EVIDENCE SYNTHESIS SUMMARY:

Social and cultural drivers of antimicrobial use

For the Chief Public Health Officer of Canada's 2019 Spotlight Report
Handle with Care: Preserving Antibiotics Now and into the Future

Canada

Contents

Introduction

This evidence synthesis identifies social and cultural conditions, including the norms, values, beliefs, historical context, and other sociocultural drivers, that influence unnecessary antimicrobial use in Canada and Organisation for Economic Co-operation and Development (OECD) countries.

Methodology

An evidence review was conducted by the Office of the Chief Public Health Officer (OCPHO) in the Public Health Agency of Canada to identify social and cultural drivers of unnecessary antimicrobial use in community and primary care settings in Canada and OECD countries.

A literature search strategy was developed in conjunction with the Public Health Agency of Canada Health Library based on predefined PICO criteria (Appendix A). Keyword queries were used to identify studies in the following electronic databases: Ovid MEDLINE/PubMed, Embase, PsychINFO, Cochrane and Campbell collaboration databases. Only studies published after January 1, 2009 (past 10 years) were included for initial screening.

A title, abstract, and keywords review was conducted by the OCPHO to determine the relevance of articles regarding sociocultural drivers of antimicrobial use (AMU) in Canada and in OECD countries. The OCPHO screened a total of 113 Canadian articles and 866 OECD articles. Of these, 13 Canadian articles and 203 OECD articles met the search criteria. Following an initial review of 203 OECD articles, 25 systematic reviews and large-scale multi-country studies were retained, in addition to the 13 Canadian articles, for further review. These search results identified gaps in the Canadian literature surrounding behavioural science and sociocultural drivers of AMU. To address these gaps, an additional 11 articles/reports were identified by grey-literature, hand searching and reference checking.

An independent rapid evidence review and synthesis was commissioned from the Michael G. DeGroote Cochrane Canada and GRADE Centres (McMaster University), which identified the sociocultural factors that drive the misuse and overuse of antimicrobials in Canada and OECD countries at all levels of health care. The external review included evidence from systematic reviews retrieved from Ovid MEDLINE, and McMaster University's evidence databases including ACCESSSS, Health Evidence, and Health Systems Evidence; grey literature from the websites of international and national health organizations; and primary research studies from Canada. The findings were cross-referenced with the OCPHO evidence review results and 12 additional articles/reports were selected and included in the synthesis. This comprised relevant articles published before 2009 that were identified through reference checking and grey literature searching. A total of 61 articles/reports were included in the evidence synthesis summary presented in Table 1.

Limitations

The searches conducted were not exhaustive and would not have captured literature not indexed in the indicated databases. Only literature published in English and French was reviewed, and some literature may have been excluded on this basis. Risk of bias and study quality was not assessed in this review. Finally, with the exception of a few key articles, the data set presented includes only articles published after January 1, 2009.

Results

A thematic analysis of the identified drivers was conducted. Results were synthesized and classified as one of the following themes: patient determinants, practitioner determinants, organizational and health systems determinants, and sociocultural determinants of antimicrobial use in Table 1.

TABLE 1: RESEARCH SUMMARY ON THE SOCIOCULTURAL DRIVERS OF AMU

Determinants of AMU	Description	References
Patient-related		
Attitudes, knowledge, or beliefs about antibiotics	Well-known cross-national differences in use of antibiotics in OECD countries can only be partially explained by epidemiological differences and differences in health care. Social and cultural factors are also thought to play an important role in the consumption of antibiotics. One of the most commonly studied determinants of AMU is patient attitude, knowledge, or beliefs about antibiotics, including the perception of the role these classes of drugs may play in the maintenance of good health. Many studies show that misconceptions and uncertainties regarding the role of antibiotics are driven by patient attitudes, knowledge, and beliefs about the causes of antibiotic resistance, such as beliefs and knowledge surrounding the efficacy of antibiotics in treating viral infections as well as general knowledge and beliefs about infectious diseases. At least one study found that people believe they are at low risk from antibiotic resistance and attribute its development to the actions of others, and strategies to minimize resistance should be aimed at clinicians.	Rennert-May & Conly, 2016; Lucas et al., 2015; Borg, 2012; Pechere, 2001; van Duijn et al., 2003; Grigoriyan et al., 2007; Grigoriyan et al., 2008; Cabral et al., 2016; Tahtinen et al., 2009; Alili-Idrizi et al., 2014; Rzeuwuska et al., 2019; Bosley et al., 2018; Altiner et al., 2007; Cantarero-Arevalo, 2017 McCullough et al., 2016

