Articulating citizen participation in national antimicrobial resistance plans: a comparison of European countries

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Abstract

Background

National action plans determine country responses to antimicrobial resistance (AMR). These plans include interventions aimed at citizens. As the language used in documents could persuade certain behaviours, we sought to assess the positioning and implied responsibilities of citizens in current European AMR plans. This understanding could lead to improved policies and interventions.

Methods

Review and comparison of national action plans for AMR (NAP-AMR) obtained from the European Centre for Disease Prevention and Control (plans from 28 European Union and four European Economic Area/European Free Trade Association countries), supplemented by European experts (June-Sept. 2016). To capture geographical diversity, 11 countries were purposively sampled for content and discourse analyses using frameworks of lay participation in health care organisation, delivery and decision making.

Results

Countries were at different stages of NAP-AMR development (60% completed, 25% in-process, 9% no plan). The volume allocated to citizen roles in the plans ranged from 0·3% to 18%. The term 'citizen' was used by three countries, trailing behind 'patients' and 'public' (9/11), 'general population' (6/11), and 'consumers' (6/11). Increased citizen awareness about AMR was pursued by ~2/3 plans. Supporting interventions included awareness campaigns (11/11), training/education (7/11) or materials during clinical encounters (4/11). Prevention of infection transmission or self-care behaviours were much less emphasised. Personal/individual and social/collective role perspectives seemed more frequently stimulated in Nordic countries.

Conclusion

Citizen roles in AMR plans are not fully articulated. Documents could employ direct language to emphasise social or collective responsibilities in optimal antibiotic use.

Keywords: Citizen participation, antimicrobial resistance, Europe

INTRODUCTION

Drug-resistant infections (DRIs) present a planetary threat to human and animal health due to the clinical, public health and economic burden associated with them.[1,2] The determinants of antimicrobial resistance (AMR) encompass clinical, socioeconomic, and ecologic factors.[3] Among these, behavioural factors including the inappropriate use of antimicrobials are critical.[4] The contribution of citizens to this suboptimal use can range from purchasing antimicrobials without prescription[5] to pressurising prescribers,[6] or not completing prescribed antimicrobials.[7]

Ideally, institutional and governmental interventions aiming to address DRIs sustainably should engage and secure citizen collaboration.[8,9,10,11,12] However, such efforts can be hampered by several reasons. Public understanding of AMR is limited,[13] with many citizens incorrectly thinking that conditions such as influenza can be treated with antibiotics. Additionally, the public may attribute the emergence of DRIs to a single cause, unlike the interconnected mechanisms that experts describe.[14] To address such shortcomings in citizen knowledge, AMR action plans have proposed to deploy awareness campaigns[15] and encourage clinicians to spend sufficient time explaining infections and AMR to patients.[16,17]

The pivotal role of national AMR action plans (NAP-AMR) to galvanise and coordinate efforts across government departments[18] and articulate a shared national vision has been firmly endorsed by the World Health Organization, who urged all Member States to have NAP-AMR in place by May 2017.[19] The lack of progress against DRIs, however, has been partly blamed on inadequate evaluation of the effectiveness and implementation of antimicrobial policies.[20]

Evidence from behavioural economics and discourse analysis suggests that moral values implied by certain language can induce different behaviours. For example, a ‘Consumer’ identity would be associated with money, efficiency and individual gain, whilst the ‘civic’

persona would relate to social and collective goods as well as shared resources. These two perspectives would be intrinsically opposed.[21] For such reason, when study participants were given identical tasks framed as either 'Consumer' or 'Citizen' tasks, the Consumers were more likely to be less cooperative with other participants, and less likely to preserve finite resources.[22] The 'Consumer' psychology was also associated with short-term thinking. However, 'Citizen' participants considered the morality and long-term implications of their actions as well.[23]

These aspects of cooperation, preservation of finite resources and long-term implications conform the core of optimal antimicrobial use. For such reasons, we suggest that the language included in NAP-AMR could persuade individuals to behave in a given manner. Therefore, understanding how citizens are spoken about and the characteristics of their participation in antimicrobial improvement activities may elicit gaps that, if addressed, could lead to improved policies and enrich interventions.

