TACKLING ANTIMICROBIAL RESISTANCE IN THE COMMUNITY

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**Summary:** Antimicrobial resistance is an important societal issue. Making sure patients in the community get the right antibiotic at the right time is important to preserve our existing antibiotics. In this article, we discuss some of the interventions that have shown promise in optimising antibiotic-prescribing and use in the community, both in, and outside the consultation room. We outline the factors needed to evaluate the cost-effectiveness of such interventions in the context of antimicrobial resistance, and highlight the caveats and challenges for policymakers.

**Keywords:** Primary Care, Antimicrobial Stewardship, Intervention, Community

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**Introduction**

Antimicrobial resistance (AMR) is an important societal issue and central to the global health policy agenda. Unless we make better use of our existing antibiotics now, 10 million extra people are likely to die each year by 2050 because of antibiotic-resistant bacteria (“superbugs”). However, the impact of AMR is broader than theoretical predictions of mortality rates. AMR is already affecting countries’ ability to reach their Sustainable Development Goals.

Poor infection prevention and control and antibiotic use are the two most important risk factors for a patient developing a resistant bacterial infection. Likewise, at a population level, important public health factors such as rates of vaccine uptake, different health care systems and social norms, human migration and tourism, sanitation, and population densities will all influence the prevalence of AMR. Recent evidence from primary care shows that patients in the community with antibiotic-resistant infections are more difficult to treat, making people sicker for longer and increasing the burden on the health service. This suggests that we need to refocus our agenda by showing that AMR also adversely impacts on patients’ recovery from even common infections in the community.

In the United Kingdom (UK), over 70% of all antibiotics are prescribed in the community or ambulatory health care settings (general practice, outpatient, emergency departments) compared to hospital inpatient settings (11%). Primary care doctors (family doctors/general practitioners) and more recently, nurse practitioners and pharmacists working in community settings, are responsible for antibiotic prescribing.

**Why is antimicrobial stewardship important?**

In an era of antibiotic resistance, it is critical that patients receive the right antibiotic at the right time with the least harm to present and future patients. This is antimicrobial stewardship (AMS) in a
nutshell. In some parts of the world where there is an excess of antibiotic use, AMS strategies will involve optimising their use and improve the quality of prescribing. In resource-poor settings, AMS strategies will involve providing better access to antibiotics.

Patients presenting in primary care with respiratory, urinary, skin or dental infections account for the majority of antibiotic prescriptions. The vast majority of antibiotics (60%) are prescribed for acute respiratory tract infections (RTIs), such as your typical coughs, sore throats, earache. Whilst antibiotics are effective for some RTIs (e.g. community-acquired pneumonia), the bulk of acute RTIs are self-limiting where there is no additional benefit from antibiotics. Thus, there is a need to reduce the number of prescriptions for these types of infections and to empower patients to self-manage their symptoms. For other infections, such as urinary or skin infections, antibiotics do offer more benefit for patients. For these presentations, the aim of AMS strategies may not be to reduce antibiotic prescriptions but instead to improve the quality of antibiotic prescribing by using first-line narrow-spectrum antibiotics, where appropriate.

Types of community interventions to tackle AMR

There have been many interventions targeted at clinicians, patients and the public (see Table 1). However, in this article we focus on specific interventions which appear to show promise in tackling AMR in community settings and for which there is more robust evidence than other interventions. Almost all interventions have focused on acute RTIs. Importantly, many interventions were trialled in European general practice and are therefore context-specific. This does not necessarily mean that other interventions would not be effective elsewhere, but context-specific evidence is needed.

Firstly, by empowering clinicians with enhanced communication strategies and shared-decision making, we consider the role of the patient in the consultation and can include intervention components targeted at the patient. Clinicians tend to overestimate patient expectations for antibiotics which can contribute to unnecessary prescribing. Eliciting patient expectations for treatment and concerns about their illness, through specific communication techniques, can help a clinician to provide reassurance and information about self-care rather than an unnecessary antibiotic prescription.

Secondly, incorporating point-of-care tests (POCTs) or rapid diagnostic tests within the consultation have to potential to optimise antibiotic prescribing in primary care. However, we should be cautious.

Thirdly, delayed prescribing strategies to reduce antibiotic use. Delayed prescriptions are considered appropriate for infections which are mostly associated with self-limiting symptoms. When given a delayed prescription a patient is given information about the likely duration of symptoms and encouraged to only take antibiotics if symptoms continue for longer than expected or if symptoms worsen.

Lastly, public antibiotic awareness campaigns. Campaigns have mostly been multi-facetted (e.g. patient informational material, mass media), often seasonal, focusing on RTIs, targeting specific age-groups and ‘at risk’ groups. The key messages in these campaigns have targeted the knowledge, attitudes and behaviours of patients seeking, or self-medicating with antibiotics, and informing the public that most RTIs are caused by viruses and thus cannot be treated by antibiotics. The evidence for their effectiveness is less clear, especially long-term. For example, in the UK, the “Antibiotic...
Guardian Campaign” was launched in September 2014, aiming to increase awareness and engagement with AMR by health professionals and the public. The campaign included a website where people could make online pledges to act to reduce AMR (www.antibioguardian.com). The impact of the campaign was assessed via an online survey sent to 9,016 self-selected “Antibiotic Guardians” to assess changes in self-reported knowledge and behaviour. Results indicated that this campaign led to increases in self-reported knowledge of AMR and self-reported behaviour change in line with pledges. However, respondents were mostly health care professionals or connected to the health care system; less than a third of respondents pledged as members of the public.

