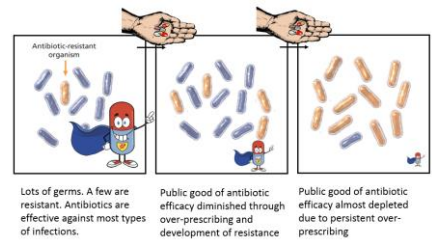# Optimising antibiotic prescribing: Collective approaches to managing a common-pool resource

Carolyn Tarrant,[1]* Andrew M Colman,[1] Edmund Chattoe-Brown,[1] David Jenkins,[2] Shaheen Mehtar,[3] Nelun Perera,[2] Eva M Krockow.[1]

[1]University of Leicester, [2]University Hospitals Leicester, [3]University of Stellenbosch

## Antimicrobial resistance as a social dilemma

Antimicrobial resistance (AMR) is one of the greatest threats in 21st century medicine. Antibiotic overuse in medicine is a significant contributing factor. AMR has been characterised as a social dilemma: a situation in which a public good (in this case, antibiotic efficacy) is exhausted due to over-exploitation. The dilemma arises because individuals are motivated to maximise individual payoffs, although the collective outcome is worse if all act in this way.



Lots of germs. A few are resistant. Antibiotics are effective against most types of infections.

Public good of antibiotic efficacy diminished through over-prescribing and development of resistance

Public good of antibiotic efficacy almost depleted due to persistent over-prescribing

## Three complicating features that make optimising antibiotic prescribing challenging …



**Lack of visibility and imminence:** the depletion of antibiotic efficacy is relatively invisible, and lacks immediacy for doctors working at the frontline and their patients.



**'Problem of many hands'**: each individual prescriber's action makes a negligible and indirect contribution to the problem. Individual accountability or blameworthiness for the collective outcome of AMR is blurred.
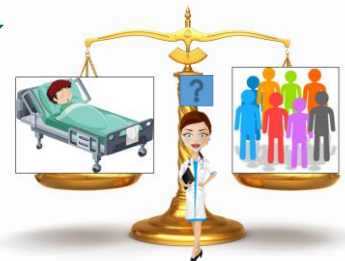


**Complex agency relationships:** Doctors are mediators of antibiotic use but are acting as agents for multiple parties. There may be tensions in balancing the interests of society for conservative antibiotic prescribing, against the responsibility for minimising the risks of morbidity and mortality for their own individual patients.

## Theory-based solutions?

Theory and evidence suggest that enabling consensus based, cooperative approaches are most effective for limiting use of a common-pool resource; but solutions need to reflect the particular challenges of optimising antibiotic prescribing.

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| Classes of theory-based AMS intervention | Description of intervention |
|---|---|
| 1. Establish clearly defined boundaries and access rights | - Define the common resource that needs protecting (e.g., all antibiotic drugs).<br>- Fully specify who can access antibiotics (e.g., fully-trained doctors; microbiologists, antimicrobial pharmacists), and whether this differs between different types of antibiotics: this turns a resource from "open-access" into a "common-property".<br>- Enforce formal training requirements for antibiotic prescribers to ensure they are fully qualified to make difficult antibiotic prescribing choices.<br>- Ensure prescribers' duty to society and their responsibility for protecting antibiotic efficacy is explicit in formal contracts and professional codes. |
| 2. Raise the problem's visibility and highlight imminence | - Collect and communicate information about local resistance levels.<br>- Establish a consensus amongst agents about the threat posed by AMR and the need to act.<br>- Increase a sense of urgency by highlighting existing treatment complications and demonstrating the imminence of AMR. |
| 3. Make collective choice arrangements | - Ensure rules about antibiotic prescribing are consensus-based, incorporating views of different stakeholders<br>- Ensure that external authorities (e.g. government) respect local, consensus-based rules about antibiotic prescribing.<br>- Fit prescribing rules to the local context, considering for example local resistance levels, hygiene and sanitation, and overall infection rates), and the local challenges and resources of individual hospitals or healthcare organisations.<br>- Ensure all parts of the system have appropriate antibiotic prescribing guidelines and there is communication and consensus across different parts of the system. |
| 4. Conduct behaviour-based monitoring | - Monitor against collectively agreed rules or guidelines<br>- Set up systems to collect and make transparent information on overall prescribing levels and individual prescriber habits.<br>- Enable behaviour-based monitoring by members of the prescribing community and the officials to whom they are accountable, placing the emphasis on prescribing choices of individual healthcare staff rather than their (loosely coupled) outcomes (i.e. hard-to-measure increases of AMR). |
| 5. Use social and reputational incentives and sanctions | - Use graduated sanctions matched to scale and frequency of inappropriate behaviours<br>- Make use of social and reputational incentives and sanctions, for example through individual and organisational awards for cooperative action, and reputational sanctions for non-engagement with consensus rules.<br>- Capitalise on the power of social norm feedback |
| 6. Address misaligned goals and incentives | - Identify and address organisational and national goals and incentives that are in tension with stewardship<br>- Manage risks for doctors of acting in the interests of society, e.g. through organisational protection from litigation |
| 7. Provide conflict resolutions mechanisms | - Ensure arrangements are in place to resolve conflicts about antibiotic prescribing (e.g. disputes about appropriate treatment in situations of uncertainty). |