Our study examined NAP-AMR in countries within the broad European region to describe the participation of citizens in AMR activities, focusing on the language used to refer to citizens and their roles in appropriate use of antibiotics, the plan expectations of citizen behaviour towards antibiotics, and the approaches previewed by plans to help citizens achieve such behaviours.

METHODS

Data collection

On the premise that a single document can reflect a country's policy framework,[24] we carried out a comparative analysis of national AMR plans. We obtained NAP-AMR (or equivalent) for 28 European Union and four European Economic Area (EEA)/ European Free Trade Association (EFTA) countries, from the European Centre for Disease Prevention and Control (website - June 2016) and supplemented by European experts in infection prevention and

control/AMR members of EUCIC (European Committee on Infection Control) or ESCMID (European Society of Clinical Microbiology and Infectious Diseases). To validate the information about availability and currency of NAP-AMR for each country selected we approached Health Officials or Science advisers attached to British Embassies in June/July 2016, with follow-up contacts in August/ September 2016. The attachés liaised with relevant officials at national Ministries of Health and confirmed the status of NAP-AMRs. To capture geographical, cultural and epidemiological variation, 11 countries were purposively sampled for comparative analysis: Nordic (Norway*, Sweden*); Western European (*UK, Netherlands)*; Central European (Austria, Czech Republic, *Germany, Switzerland*); Southern European and Mediterranean (Cyprus, Portugal, *Spain*). The italics indicate availability of documents in English. Countries were categorised into stages of policy development. Each policy was read in whole, excerpts relevant to citizens (or equivalent) and citizens' roles in AMR were extracted and treated as a single unit of analysis. Non-English (5 policies) excerpts were translated by native speakers who were also experts in infection prevention and control/AMR.

Data analysis

All analysis was carried out in English using content and discourse analyses. Considering that contexts, author, and audiences are crucial for text analysis, it is inevitable that texts are interpreted differently with multiple meanings.[25] So, whilst content analysis is useful, context is important in interpreting the frequency of codes.[26] Hence, a sequential approach to analysis was used. First, quantitative content analysis to identify patterns and frequency of terms to provide 'a crude overall picture' or 'a proxy for significance' with caution.[26] Second, qualitative content analysis (thematic analysis) provided underlying meanings of citizen's roles. Thematic analysis followed an integrated deductive-inductive approach.[27] The deductive themes were informed by conceptual frameworks of lay participation in health care organisation, delivery and decision making (**Table 1**).[28,29] The Domains in the frameworks were amalgamated and simplified around overlapping areas.

Insert Table 1 here

The themes explored the breadth and depth of citizen roles. For example, the 'Domains of Participation' articulated whether citizen contribution was allowed or encouraged during the development of plans or was restricted to organisational design and governance (i.e., citizens as members of advisory boards), or operational aspects. Similarly, the 'Continuum of Participation' quantified the relation between citizens and the NAP-AMR development process, explaining whether citizens were merely consulted or had a rather more involved role during the plan development. Finally, the 'Role perspective' examined whether citizen participation reflected social/collective or personal/ individual standpoints.

Two researchers (MI, ECS) independently carried out line by line inductive coding, for five policies. The coding structure was then agreed amongst the co-authors and applied to all 11 policies.

RESULTS

Availability of a national action plan on AMR

National plans were at different stages of development (**Table A, Supplementary material**), with a finalised document in 60% (19/32) countries, 25% (8/32) in-process, 9% (3/32) reporting no plans to develop a document, and 6% (2/32) had AMR plans included within wider public health documents. Italy was the only country with a wider NAP-AMR equivalent (National Prevention Plan 2014-2018) yet a NAP-AMR was also in development. Lichtenstein had adopted another country's plan ('Strategy on Antibiotic Resistance Switzerland'). In Estonia, we could not identify a single AMR plan; however, DRIs were incorporated into an overarching policy with limited and rather general AMR activities. Finally, Romania issued a 'National plan for the supervision and control of nosocomial

infections and the monitoring of the antibiotics use' in February 2016, which we considered within the 'wider NAP-AMR or equivalent' category.

Citizen-specific content, purposively selected NAP-AMR

Table B (Supplementary material) summarises citizen-specific content for the 11 plans. Overall, a small proportion of content was allocated to describe the roles, expectation and participation of citizens, ranging from 0.3% (Austria) to 18.3% (Netherlands).

