Coming of age: governance challenges in updated AMR national action plans in the EU

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Background: National action plans (NAPs) are key instruments for governing antimicrobial resistance (AMR). In Europe, we can now observe many countries updating their NAPs which raise two key research questions; what substantial modifications are states opting for, and how do they wish to address challenges related to AMR governance in a comparative perspective? Methods: Building on a previous analytical classification, we address these two questions by examining data of updated versions of NAPs in 13 European Union member states covering seventeen elements related to AMR governance. Results: Our results substantiate the large variation with regard to both substantive issues and governance-related matters. Most tellingly, they highlight the growing importance of the One Health approach in updated versions of NAPs. Our analysis also shows that while substantive issues remain important, One Health and the coordination and collaboration issues it entails are becoming more salient in the second or third generation of NAPs. Conclusions: Updated NAPs suggest that EU member states are becoming increasingly knowledgeable on the causes and consequences of AMR and how it needs to be addressed. The enhanced level of knowledge also leads these countries to address the next set of issues and challenges; to improve domestic and international coordination and collaboration. Thus, the revised NAPs present a noticeable development from substantive issues towards governance issues.

Introduction

This paper studies the process of revising national action plans (NAPs) to mitigate antimicrobial resistance (AMR) in the European Union (EU) member states. We are particularly interested in the degree to which the revised NAPs indicate a learning curve about AMR among elected officials and public health experts. We also want to see whether the second and, in some cases, third, generation of NAPs indicate a changing balance between substantive issues and governance-related issues compared to the first NAPs. We find that the second-generation NAPs tend to define a broader agenda of AMR-related problems and a growing focus on issues related to the governance of addressing AMR, particularly domestic and international collaboration and coordination. At the same time, however, there are also aspects of the revised NAPs that raise questions about national financial commitment to the AMR work and the capacity for countries to contribute to international governance while at the same time developing their domestic One Health strategy.

We conduct this study in the wake of a decade of intense AMR program work at the national and global levels. In 2012, the European Council adopted the conclusions on the ‘Impact of Antimicrobial Resistance in Human and Veterinary Medicine – The One Health Initiative’. Also in 2012, the EU’s Action Plan was delivered in the European Union Parliament’s committees on Agriculture and Rural Development and in the Committee on the Environment, Public Health and Food Safety.

In 2015, this program work was elevated to a global level when the World Health Organization (WHO) adopted its Global Action Plan (GAP) and urged its member states to produce NAPs. The GAP’s five main objectives and 83 specific recommendations provided a framework and a template for national governments as they prepared their respective NAPs. In 2020, the WHO joined forces with The Food and Agriculture Organization of the United Nations (FAO), the UN Environmental Programme (UNEP) and the World Organization for Animal Health (WOAH) to create a One Health-inspired platform nicknamed ‘The Quadripartite’ for highlighting AMR’s threat to not just humans but animals and the environment as well. In a similar vein, the EU conducted a One Health Ministerial Conference on AMR in 2016 and the European Council published an updated action plan in 2017, and most countries began implementing the WHO’s recommendation to develop NAPs.

Today we can see the results of this intensive period of formulating programs and strategies. 64% of all states have adopted NAPs and several countries have revised and updated their NAP at least once. While we lack systematic data on the extent of implementation of the NAPs and comparative studies of NAPs over time, the revisions can be assumed to reflect an evaluation of, and learning from, the previous Plan. In a global perspective, we need to note that the EU member states, and perhaps particularly the 13 member states that have presented revised and updated NAPs, are among the forerunners in the AMR sector.

The revisions of NAPs tell us a great deal about what has been accomplished in the AMR field in the respective countries. These revisions illustrate institutional learning and an elaboration of governance arrangements to address AMR. For instance, domestic governance arrangements now appear to be in place along with budgets for the AMR work. At the same time, however, we note the intriguing pattern that second-generation NAPs are not more independent in relationship to the GAP but in fact rather the opposite; they now follow the GAP structure more closely than did the first generation of NAPs. We discuss this pattern of aligning cross-national and domestic coordination and governance below.

Thus, a systematic analysis of the differences between the first and second – or in some cases the third – generation of a country’s NAP tells us much about the development of knowledge, expertise and administration of AMR in that country and in which direction they
want to take their work to address AMR. Whether it is the result of international pressure or a genuine domestic public health concern, NAPs represent a significant commitment; what is in the plan tends to be implemented. The revised NAPs also illustrate the pattern that as some issues have been resolved or mitigated, other issues emerge. Perhaps the best example of this process would be the increasing tendency in many countries to adopt a One Health approach which in turn engenders significant governance challenges.