Determinants of AMU	Description	References
Patient-related		
Attitudes, knowledge, or beliefs about illness and health behaviours	Many sociocultural factors such as attitudes, knowledge or beliefs about illnesses and health behaviours, including knowledge and beliefs about labeling a diagnosis (i.e. perception of what is considered a problematic symptom), knowledge of the natural course of infectious diseases, perceived thresholds for consulting a physician, coping strategies, and beliefs in the inherent healing power of the human body have been linked to AMU. Canadian studies have demonstrated a strong link between influenza season and the increase in antibiotic use. This illustrates the incorrect belief that antibiotics can be used to combat illnesses caused by viruses. Provinces, such as Ontario, that have implemented a universal influenza immunization program have seen decreases in influenza-associated respiratory antibiotic prescriptions.	van Duijn et al., 2003; Grigoriyan et al., 2008; Rosman et al., 2008; McKay et al., 2016; McIsaac et al., 2011 Glass et al., 2010; Kwong et al., 2009
Expectation that a physician visit will lead to a prescription	Patient/caregiver expectations have been identified as one of the main drivers for inappropriate antibiotic prescribing by primary-care physicians. Patient expectations have been shown to vary depending on type, duration and severity of symptoms. Parents/caregivers are also more likely to expect an antibiotic if their child was previously prescribed an antibiotic. At times, demographic factors have been shown to be associated with patient expectations. For example, studies in the USA showed that recent immigrants from countries where antibiotics are available over the counter had the higher expectations for antibiotics for upper respiratory infections compared with the general population.	Rowan & Thompson, 2016; Cadieux et al., 2007; Cockburn & Pit, 1997; Avorn et al., 2000
Previous experience with antibiotics	At least one study showed that patients who received antibiotics were more likely to request these in the future.	Tahtinen et al., 2009

Determinants of AMU	Description	References
Patient-related		
Demographic and social determinants of health	Age (i.e. youngest and oldest patient groups), low socioeconomic status (i.e. poverty, low education levels), being foreign born, living in more urban settings, having co-morbid conditions, and lack of access to a health care system and/or continuous care have been found to be consistently associated with higher or inappropriate antibiotic use. Crowding, homelessness, and poverty have all been associated with higher rates of antimicrobial resistance in high-income countries.	Kozyrskyj et al., 2004; Marra, Mak and Chong, 2010; PHAC, 2012 Alividza et al., 2018
Practitioner-related		
Perceived patient expectations	Several studies suggest prescribers are influenced by a desire to maintain or establish positive relationships with patients, and prescribe according to their perceptions of patient expectation. Often this is related to their belief or assumption that patients expect antibiotics or that patient satisfaction is related to a prescription, when in fact factors such as time allowed for a consultation tend to be a better predictor of patient satisfaction.	Ternhag, et al., 2014; Teixeira Rodrigues et al., 2013; MacFarlane et al., 1997; Coenen et al., 2013
Knowledge, beliefs, and attitudes towards antibiotics	Many studies show that a better understanding of physician knowledge, beliefs, and attitudes toward antimicrobial prescribing is essential for formulating effective antimicrobial stewardship programs. A systematic review conducted in OECD countries demonstrated that although prescribing providers are aware of antimicrobial resistance, they attribute responsibility to patients, other countries, and healthcare settings. They also consider antimicrobial resistance a low priority and distant consequence of antibiotic prescribing.	Rosman et al., 2008; Deschepper et al., 2008; Cole, 2014; Teixeira Rodrigues et al., 2013 McCullough et al., 2015
Attitudes, beliefs, or practices related to shared decision making	Shared decision making has long been recognized as an effective strategy for reducing the overuse of treatments and decisional conflict around treatment options. At least one good-quality study from Quebec showed that a shared decision making program in primary care enhanced patient participation and led to fewer patients opting to use antibiotics for acute respiratory infections.	Légaré et al., 2012