Language used: 'citizens', 'public' or 'society'?

The term '*citizen'* was only used by Cyprus, Switzerland, and Portugal. A variety of other terms were used, from '*patients'* (9 policies), to '*consumers'* (6), '*public/general public'* (9), '*general population'* (6), and '*society'* (3) (**Table 2**). The Norwegian and Spanish plans included '*society'* but much less frequently than the Swedish document, which referred continuously to '*society'* and '*all of society'*.

> '*Perceptions, attitudes, and knowledge of citizens about antibiotics*.'
>
> (Cyprus, p.28)

> '*Encourage citizen awareness campaign for the prudent use of antibiotics, with attention the risks associated with its use.*'
>
> (Portugal, p.4)

> '*Society as a whole, and in particular patients and their family members who need to understand that antibiotics do not cure all diseases and that their incorrect use could compromise their efficacy […].*'
>
> (Spain, p.28)

Insert Table 2 here

Often, specific groups were highlighted for their vulnerability to infections or their crucial role. In three documents (Netherlands, Switzerland, and Spain) '*consumers'* featured prominently but focussed on food preparation rather than healthcare. Spain was the exception, as specifically centred on antibiotics. In other plans (Germany, Sweden, and Portugal), consumers were marginally included. People who were in contact with live animals (other than for food) were mentioned by the UK, Sweden, Germany, Netherlands, Switzerland, and Spain.

Expectations and intentions

The language used in the NAP-AMR to describe the desired participation of citizens in AMR was, generally, not directive (**Table 3**).

Insert Table 3 here

However, clear future intention particles (i.e., '*will'*) were in plans by countries performing relatively well in AMR, such as Norway and Sweden and some central (Switzerland) and Western European (Netherlands) nations. Sweden mentioned '*The Government expects: […]*', whereas Norway uses '*The Government will: […]*', and Netherlands uses '*We will […]*'. Sweden also used '*must'* to refer to activities for stakeholders including citizens, suggesting a certain obligation, but the norm was for permissive (i.e., '*should'*, 8/11 countries) rather than prescriptive language, implying therefore a moderate level of compliance expectations.

Further tolerant language ('*may'*) directed at citizens was explicit in the UK and Swiss plans, freeing people to follow or ignore the mandates. In the Swiss case such moderate and less authoritative language was counterbalanced with clear future intention particles ('*will'*) for all

actors, including citizens. Perhaps not surprisingly, all documents included citizens, the public, or society at large among those responsible for appropriate antibiotic use (**Table 4**).

> *'Our understanding and knowledge of the development and spread of antibiotic resistance remains incomplete. This must be put right so that specialists […], farmers, food producers, as well as the general public, take informed decisions on the responsible and appropriate use of antibiotics […].'*
>
> (Switzerland, p.20)

Insert Table 4 here

What were the intended effects of NAP-AMR on citizens?

The NAP-AMR examined intended to exert a variety of effects on citizens' knowledge, attitudes and behaviours surrounding antimicrobials (**Table C, Supplementary material**). Increased awareness about DRIs among citizens was an intended outcome pursued by ~2/3 of plans (except Norway, Portugal, Czech Republic, and Austria). The Dutch document particularly stood out on this domain.

> *'In the fall, we will launch […] the follow-up to the public awareness campaign by the Nutrition Centre which focuses on raising awareness, improving knowledge and providing concrete recommendations for both kitchen hygiene and preparing and storing food in order to reduce pathogens.'*
>
> (Netherlands, p14)

Better citizen education about infections was a core function assumed by most plans, explicitly mentioned in all but Sweden, Austria, Portugal, and Spain. On the contrary, Germany substantially emphasised training for citizens, complementing well a perspective of

active population involvement integrated with awareness and education. Still in central Europe, the Swiss document also described training for citizens, but to a lesser extent. Norwegian, UK, and Dutch plans explicitly aimed to influence citizens to adopt optimal antimicrobial behaviours. Other documents such as the Swiss centred such behaviour change in specific subgroups such as those at high risk of acquiring DRIs **(Table D, Supplementary material)**. On the opposite side, Germany's plan often referred to behaviour change yet only in relation to healthcare workers, specifically doctors.