Such comparative examination also uncovers country-level differences in addressing the AMR challenge. On the one hand, merely adopting GAP items without carefully assessing and integrating recommended activities in the national contexts may prove to be ineffective. On the other hand, allowing states to ‘go their own way’ can be hazardous as harmonized systems for data sharing are crucial for controlling the issue at the international level. Vast differences in national strategies can also prompt, and justify, the European Commission to take a leading role to coordinate international AMR governance.

Finally, we are interested in the degree to which revised NAPs address international collaboration. The transnational coordination of AMR governance presents a difficult challenge in terms of how extensive those governance arrangements can and should be. The difficulty of creating ‘international harmony’ in AMR governance while national contexts and priorities largely determine countries’ AMR strategy remains a salient problem. While experts and elected officials emphasize the global nature of the AMR problem, the global governance of AMR work is still in its early stages.

Methods

In order to better uncover systematic differences between the first and second (or third) NAP we have analysed the NAPs both country-by-country and thematically. Thus, we supplement the country-based approach to programs addressing the AMR issue with a thematic approach to programs addressing the AMR issue with a thematic approach which looks at developments over time in the attention to, and prioritization of, various program objectives. This approach is developed by adopting and elaborating an analytical model developed to assess the style and substance of features related to the governance of AMR in comparative European perspective.

Firstly, we assess the extent to which NAPs discuss fundamental instruments for AMR governance, such as stewardship programs, surveillance and monitoring systems. This assessment also considers the written statements describing the nature of AMR, and the preventive interventions that are outlined to mitigate that problem. Specifically, with regards to these basic characteristics of AMR governance, we evaluate the following items: prevention of microbial infection and their spread; appropriate use of antibiotics in humans and animals; delivering new antimicrobials or alternatives, diagnostic tests, and implement fast-track procedures for marketing authorization; boost research on AMR development and spread; improve monitoring and surveillance of AMR and antibiotic consumption; and improve awareness, education and training.

Secondly, after establishing the basic institutions for AMR management, the effectiveness of the policy design is likely bound to its domestic and international coordination. Therefore, we consider several items attempting to capture these challenges, which altogether consider statements about the integration of activities among various actors in the overall governance framework. With regard to domestic coordination, we assess whether and the extent to which domestic arrangements are discussed, and in particular, statements with reference to the One Health approach or more generally to animal-human–environment-related activities in case the NAP was drafted before the One Health paradigm. Regarding international coordination we include items describing the country’s willingness and inclination to take stronger action on the international level. Specifically, with regards to coordination, we analyse the following categories in the NAPs: increase international cooperation; taking a leading role in international cooperation; increase international cooperation in the animal and/or human sector; reference to the One Health approach; references to the EU; WHO and/or individual countries in the EU.

Finally, the general design of NAPs often conforms to international standards. Therefore, we evaluate the general structure by assessing the following items: the extent to which NAPs mirror the general content of the GAP; how they define their domestic governance arrangements; whether statements regarding costing and budget are included; and the degree and nature of statements relating to the basic issue of AMR.

In total, and in direct consistency with Carelli et al., we consider 17 analytical items for the present analysis. Each item was coded on a three-point ordinal scale, attempting to measure how much each item was mentioned in the respective NAP. More details on the coding of each item are briefly described in the Supplementary Material. We code these categories in the range 1–3, producing a min-max scale of 17–51. The item ‘international cooperation’ is an exception to this coding rationale, which instead ranges on a 4-point scale, where 3 equals ‘only human sector’ and 4 equals ‘for both human and animal sector’. To ensure inter-coder reliability, the coding was cross-checked by two, occasionally three, coauthors. In cases of uncertainty, we iteratively re-assessed the NAP among all three coders. This approach follows the same rationale as recent qualitative assessments of NAPs.

We analyse all EU countries that have updated their NAPs before 2022. A total list of the NAPs assessed in this paper is provided in the Supplementary Material. In total, 13 countries are included in the sample. Consider the significant cross-national variation of antibiotic consumption and the prevalence of several different antibiotic-resistant bacteria, these countries can be said to represent highly dissimilar ‘mature’ governance systems. For instance, Greece and Italy have remarkably higher consumption and prevalence levels than Sweden and Denmark. By contrasting countries with elaborated governance arrangements with countries experiencing bigger governance challenges we generate a fuller picture of the European AMR governance landscape. Lastly, reporting basic descriptive data of temporal and spatial differences in the style and substance of NAPs provides direct testimony of institutional learning. In essence, the results of the coding provide a comprehensive account of the quality of AMR governance in Europe.