Determinants of AMU	Description	References
Practitioner-related		
Attitudes, beliefs, or practices towards uncertainty avoidance	Uncertainty avoidance or tolerance of an ambiguous situation is thought to result in patient demand and practitioner prescription in situations where the indication of treatment may be unclear. A positive significant correlation was found between the Uncertainty Avoidance Index and use of antibiotics in ecological studies.	Deschepper, 2008; Gaygisiz, Lajunen & Gaygisiz, 2016; Teixeira Rodrigues et al., 2013
Factors that affect the quality of patient-practitioner relationships (e.g. power distance, trust, and perceived competence)	The patient-practitioner relationship has been described as one of the most important determinants of AMU. Cultural norms, values, beliefs, and attitudes toward health and health care may influence the quality of communication between physicians and their patients. Several studies have explored cross-national differences in medical communication in Europe through Hofstede's cultural framework and found that factors such as power distance, or the culturally specific way people deal with authority, trust, and perceived competence of the physician by patients are important dimensions that influence antibiotic prescription by affecting communication and shared decision making.	Bosley et al., 2018; Brooks-Howell et al., 2013; Lucas et al., 2015; Deschepper, 2008
Practice volume	At least three studies showed that physicians practicing in a high practice volume were more likely than those in a low practice volume to prescribe antibiotics inappropriately or excessively.	Cadieux et al., 2007; Daneman et al., 2017; Fleming-Dutra et al., 2018
Socio-demographic factors of practitioners	Of physicians' socio-demographic factors, older age, medical speciality, and higher number of years in practice were associated with inappropriate prescribing. For instance, one study from Manitoba, which examined prescribing among children, showed higher prescribing rates among older clinicians, than those trained outside North America and non-specialists.	Lopez-Vazquez et al., 2012; Kozyrskyj et al., 2004
Medical training and education	Better physician clinical skills and education are associated with reduced antibiotic prescribing for viral respiratory infections. A systematic review of OECD countries demonstrated that the lack of previous clinical experience and continuous medical education was associated with inappropriate prescribing. A study conducted in British Columbia, examining the prevalence of antibiotic prescribing among providers, found that dentists were the second highest prescribers of antibiotics after physicians. Factors that drove dentists to prescribe include differences in training and slow uptake of new guidelines.	Cadieux et al., 2011; Teixeira Rodrigues et al., 2013 Marra et al., 2016

Determinants of AMU	Description	References
Organization and health system-related		
Availability and access to diagnostic tools	Diagnostic uncertainty can play a role in inappropriate antibiotic use. Diagnostic tools often can help identify the organism causing the infection and provide insight into the patient's immune response, thereby enabling healthcare providers to distinguish between infections requiring antimicrobial treatment and those that do not.	Laxminarayan et al., 2013; Drekonja et al., 2015
Availability of guidelines tailored to local context	Diagnostic uncertainty and the wish to avoid complications can be important drivers of inappropriate antimicrobial prescribing. Where available, tailored clinical practice guidelines are important drivers of behaviour to reduce inappropriate antimicrobial prescribing.	Grossman et al., 2012; Doyon et al., 2009; Ness et al., 2016; Dickson et al., 2017
Peer influence and the availability of systems for self-monitoring	Social norms can influence human behaviour. A few studies show that shared values within a clinical practice can define the local antibiotic-prescribing culture. Characteristics of cultures where this may be more prevalent include practices where antibiotic overuse is generally accepted, where the potential adverse effects of antibiotics have a limited influence on clinical decision making, and where there may be limited peer-to-peer feedback.	Doyon et al., 2009 ; Daneman et al., 2017; Livorsi et al., 2015
Over-the-counter prescription of antibiotics	Antimicrobial use may be affected by reimbursement policies, financial incentives, and healthcare regulation. Ways in which health care is funded or reimbursed can affect antibiotic prescriptions. At least one study reported a decrease in antibiotic use following regulatory restrictions on over-the-counter prescription of antibiotics.	Harbarth & Monnet, 2007
Economic incentives or pressures from pharmaceutical industries	Economic incentives or the pressure of pharmaceutical industries can affect antibiotic prescription by clinicians. A few studies showed that pharmaceutical industries sometimes strive aggressively to influence physician prescribing habits. For example, Harbarth et al. (2002) describe how low drug prices in one European country motivated the pharmaceutical industry to compensate with extremely offensive marketing. Frequent physician meetings with pharmaceutical representatives have also been associated with high rates of antibiotic prescriptions (Harbarth, 2007).	Hulscher et al., 2010; Harbarth & Monnet, 2007; Harbarth et al., 2002; Teixeira Rodrigues et al., 2013
Malpractice laws	In certain jurisdictions, physicians may be more likely to prescribe to avoid legal complaints.	Rosman, 2009; Harbarth & Monnet, 2007