Overall, the UK and the Netherlands included awareness, education and behaviour change. In the UK, these domains were promoted through activities linked to the European Antibiotic Awareness Day. Training and acquisition of practical skills were however not featured.

> *'Since 2008, 'European Antibiotic Awareness Day' is held in November each year to raise awareness among health professionals and the public of AMR and appropriate prescribing. Evaluations of the activities have shown them to be cost-effective and successful in raising awareness and in driving behavioural changes.'*
> (UK, p.9)

Construction of citizen participation in AMR activities

From the perspective of the plans, citizens were expected to be recipients of awareness activities or education interventions postulated within the documents, rather than actively engage in proactive, self-care measures that may reduce their need for antibiotics **(Table E, Supplementary material)**. Regarding the 'Participation domain' most cases were limited to the operational sphere of citizen participation, meaning the context of interaction with healthcare providers. Hardly any selected plans explicitly incorporated citizen participation in dimensions of policy-making (e.g. resource allocation) at the macro level.

Operationally, the emphasis placed by the plans on awareness, training and education was reflected on the roles implied for citizens (**Table F, Supplementary material**). All countries

highlighted the need for citizens to be given information (e.g. via awareness campaigns, 11/11 NAPs), training/education (7/11 NAPs) or specific antimicrobial-related materials during clinical consultations (4/11 NAPs).

> *'Inclusion of proper use of antibiotics (emphasis that its use is ineffective for colds viral infections and their use in these cases may be hazardous) to health education topics of secondary school education provided by the Ministry of Health.'*
> (Cyprus, pp.42-43)

Equally, all countries in our study participate in the annual European Antibiotic Awareness Day, although it was only reported in the national plans of Spain, Cyprus, UK, Netherlands, and Czech Republic.

Enhancing vaccination uptake was constantly acknowledged in the Norwegian and Swiss plans. Another protective, self-care measure exclusively present in Norway's plan was the promotion of hand hygiene for citizens. The Czech document underscored the need to avoid self-medication, an aspect solely mentioned on this plan. Finally, the Swiss plan reflected upon the challenges of citizen movements across borders, for tourism or trade, which could echo local concerns.

> *'Norway has high vaccination coverage in childhood immunization with more than 90% coverage among 9-year olds. If the goal of 30% reduction in the use of antibiotics is to be reached, this level is must be maintained or preferably increased.'*
> (Norway, p.8)

> '*Restrict self-medication with antibiotics without consulting your doctor and explain the necessity of the restricted dispensing antibiotics (i.e. Only by prescription).*'
> (Czech Republic, p.18)

The personal/individual and social/collective role perspectives of citizens seemed more frequently stimulated in Nordic rather than other European countries **(Table G, Supplementary material).** For example, the Norwegian document motivated patients to act as nodes of optimal information and behaviour within their networks:

> '*The general public must be provided with better information about appropriate use of antibiotics and antibiotic resistance so that patients and those around them do not insist that doctors […] provide inappropriate antibiotic prescriptions*.'
> (Norway, doc 2, p.11)

Switzerland illustrated the case for individual citizen responsibility. The Czech plan spoke about 'co-responsibility' for the use of antibiotics, although citizens remained firmly as recipients of information campaigns designed and led by clinicians.

> *'Regular organization of information campaigns aimed at the general public to strengthen co-responsibility for the proper use of antibiotics and limit their overuse.'*
> (Czech Republic, p.18)

DISCUSSION

Our analysis of European AMR plans highlighted a disparity of institutional perspectives regarding the depth and breadth of citizen participation in national AMR efforts. Such range of viewpoints was demonstrated by the language used to refer to citizens, the expected roles and citizen behaviours encouraged by the documents, and the resulting relation between citizens and governments inferred by the policies.

Our study presents some limitations. Data was extracted from national plans using clinical experts who were native speakers of each language. However, they were not certified translators, which may have led to some terms being apportioned to erroneous categories. Secondly, we analysed high level documents but not the complete corpus of national plans, policies, and guidelines available. Particularly important, we did not examine documents

where the implementation of interventions presented in those high-level documents may have been formalised. Among the strengths of our approach, we used published documents that were reviewed by clinical experts, who also provided validation to our analysis. Further, the analysis was based on well-established analytical frameworks applied, for the first time, to the analysis of AMR documents.