Having that said, we also note that the sample represent, from a global perspective, among the most committed countries in the struggle against AMR. Indeed, the mere existence of multiple versions of NAPs witnesses of a relatively long-term commitment to AMR, while about a third of the world’s countries still lack a first version of NAP. Thus, our sample can be argued to represent ‘successful cases’ of AMR governance, whose substantial developments bear important insights for countries lagging behind.

Results

We present our results first country-by-country before we move on to the thematic findings. Figure 1 presents scores from the coding of NAPs for the EU member states.

Figure 1 displays the total scores for each country’s first, second, and, for three countries (France, Portugal and Spain) third, version of NAPs. The term ‘total’ represents the cumulative sum of codes associated with the NAPs (see the coding in Fig 2). Most countries that have revised their NAPs show a higher total score, i.e. the number of items covered or elaborated in the NAP, for the second or third revision. The average total score for first revisions is 39.8 while the average score for the second revisions is 44.2. Thus, for the vast majority of countries, revised NAPs are more elaborated and/or cover more of the items we coded (see Fig 2). An interesting example is Portugal, which has revised its NAP twice and exhibits a
**Figure 1** Updated NAPs, by country

**Figure 2** Updated NAPs, by theme

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significant difference in total scores between the first, second, and third update. Like the case of Belgium, the first Portuguese NAP was a small and incomplete plan, which may explain why their NAP has been revised twice.

Conversely, Sweden, Spain, Italy, and Austria have lower scores for the first and second NAPs, and Spain whose third revision also shows a lower score. France, finally, has developed three NAPs, with the first and third NAPs having the same score (33), while the second revision has a much higher score (40).

Before we discuss these patterns further we will report our thematic findings, see fig 2.

Figure 2 presents aggregated scores per variable from all countries with updated NAPs. International cooperation is assigned codes ranging from 1 to 4, while other variables are coded from 1 to 3. In most cases, we find a higher score per variable in the updated NAPs. However, there are exceptions, such as a lower score for the extent to which countries reference other countries in the EU in their updated NAPs, resulting in a net change of −2. Additionally, there are equal scores for the level of information provided by the NAPs regarding the AMR problem and domestic AMR governance arrangements.

The most conspicuous development in the revisions is the dramatically increasing attention to the One Health approaches, and, relatedly, to governance and coordination issues more broadly. The score of the variable representing references to the One Health approach in the NAPs presents a significant net positive change of 12 from the initial versions to the updated versions. Since rolling out a One Health strategy against AMR means integrating human public health, veterinarian care and environmental protection, this significant change in the NAPs substantiates the growing attention to vertical and horizontal coordinating mechanisms and governance arrangements.

A few examples of how countries have set programs and strategies to address AMR will add context to the analysis. In France, AMR has been addressed in programs and reports since the early 2000s. In recent NAP revisions, and partly as a result of adopting the One Health approach, French NAPs have become both more diversified and focused on governance and coordination issues. There are now separate plans for international governance and domestic governance.

Sweden is another example of the trend towards a stronger One Health approach in AMR management. Their updated strategy, ‘Swedish work against antibiotic resistance – A One Health approach’, refines and consolidates this approach. The strategy is largely defined by the so-called coordination mechanism which includes all stakeholders from the animal, human and environmental health sectors in the Swedish AMR management. In addition, a working group—or ‘vision’ (Antibiotikasmart) – has been established to coordinate national, regional, and local actors with AMR-related activities in a coherent and sustainable vein.

In The Netherlands, finally, the AMR expert community and its leadership have taken an increasingly autonomous and expert-based position. Notably, the latest AMR program document outlining the current AMR work and setting priorities for the next several years was communicated as a letter to the Dutch parliament. Dutch AMR work comes across as distinctly expert-led; an arrangement which the political leadership appears satisfied with.

Discussion

If the first round of NAPs were mainly concerned with applying the WHO’s GAP to national preconditions and assigning responsibilities, the second generation of NAPs is predominantly focused on a range of governance issues. We should however note that the increasing attention to governance-related matters has not meant that the process of adapting NAPs to the GAP structure has been arrested; indeed, there is now a higher score on the variable measuring the degree to which the structure of the NAP aligns with that of the GAP. To put this pattern differently, there is now a movement towards aligning an international vertical, GAP-based strategy with a domestic, horizontal One Health approach. This approach, emphasizing cross-sectoral coordination has exacerbated the governance problems in the AMR strategy. Furthermore, international coordination, including aspiring to a leading role in such collaboration is more prominent in many countries’ revised NAPs. And, finally, the revised NAPs tend to move beyond setting goals, strategies and targets and are now more concerned with the operational side of the AMR work largely executed at the regional or local institutional levels.

