

This review identified numerous articles describing the complex social interface between healthcare providers and patients. From this research, it is apparent that both the patient and prescriber bring their own ideas, biases, cultures, and experiences into the clinical encounter. The magnitude of these factors is likely larger than prescribers or patients realize, meaning that clinical decisions as to whether an antibiotic should be prescribed occur within a highly dynamic social transaction. Importantly, prescribers are often biased in favour of prescribing antibiotics when they believe their patient wants one. For prescribers, this suggests that further awareness of one's own biases may be a relevant part of clinical training. Prescribers may also need to be armed with more effective tools to manage antibiotic prescribing conversations. Since it appears that there is generally not a knowledge gap between those who prescribe appropriately and those who do not, continuing to rely on education-focused interventions for prescribers may not be effective.

Physicians who have heavier patient loads or spend less time with their patients are more likely to prescribe antibiotics inappropriately. However, reducing patient volumes may not be feasible, particularly in low-resource environments where there are relatively few physicians caring for a population. Studies have corroborated this, noting that antibiotics are more likely to be prescribed when there is a low ratio of physicians per capita (17). Further examination of healthcare resources may be beneficial, particularly in rural and remote communities, as solutions aimed at preventing the overburdening of healthcare providers may also have an impact on AMR. However, data is limited on how such strategies could be applied within the Canadian context.

Social sciences research on AMR has occurred within both hospital (inpatient) settings and within the community. Many of the factors influencing antibiotic use are common between both; however, the interpersonal clinical team dynamic is a more pronounced consideration in hospitals. While clinicians often feel that they have sole discretion over whether they prescribe an antibiotic, often these decisions occur through discussion, negotiation, and at times are influenced by hierarchies within the workplace culture. This may in-part be why many stewardship programs are only partially effective, and different strategies should be explored. For example, Warreman et al. suggested that each determinant of antibiotic prescribing in hospitals could potentially be addressed in a specific, intentional way (46). In facilities where reputational risk significantly impacts prescribing behaviour, for instance, interventions focused on promoting a positive safety culture may be indicated. Likewise, teams that are driven to over-prescribe antibiotics due to fear or intolerance of uncertainty may benefit from structured training and guidance on how to overcome these barriers. By helping hospitals and teams understand the dynamic of their own prescribing behaviours, it is possible that more effective stewardship interventions can be applied.

Stewardship interventions in community settings may be similar, but should reflect local contexts. Interventions have been described that assess antibiotic prescribing or use behaviours, and then develop stewardship programs that are tailored to specific settings. One potential model is called

“Preserving Antibiotics through Safe Stewardship (PASS). This research program in the United Kingdom aims to evaluate antibiotic use in multiple settings, investigating the factors that influence prescribing and characterizing the gaps and facilitators in order to develop effective stewardship programs (61). Another research proposal (GPPAS Study) in Australia aims to systematically evaluate the relationships and collaboration between general practitioners and community pharmacists, purposefully exploring attitudes around antimicrobial stewardship and barriers and facilitators for implementation (62). Utilization-focused program development, implementation and evaluation may therefore be of benefit. Finally, the Values and Principles tool has been developed to support stakeholders when they attempt to engage with community members to tackle complex issues like AMR (63). Key values include clarity, creativity, evidence-led, equity, interdisciplinarity, sustainability and flexibility, and use of this tool may assist in developing collaborative relationships when developing AMR prevention strategies.

Unlike most other medicines, antibiotics used by individual patients can have population-level consequences (24). For this reason, public health practitioners have a critical role to play in addressing AMR. Public health has already contributed through actions such as research and surveillance. However, public health also has relevant expertise in the area of health promotion that could be of benefit. Social science research on AMR informs us of the social, behavioural, environmental and equity factors that contribute to worsening AMR and inequitable burden of its consequences; however, generating awareness and willingness to change behaviours may be challenging. Public health experts have the skills and resources to meaningfully contribute to the AMR discussion, including the development of messaging and materials that target prescribers. Additionally, the links between AMR, social inequities and community specific drivers that may reflect colonial policies should be explored further by public health practitioners, many of whom already work to address some of these inequities in their communities. There may also be value in further public health evaluation to determine whether targeted strategies to reduce inequities may in turn prevent AMR.

This narrative review has several important limitations. The literature search was not conducted in a systematic fashion, nor with the rigor required of a scoping review. While this allowed for the identification of a broad range of relevant publications, it is possible that some related articles were missed. Later phases of the literature search focused on specific theme areas, including prescriber-patient relationships and social determinants. It is known that social sciences research contributes to AMR beyond these focused areas, and further exploration of extant literature may be required. Later searches also focused, where possible, on Canadian data. While this was important for the purpose of this review, it also means that relevant studies in other parts of the world may have been missed. This review focuses on AMR and antibiotic use in humans. It is known that animal and agricultural use of antibiotics is a significant contributor to AMR, and while beyond the scope of this review, further exploration of social science research relating to drivers of AMR and interventions relevant to these sectors may be beneficial. Most publications were identified in biomedical journals rather than social sciences journals, which may reflect the intended audience of this research. Finally, many of the studies

describe population-level data, sometimes comparing one country against another. While this paints a picture of the factors relating to AMR and may be useful for generating hypotheses, caution must be made when drawing specific conclusions from these relationships.

Conclusion

AMR is a known threat to the health of Canadians and people around the world. While there is an established breadth of current and historical microbiological research examining AMR, social sciences research on AMR has grown substantially over the last decade. As this review has identified, the social sciences can provide a greater level of insight into why certain prescribing behaviours occur, why some stewardship programs work and others fail, and how social inequities are intrinsically linked with worsening AMR. This research informs our understanding of AMR and offers potential avenues for prevention strategies.

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