Virtually all countries we evaluated had a NAP-AMR in place or in development. These findings align well with recent results highlighting that 129 countries reported plans in place or development.[30] The peculiarities we observed in terminology and roles may reflect true ideological differences between countries regarding the participation of citizens in AMR interventions, driven by cultural idiosyncrasies, as seen in other fields.[31] However, validation via qualitative designs would be required to avoid interpretation biases.

The policies recognise the existing deficit in public education and knowledge about DRIs. Clearly, addressing such gap would be beneficial. However, a narrow emphasis on public awareness may not yield the desired returns, as for citizens to benefit from information offered by campaigns and clinicians they ought to be able to understand it according to their health literacy.[32] As health literacy is in turn driven by a wide range of social determinants, resolving these in parallel may be indispensable.

Equally, effective citizen participation must be stimulated. Some previous experiences including citizens' juries examining health policy[33] or elected health boards[34] could serve as templates for such participation at different levels. A recent review of AMR policy narratives[35], however, placed the general public as actors within the 'AMR as a healthcare problem' model only, which may therefore circumscribe their participation within AMR efforts to a 'patient' identity, likely to be passive and expected to obey, rather than share decide, clinical mandates.[36] Indeed, the most frequently identified term in our study was 'patient', followed by the 'public'.

However, shifting the policy narrative towards a notion of citizenship may be an attractive feature to influence and foster optimal public use of antimicrobials embedded within a dyad of responsibilities and rights. This point of view would bond the right of citizens to have access to antibiotics, for example, with an implicit civic responsibility to 'protect them'[37] with optimal use, in line with much of the expectations expressed within the national plans. These responsibilities may encompass other behaviours such as hand hygiene and vaccination that protect against infections and thus reduce antimicrobial use. Further, comprehensive perspectives such as the 'One Health' approach could be used to integrate the duties of key citizen subpopulations (animal owners, travellers, etc.) highlighted in the plans. Finally, the moderate level of compliance expectations ('need', 'can') suggested by the plans may be boosted by more prescriptive yet culturally appropriate directions. This perspective may facilitate altruistic behaviours from citizens, encouraging them to avoid requesting antibiotics or where the individual benefit may be marginal compared with the impact on antimicrobial pressure.[38]

Considering the effect that the plans' language is likely to have on population behaviour, we recommend that documents emphasise a citizenship perspective that couples the rights to access with responsibilities to avoid antimicrobial misuse and encompasses salutogenic behaviours.

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Conflict of interest

None declared.

Key points

- European Action Plans on Antimicrobial Resistance present a variety of institutional perspectives regarding the participation of citizen participation in national AMR efforts.
- Most plans focused on providing awareness and training/education – encouraging preventive or self-care behaviours was much less emphasised.
- Personal/individual and social/collective role perspectives seemed more frequently stimulated in Nordic countries.
- Documents could employ direct language to emphasise social or collective responsibilities in optimal antibiotic use.
- Shifting the policy narrative towards a notion of citizenship may be an attractive feature to embed optimal public use of antimicrobials within civic responsibilities and rights.

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Table 1. Analytical framework (adapted from [28,29])

	Dimension	Definition & examples
Domains of participation	Policy-making	Decision making in broad macro-level (country) healthcare allocation and policy decisions for a broader jurisdiction.
	Organisational design & governance	Decision making in meso-level changes (i.e. health organisation) through membership in platforms such as quality & safety committees or advisory board in hospital, etc.
	Operational	Decision making at micro-level (i.e. individuals) on treatments or interventions.
Continuum of participation	Consultation	Individuals are provided with information, but they do not have direct access to such information (one-way information flow).
	Involvement	Individuals have direct access to information, but their views are not considered (e.g. editing information only).
	Partnership	Horizontal relationship created through two-way information flow or communication with shared power and responsibility.
Role perspective	Personal / individual	Narrow perspective or health service user perspective based on concentrated or narrowly defined interests (e.g. immediate personal interest, family interest, vested interest).
	Social / collective	Universal or public policy perspective, concerned with broader public/community good, social/collective interest.