Together, these three developments of the NAPs suggest that AMR work in the EU member states increasingly focuses on governance issues to coordinate across sectors; across national borders; and across domestic institutional jurisdictions. Indeed, the NAP revisions broadly describe a trajectory of learning. In the first stage, manifested in the first NAP, the main tasks that governments set for themselves include installing a new policy domain and creating an institutional framework for surveillance systems, consumption monitoring, data-sharing, etc. This initial plan typically describes the role of each actor in the AMR governance space, i.e., the national strategy. In the revised NAPs there is recognition of the need to conform to the GAP while at the same time addressing the governance dimensions of the AMR issue.

Thus, in the second stage, the revised NAPs typically address issues of creating coordination among the actors and functions outlined in the first NAP. Equally important, the AMR issue is now increasingly defined as a One Health problem; a policy shift which exacerbates national cross-sectoral coordination challenges. Integrating One Health into the national governance framework can itself be a daunting task and require innovative institutional solutions. Depending on the respective national context in Europe, we can observe a diversification of issues and solutions related to this, such as different degrees of decentralized governance or simply varying capacities and arrangements to uphold data-sharing systems across the three domains of animal, human and environmental health.

In the third stage, the third generation of NAPs, we have seen thus far present a growing interest in international coordination. Having outlined processes to coordinate national institutions, the question is now how to insert domestic agency and knowledge into regional and international AMR governance and strengthen coordination with, and among, international actors. Typically, the main strategy is to lean towards supranational organizations such as the EU and WHO. In the future versions of NAPs, we should expect explicit channels and processes of coordination with certain countries to become more articulated.

The third stage is also observed to advance the notion of One Health into more practical terms. After extensive reports and scholarly contributions on the necessity to integrate One Health, most states simply had no choice but to include it in the plan. But, as already briefly discussed, the challenge of creating a meaningful One Health framework can be a daunting governance task in itself. As argued a few years ago, breaking the sectoral partitioning between the three domains is challenged by resources and institutional capacities, and more generally different ‘organizational and funding modalities, disciplinary silos, and conflicting interpretations of the meaning of integration’.

Moreover, the future of NAPs will clearly stretch beyond the third ‘stage’. First, a hitherto relatively neglected subject in the NAPs is the matter of budgeting and costing the outlined activities. Few policy instruments are more powerful than allocating funds and specifying their intended use in a coherent framework. It is probable that countries opt towards more meticulous statements around this issue. Second, while international coordination is an increasingly palpable issue in updated NAPs, statements tend to be rather general in substance, simply urging for more coordinated action but not outlining more specific activities to reach such outcomes. Third, if the gap between high- and low consumption countries in Europe continues to grow, then it is likely that bilateral strategies are strengthened to ensure positive change. Herein lies one of the greatest challenges in managing AMR; countries are directly vulnerable to
one another, but they cannot impose any formal demands for policy change beyond their own sovereign state. How can NAPs accommodate this governance dilemma?

In sum, there are many positive aspects of the trajectory we can see in the development of the AMR NAPs; there is a logical development from the first NAPs defining targets, objectives, and responsibilities to the revised NAPs’ concern with domestic and international collaboration. All is not well, however. The increasing scores on budgeting could indicate that there is a dissensus on costing and that putting financial commitments on paper is a way to mitigate that controversy.

Furthermore, there is a conspicuous absence of program and planning activity at the international level. Following the very active time-period from circa 2000–2015, transnational institutions like the EU and the WHO have taken a lower profile at the AMR policy and program level. To some extent it appears as if the main international driver of AMR work today is ‘The Quadripartite’ mentioned earlier; the collaborative structure comprising the WHO, the FAO, the UNEP and the WOAH. Given that most European states are increasingly emphasizing a One Health approach to AMR, this shift in international AMR governance seems entirely appropriate. Even so, the overall conclusion is that AMR program development today appears to be driven more by national differences and less by international institutions.

The potential downside to this development could be that cross-national differences in AMR performance will continue to increase, given that international institutions appear to be less inclined than earlier to guide and recommend states in their AMR work. In the EU, a growing difference in member state performance could, as mentioned earlier, induce the European Commission to pressure and/or incentivize lagging member states to commit themselves more strongly to mitigating AMR.

Supplementary data

Supplementary data are available at EURPUB online.

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Data availability

All NAPs were retrieved from the WHO’s NAP online library. The coding of the NAPs presented in the article is free to use with cited source.

Key points

- Updated NAPs against AMR reflect institutional learning and reveal general developments in outlined activities and management.
- An increased attention to the One Health approach is observed among all updated NAPs in Europe.
- Three general stages of NAP development are observed: (i) initializing and specifying the roles of various organizations in the AMR framework; (ii) creating holistic national coordination and (iii) aiming for international coordination.

References