



# Ministry of Health

# NEXT STEPS TOWARDS MAKING THE EU A BEST PRACTICE REGION IN COMBATTING ANTIMICROBIAL RESISTANCE THROUGH A ONE HEALTH APPROACH

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**Conference Background Document** 



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#### **Conference Background Document**

#### 1. Introduction

Antimicrobial resistance (AMR) is driven by inter-related dynamics in the human, animal and environmental health sectors and one of the most significant and complex current public health issues of our time. Without effective antimicrobials even common infections may become life-threatening and many treatments such as surgical procedures and chemotherapy will not be possible.<sup>1,2</sup> Today, drug-resistant pathogens are a challenge for all healthcare-systems; recent modelling of the health impact of AMR in European Union/ European Economic Area (EU/EEA) countries has shown that approximately 670000 infections occurred in 2015, responsible for just over 33000 attributable deaths. The burden of infections with bacteria resistant to antibiotics on the EU/EEA population was comparable to that of influenza, tuberculosis and HIV/AIDS combined.<sup>3</sup> If not addressed, AMR is projected to cost the global economy up to EUR 90 trillion by 2050, due to losses in international trade or livestock production and increased healthcare expenditure.<sup>4</sup>

The following background document draws on several publications disseminated at the EU Ministerial Conference "Next steps towards making the EU a best practice region in combatting AMR through a One Health Approach", held in Bucharest, Romania 28<sup>th</sup> February - 1<sup>st</sup> March as part of the Romanian EU Council Presidency.<sup>5-8</sup> Central messages are summarised and the progress of EU/EEA countries is reviewed to stimulate discussion, however further detail can be found in these publications, particularly chapters 3-5 within the book titled; "Antimicrobial Resistance; Economic and Policy Challenges", and sections 3-6 in the European Observatory policy brief titled; "Averting the AMR crisis: What are avenues for policy action for countries in Europe?".<sup>5,6</sup>

#### 2. International and National Developments

International and national efforts to combat AMR have grown steadily over the last two decades. Two major landmark developments include the launch of the World Health Organisation (WHO) Global Action Plan on AMR in 2015, which asks all countries to develop national action plans by 2017,<sup>9</sup> and the United Nations (UN) General Assembly agreeing a political declaration on AMR in 2016 where countries committed to work at national, regional, and global levels to develop and implement multisectoral national action plans in accordance with the 'One Health' approach.<sup>10</sup>

The European Commission (EC), along with the European Centre for Disease Prevention and Control (ECDC), the European Food Safety Authority (EFSA) and the European Medicines Agency (EMA), has a long history of working together with member states to combat AMR.<sup>11</sup> As early as 1998, the EC established the European Antimicrobial Surveillance System (EARSS) and in 2001 the Community Strategy against AMR was published.<sup>12</sup> Several EU Council's recommendations followed; on the prudent use of antimicrobial agents in human medicine in 2002, on patient safety, including the prevention and control of healthcare associated infections in 2009 and new legislation on serious cross-border threats to health in 2013.<sup>13–15</sup> In addition, the importance of the prudent use of antimicrobials in the animal sector has

been recognized and reflected in EU legislation and other policy documents. For example, the use of antibiotics for promoting growth has been banned for all EU countries since 2006.<sup>16</sup> Moreover, in 2018 the EU adopted new legislation on veterinary medicines banning the prophylactic use of antibiotics in groups of animals, restricting metaphylactic use of antimicrobials in animals and providing for the possibility to restrict the use of certain antimicrobials to human use only.<sup>17</sup> At the same time, it includes the obligation for EU Member States to collect data on the sale and use of antimicrobials in animals. In 2018, new legislation on medicated feed was also adopted, which foresees a complete ban on the preventative use of antimicrobials via medicated feed, as well as further restrictions for veterinary antimicrobials.<sup>18</sup> Guidelines for the prudent use of antimicrobials in veterinary medicine were produced in 2015 which support these efforts and encourage appropriate antimicrobial use.<sup>19</sup>