1 **Table 2. Language used - excerpts from NAPs-AMR**

Citizen	'*Perceptions, attitudes, and knowledge of citizens about antibiotics*.' (Cyprus, p.28) '*Encourage citizen awareness campaign for the prudent use of antibiotics, with attention the risks associated with its use.*' (Portugal, p.4)
Patients	'*Patients frequently believe, incorrectly, that antibiotics will help them recover from all respiratory tract infections faster*.' (UK, p.17)
Consumers	'*Consumers can also prevent exposure to resistant bacteria by preparing food in a hygienic manner. The Netherlands Nutrition Centre informs consumers about general hygiene guidelines*.' (Netherlands, p.9) '*The objective is to raise awareness in consumers about the individual and collective benefits of the rational use of antibiotics and provide information on the risks of AMR so as to encourage adherence to the policy of prudent use of antibiotics*.' (Spain, p.58)
(General) public	'*[…] organize information campaigns and incentive programs aimed at the general public, which would explain the need to reduce unwarranted use of antibiotics.*' (Czech Republic, p.18)
(General) population	'*The government will: reinforce efforts among the general population to ensure a high degree of vaccination coverage through the publicly funded vaccination program*.' (Norway, p.15)
Society	'*[…] Improved awareness and understanding in society about antibiotic resistance and countermeasures. This objective involves: knowledge, competence and increased awareness among all relevant parties – including the general public – about measures to prevent the spread of infections and about the risks of resistance development through the use of*

	antibiotics.' (Sweden, p.14) '*Society as a whole, and in particular patients and their family members who need to understand that antibiotics do not cure all diseases and that their incorrect use could compromise their efficacy when really needed.*' (Spain, p.28)
Animal owners	'*The expectations of patients and animal owners with regard to the prescription of antibiotics and their appropriate consumption or administration have an influence on antibiotic consumption and thus on the development of resistance.*' (Germany, p.18) '*In the area of veterinary medicine, contact points with experts on antibiotic resistance who know the specific needs of veterinarians and animal owners will be created.*' (Switzerland, p.37)

16 **Table 3: Expectations/intentions - excerpts from NAPs-AMR**

Expectation – directive / prescriptive	'*In view of the complexity of the problem, all of society must come together and work within a 'One Health' approach*. '(Sweden, p.3)
Expectation - moderate	*'Similarly, animal keepers need to understand and follow directions for correct drug administration.'* (UK, p.17) *'The population should be aware of where antibiotics should and should not be used, of the alternatives to antibiotic treatment and of preventive measures.'* (Switzerland, p.50)
Intention – stronger possibility	*'More information will be provided to the general public about the development of antibiotic resistance, where antibiotics should and should not be used, and ways in which resistance can be prevented. This will allow individuals to take responsibility more effectively.'* (Switzerland, p.50) *'Awareness of the issue of antibiotic resistance will be raised among stakeholders in all areas.'* (Switzerland, p.50)
Intention – weaker possibility	'*We recognise that GP consultations can often be challenging, particularly when patients expect to receive antibiotics and may be unwilling to accept that they do not need them*.' (UK, p.9) '*It can be assumed that some Swiss citizens travelling abroad had to make use of medical services during their trip, and that the same applies to foreigners travelling to Switzerland. These persons may have been at greater risk of exposure (medical procedures, close contact with people in countries with a high level of resistance, etc.)*.' (Switzerland, p.45)

17 **Table 4: Responsibility - excerpts from NAPs-AMR**

Responsibility about antibiotic use	'*Among those affected by this threat, but who are also responsible for combating it and therefore participants in the Plan, are: Society as a whole, and in particular patients and their family members who need to understand that antibiotics do not cure all diseases and that their incorrect use could compromise their efficacy when they are really needed.*' (Spain, p.28) '*Our understanding and knowledge of the development and spread of antibiotic resistance remains incomplete. This must be put right so that specialists such as doctors, veterinarians, pharmacists, farmers, food producers, as well as the general public, take informed decisions on the responsible and appropriate use of antibiotics, thereby contributing to reducing resistance*.' (Switzerland, p.20)

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