under consideration by governments and health care experts.

Better managing antimicrobial use is a shared responsibility among multiple stakeholders including public health and health care professionals, health care organizations, local, provincial, territorial, national governments, the research community and others who provide and use antimicrobials and who care for the people who use them. The development, promotion and implementation of initiatives to promote optimal use of antimicrobials across Canada will require collaboration among all of these stakeholders, helping to create synergies that will effectively combat AMR.

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Conflict of interest

None. Jacqueline Arthur is one of the Guest Editors for this issue and recused herself from taking editorial decisions on this manuscript. Editorial decisions were made by the Editor-in-Chief, Dr. Patricia Huston and the other Guest Editor Dr. Kanchana Amaratunga.

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