In 2011, the EC issued the "Communication on an Action Plan against the rising threats from AMR."<sup>20</sup> This was updated through the adoption of the 2017 EU One Health Action Plan against AMR, which includes the ambitions (i) to make the EU a best practice region; (ii) boost research, development and innovation and (iii) shape the global agenda.<sup>21</sup>

Countries have taken advantage of hosting the EU Presidency by drawing attention to alternate strategies to combat AMR. For example, in 2008 Slovenia stressed the importance of improved surveillance of AMR and antimicrobial use and increased awareness of AMR in the general public as well as veterinary and healthcare professionals. In 2009 and 2016 Sweden and the Netherlands made antimicrobial development a priority, following the publication of European Observatory studies which highlighted high unmet need as well as potential policies and incentives to promote antimicrobial research.<sup>22,23</sup> Whereas, in 2012 and in 2016 under the Danish, and the Dutch presidency, the Council adopted Council Conclusions on emphasising the importance of the 'One Health' approach to national AMR policy. In 2014, under Italian presidency, the Council also adopted Council Conclusions emphasising the importance of prevention and control of health-care associated infections to improve patient safety and reduce AMR. In 2017, the Estonian presidency also prioritized AMR.

Collectively, these efforts have contributed to all EU/EEA countries now having an AMR national action plan implemented or under development. However, more progress can be made; only 20% (6/30) of EU/EEA have a multi-sectoral AMR action plan which has funding sources identified and is currently being implemented with monitoring in place. (Figure 1)







Figure 1: Progress of EU/EEA countries with developing and implementing national action plans on AMR

A - No national AMR action plan.

B - National AMR action plan under development or plan involves only one sector or ministry,

 ${\bf C}$  - National AMR action plan developed that addresses human health, animal health and other sectors,

**D** - Multi-sectoral AMR action plan approved that reflects Global Action Plan objectives, with an operational plan and monitoring arrangements,

**E** - Multi-sectoral AMR action plan has funding sources identified, is being implemented and has monitoring in place.

Source: WHO/OIE/FAO Global Database for Antimicrobial Resistance Country Self-Assessment.<sup>24</sup>

# 3. Objectives of the Conference

AMR is a complex multifactorial issue and previous EU Presidencies have chosen to focus on a specific aspect of AMR policy for maximum impact. The Romanian Presidency of the EU would like to build on these previous efforts by focusing on three key objectives:

- 1. To improve the quality of infection prevention and control measures and optimise antimicrobial use across human, animal and environmental health sectors
- 2. To strengthen the implementation of 'One Health' national action plans
- 3. To encourage solidarity between countries by working together to combat AMR

We hope that the discussions during our ministerial meeting will feed into EU council conclusions on these three objectives, which are crucial next steps towards making the EU a best practice region in combatting AMR through a 'One Health' approach.

However, we do acknowledge there are other issues which need to be addressed

for an adequate response to AMR, such as: 1) incentivising research and development of novel antimicrobials and alternative treatments; 2) increasing awareness and understanding of AMR by the public and healthcare professionals, as well as by farmers and veterinarians; 3) conducting comprehensive and reliable surveillance of AMR and antimicrobial consumption.<sup>9</sup>

# 4. Infection Prevention and Control (IPC) and Optimising Antimicrobial Use

Antimicrobial stewardship and infection prevention and control (IPC) are two of the five main objectives outlined in the global action plan on AMR.9 (Box 1) The principles behind these objectives can be applied across the human, animal and environmental health sectors taking a 'One Health' approach.

### Box 1: 2015 WHO Global Action Plan on Antimicrobial Resistance Objectives

1. Improve **awareness and understanding** of antimicrobial resistance through effective communication, education and training

2. Strengthen the knowledge and evidence base through surveillance and research

3. **Reduce the incidence of infection** through effective sanitation, hygiene and infection prevention measures

4. Optimize the use of antimicrobial medicines in human and animal health

5. Develop the **economic case for sustainable investment** that takes account of the needs of all countries, and increase investment in new medicines, diagnostic tools, vaccines and other interventions while reconciling these incentives with responsible use and acceptable prices.