Determinants of AMU	Description	References
Organization and health system-related		
Sick leave policies	One study reported the influence of parents under sick leave policies on antibiotic demand by illustrating the need of parents to return to work as a common driver of antibiotic demand.	Harbarth & Monnet, 2007
Daycare practices and policies	At least one study reported that attendance at a child-care centre has been associated with an increased risk of ear infections in children and excessive antibiotic use.	Harbarth & Monnet, 2007
Vaccination campaigns and vaccine development	Investment in development of new vaccines and implementation of vaccination strategies are likely to contribute to decreased transmission and impact of antimicrobial-resistant bacteria by decreasing susceptibility to various infectious diseases.	Kwong et al., 2009; Harbarth & Monnet, 2007; Harbarth & Samore, 2005
Sociocultural factors		
Power distance	Power distance refers to the strength of real or perceived social hierarchies. Prescribing antibiotics can hold symbolic connotations and be seen as a sign of power and expertise. Several studies indicate that high power distance between prescriber and patient may result in poor communication and less shared decision making. On the other hand, low power distance between prescriber and patient is thought to result in better communication and higher patient satisfaction, as well as more shared decision making. While the pathways between AMU and power distance have been tested in ecological studies, thereby limiting causal inferences, it is thought that low power distance between patients and practitioners can reduce inappropriate AMU by supporting shared decision making around patient preferences on the pros and cons of antibiotic treatment. Shared decision making may also lead to clarifying patient expectations, which has been identified as a key driver of AMU.	Harbarth & Monnet, 2007; Deschepper et al., 2008; Pechere et al., 2001; Rosman 2010

Determinants of AMU	Description	References
Sociocultural factors		
Uncertainty avoidance	Many studies show that use of antibiotics is associated with unwillingness of both practitioners and patients to accept uncertainty. High uncertainty avoidance is likely to result in patient demand for or physician prescription of antibiotics in situations where indication for treatment maybe unclear. Cultural analyses of this phenomenon describe the association of lower antibiotic use in countries where "watchful waiting" strategies are more common among practitioners prescribing antibiotics.	Harbarth & Monnet, 2007; Deschepper et al., 2008; Pechere et al., 2001; van Duijn et al., 2003; Deschepper, Vander & Stichele, 2001
Cultural perceptions of health and illnesses	Cultural factors that may influence antibiotic use include cultural conceptions of health and illnesses, including beliefs about health, causes of disease, labelling of illnesses, and coping strategies. These factors may determine which signs and symptoms require medical attention and drive health-seeking behaviours.	WHO, 2019; OECD, 2017; Harbarth & Monnet, 2007; Hulscher et al., 2010
Income inequality	One ecological study observed a moderate correlation between antimicrobial resistance and income inequality in 15 European countries. Although the mechanisms that might link income inequality and antimicrobial resistance remain poorly understood, they may be influenced by factors related to income inequality, such as access to and investment in health care. One Canadian study found an increase in demand for antibiotics in populations with high percentages of low-income individuals, high unemployment levels and low percentages of individuals with a bachelor's degree.	Kirby & Herbert, 2013; Glass et al., 2010

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Appendix A: PICO Criteria

Criteria	Inclusion	Exclusion
Population	Patients and prescribers (i.e. physicians, pharmacists, dentists, nurse practitioners, specialists) Healthcare system Social and cultural systems and institutions	Animal studies, Veterinary studies
Exposures	Patient factors – Norms, beliefs, attitudes and values that may lead patients to have misconceptions about the effectiveness of antibiotics and create expectations around problematic use Practitioner factors – Factors that lead healthcare providers to prescribe antibiotics unnecessarily. This may include beliefs, practice patterns (pressure from patients to prescribe, prescribing "just in case"), lack of knowledge and training (medical school curricula, practice guidelines), as well as structural barriers such as not having sufficient time to have conversations with patients about appropriate antibiotics use and treatment alternatives. Health system factors - Health system factors that perpetuate antibiotics overuse and misuse (e.g. lack of system supports, such as rapid diagnostic tools and antimicrobial resistance research and development funding, lack of time in a fee-for-service environment). Cultural factors – Societal norms, values, and beliefs of various groups that may lead groups of individuals to misuse antimicrobial agents	
Comparator(s)	Appropriate use of antimicrobials	
Outcomes	Primary: misuse or overuse of antimicrobials Secondary: patient outcomes (i.e. symptom severity, symptom resolution, disease duration and complication or adverse effects); antibiotic resistance, patient and/or provider knowledge, attitudes, or beliefs about antibiotic use; patient participation in shared decision-making about antibiotic use; patient satisfaction with care; quality of patient-healthcare provider communication; changes to regulatory practices	
Study designs	Systematic reviews Case-control studies Cohort/longitudinal studies Cross–sectional studies Randomized controlled trials and/or cluster RCTs Economic evaluations	Conference reports Editorials Letters Case series reports
Settings	Canada and OECD countries	