Assessing cost-effectiveness of community interventions

The uptake of AMS interventions relies on a compelling health-economic justification. There are a number of linked components to consider in assessing the cost-effectiveness of AMS interventions.

Firstly, effective AMS interventions need to reduce antibiotic prescribing without reducing health benefits. This is important because if reducing prescribing results in inferior health outcomes, then this will need to be weighed against the value of reducing the health consequences of future AMR, and against that of alternative interventions that may have improved health outcomes. Next, is the cost of the intervention. Many new interventions, such as POCTs, will cost considerably more than the antibiotics they replace. For example, in England, amoxicillin costs £0.91 (€1.05), while a CRP test costs £5.53 (€6.30), and if additional appointments are required, the cost of these extra resources will quickly add up. However, most cost-effectiveness analyses continue to ignore AMR as an outcome or consequence entirely. This final component of AMS cost-effectiveness, the value of AMR itself in economic terms, is an opportunity cost to prevent AMR in terms of benefits foregone now, such as current health and cost savings. There is considerable uncertainty around both how much society is willing to give up to avoid future AMR. Importantly, all these components are required to make a transparent judgement on whether AMS interventions are truly cost-effective.

There have been a small number of interventions attempting to consider these outcomes in cost-effectiveness analysis. One study evaluated the proportion of societal costs, which have been estimated in several large analyses such as the O’Neill report, attributable to a single prescription of antibiotics. They then applied this single cost to each prescription to give some idea of the opportunity cost of antibiotic prescriptions in RTI. However, as yet, studies are unable to provide valid results on the cost-effectiveness of AMS strategies, and considerable methodological work in this area is still required.

Challenges for policymakers

Policymakers should be cautious about assuming that an intervention which is effective in one context is likely to be effective in another, whether that is due to a difference in health care organisation, culture or country. That said, it is encouraging to see that the same interventions (mentioned above) across multiple European countries, have been shown to be effective in different health care organisations and in health systems with different financial structures. However, we would caution that the influence of culture and context on antibiotic use is currently underexplored and other studies have highlighted that such factors may be a barrier in transferring effective interventions from one context/country to another, especially for low and middle-income countries where interventions could have significant resource implications and disrupt existing patient workflows.

AMS interventions have tended to focus on reducing the overall antibiotic prescribing rate. However, this might be too simplistic. Quality indicators that focus on the diagnostic process are also needed for common infections managed in primary care, similar to those successfully employed in chronic diseases like diabetes and cardiovascular diseases, which have led to improved outcomes. Adopting quality indicators will likely improve the appropriateness of antibiotic prescribing and complement current financial incentives in primary care to reduce overall antibiotic prescribing. This is highlighted by a recent review where the majority of identified quality indicators focused on the choice of antibiotic (72%) rather than the diagnostic process leading to a diagnosis (6%), and the decision to prescribe an antibiotic (22%).

Another limitation of the available evidence concerns the long-term effects of interventions. Many trials of interventions have focused on short-term outcomes, either a few weeks or months post-intervention with recent evidence showing the transience of initially effective interventions. For example, the use of enhanced communication strategies were more likely to have a long-term effect than the use of CRP-POCT when
reducing antibiotic prescribing for RTI.

This suggests that interventions based on enhancing the skills of health professionals may be implemented more easily than the use of novel technologies because there is potentially less disruption to clinical practice and skills can be rehearsed and learnt more easily.

Lastly, policymakers should carefully consider the introduction of concurrent national public health campaigns that can be construed to be conflicting, e.g., sepsis campaigns advocating early detection and antibiotic administration versus antibiotic awareness campaigns encouraging self-care and promoting the use of fewer antibiotics. Likewise, there should also be an awareness that hospital-derived antibiotic stewardship measures, e.g., hand hygiene and infection control, might compete with the public’s mistaken beliefs of being less “hygienic” to promote a young child’s developing microbiome.

Conclusions

Policymakers wanting to address AMR should refocus their agenda by showing that AMR adversely impacts on patients’ recovery from even common infections in the community. The literature to date has focused on RTIs in general practice. The literature to date has focused on RTIs in general practice. The literature to date has focused on RTIs in general practice. The literature to date has focused on RTIs in general practice.

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Conclusions

Policymakers wanting to address AMR should refocus their agenda by showing that AMR adversely impacts on patients’ recovery from even common infections in the community. The literature to date has focused on RTIs in general practice. However, there are other common infections, e.g., urinary tract infections, where AMR strategies are urgently needed to optimise antibiotic prescribing. Reframing AMR into campaigns that the general public can engage with are urgently needed. Evidence-based community AMS interventions require further evaluation in real-world settings, and include low and middle-income countries where little is known about the influences on antibiotic-related behaviours.

References