Source: Global Action Plan on AMR  $^{\rm 9}$ 

# 4.1 Infection Prevention and Control

# Human Health

Effective IPC requires a combination of actions including hygiene measures (i.e. hand disinfection), the isolation of infected patients, environmental cleaning, as well as the active screening of incoming patients<sup>25</sup>. IPC teams within hospitals should ideally include specialist infection control nurses and infectious disease physicians and be supported by laboratory and data analysis support<sup>26</sup>. IPC measures should not just take place within the hospital but across the whole healthcare system including community and long-term care facilities. In 2009, the WHO published e dence-based guidelines on core components for IPC programmes to support countries and health care facilities in developing or strengthening IPC programmes and strategies. Updated guidelines were published in 2016 and cover eight core components.<sup>27</sup> (Box 2)



#### Box 2: WHO Core components for IPC

1. An **IPC programme** with a dedicated, trained IPC team should be in place in each acute health care facility for the purpose of preventing HAI and combating AMR through implementing IPC recommendations

2. Evidence-based **IPC guidelines** should be developed and implemented for the purpose of reducing HAI and AMR. The education and training of relevant health care workers on the guideline recommendations and the monitoring of adherence with guideline recommendations should be undertaken to achieve successful implementation.

3. **IPC education and Training** should be in place for all health care workers by utilizing team- and task-based strategies that are participatory and include bedside and simulation training to reduce the risk of HAI and AMR.

4. Facility-based **HAI surveillance** should be performed to identify the most frequent HAIs and detect HAI outbreaks, including AMR surveillance. Timely feedback of results should be provided to health care workers and managers, as well as through national networks, and should guide IPC interventions.

5. IPC activities using **Multimodal strategies** and a multidisciplinary team approach should be implemented to improve practices and reduce HAI and AMR.

6. **Regular monitoring/audit and timely feedback** of health care practices and other indicators according to IPC standards should be performed to prevent and control HAI and AMR at the health care facility level. Feedback should be provided to all audited persons and relevant staff.

7. Workload, staffing and bed occupancy should not exceed appropriate recommended levels. Bed occupancy should not exceed the standard capacity of the facility (one patient per bed with adequate spacing of >1 metre between patient beds). In exceptional circumstances where bed capacity is exceeded, health care facility management should act to ensure appropriate staffing levels that meet patient demand and an adequate distance between beds. Health care worker staffing levels should be adequately assigned according to patient workload

8. The necessary **Built environment, materials and equipment** for IPC should be provided. Patient care activities should be undertaken in a clean and/or hygienic environment that facilitates practices related to the prevention and control of HAI, as well as AMR. Materials and equipment to perform appropriate hand hygiene should be readily available at the point of care. WHO standards for the following elements should be implemented in all health care facilities: adequate number and appropriate position of hand hygiene facilities; WASH services; health care waste management and environmental health; and appropriate disinfection and sterilization practices

Source: Adapted from the WHO Core components for IPC - Implementation tools and resources.  $^{\rm 27}$ 

Positively, 90% (27/30) of EU/EEA countries have a national IPC policy available. However, the degree of implementation, monitoring and evaluation of national IPC policy varies significantly between countries (Figure 2). It is challenging to implement

national IPC policies across a healthcare system; including mixed public and private providers of hospital and community care. High quality surveillance data is an essential enabler for adequate monitoring and evaluation of IPC measures across the healthcare system.





A - No national IPC policy or plan is available,

**B** - A national IPC policy or operational plan is available, with standard operating procedures (SOPs), guidelines and protocols available to all hospitals,

 ${\bf C}$  - National IPC SOPs, guidelines and protocols are implemented in selected health-care facilities,

 $\ensuremath{\textbf{D}}$  - Several infection control measures in IPC plans are implemented nationwide and monitored,

**E** - All relevant infection control measures are implemented in all targeted health facilities. Compliance and effectiveness regularly evaluated and published.

Source: WHO/OIE/FAO Global Database for Antimicrobial Resistance Country Self-Assessment<sup>24</sup>.

### Animal health

IPC in animals is key to reducing antimicrobial usage and preventing potential transmission to humans and is also known as biosecurity. Biosecurity means a set of management and physical measures designed to reduce the risk of introduction, establishment and spread of animal diseases, infections or infestations to, from and within an animal population. Biosecurity can be divided into external biosecurity which aims to prevent a pathogen entering a herd, or internal biosecurity which aims to contain the spread of a pathogen within a herd.<sup>28</sup> External biosecurity includes animal and human movement controls, controls over vehicles and equipment and the use of vaccination. Internal biosecurity



includes interventions such as changing of needles, buildings, equipment and personal hygiene measures, and security of feed and water sources. It also includes good animal husbandry practices, especially as intensive farming can contribute to the occurrence of a wide range of, so called 'production' diseases.<sup>29</sup>

Over 50% (16/30) of EU/EEA countries either have no or some activities to promote good production practices in animal health. The complexity of measures required across multiple terrestrial and aquatic settings is a barrier to strengthening implementation of IPC measures in animal health. However, international organisations such as the World Organisation for Animal Health (OIE) produce useful guidance such as the Terrestrial and Aquatic Animal Health Codes. Aligning national policies with international guidance is an important first step to improving the quality and consistency of IPC measures in animal health across Europe.

# Figure 3: Progress of EU/EEA countries in good health, management and hygiene practices in animal and plant production



**A** - No systematic efforts to improve good production practices to reduce the need to use antimicrobials,

**B** - Some activities in place to develop and promote good production practices,

**C** - National plan agreed to ensure good production practices in line with international standards (e.g. OIE Terrestrial and Aquatic Codes, Codex Alimentarius). Nationally agreed guidance for good production practices developed, adapted for implementation at local farm and food production level,

**D** - Nationwide implementation of plan to ensure good production practices and national

guidance published and disseminated,

**E** - Nationwide implementation of plan to ensure good production practices and monitoring of impact on level of AM use, on animal health and welfare, and on production, with updating of plans and guidance in response to findings.

Source: WHO/OIE/FAO Global Database for Antimicrobial Resistance Country Self-Assessment <sup>24</sup>.

#### **Environmental health**

Even low concentrations of antimicrobials from use in animals and humans, and foundinagricultural, domestic and healthcare waste and in the soil and water environment, can exert a selective pressure to increase AMR among microbes in the environment, and may therefore increase the risk of occurrence of AMR pathogenic microbes. Emissions from manufacturing, in particular in some developing countries where emissions controls are not always stringent, are also thought to be leading to the development of AMR pathogens.<sup>30</sup>

The spread of resistant pathogens in the environment and particularly within the water environment is of great concern. To address this, many countries are now seeking to monitor and regulate activities and practices that influence the release of antimicrobials to the environment which contribute to the development and spread of AMR pathogens in soil, surface waters and groundwaters, e.g., wastewater treatment (level of treatment; effluent and sewage-sludge handling), agriculture (i.e. land spreading of manure, sewage sludge, fertilizer, bioaerosols, use of antimicrobial pesticides), animal husbandry (i.e. use of antimicrobials, disposal of animal by-products, slurry, or manure), aquaculture (i.e.use of antimicrobials in fish farms in fresh, transitional, coastal and bathing waters).<sup>31–33</sup>

Wastewater treatment plants are a major pathway for dissemination of resistant bacteria, and treatment of wastewater with ozone, ultraviolet radiation, ultrafiltration, or chlorination can drastically reduce their concentrations.34 However, not all treatments are effective at removing antimicrobials and antimicrobial resistance genes, and treating livestock manure is difficult. More research is needed on treatment methods and on the mechanisms whereby the presence of antimicrobials and resistance genes in the environment contribute to the spread of AMR. This current uncertainty regarding the best approaches to tackle AMR in the environment could explain why 60% (18/30) of EU/EEA countries gave no response when asked whether they have policies to reduce AMR in the environment. (Figure 4) The upcoming publication of the European Union Strategic Approach to Pharmaceuticals in the Environment will provide valuable guidance to begin to address this.







**A** - No systematic efforts to improve good production practices to reduce the need to use antimicrobials,

B - Some activities in place to develop and promote good production practices,

**C** - National plan agreed to ensure good production practices in line with international standards (e.g. OIE Terrestrial and Aquatic Codes, Codex Alimentarius). Nationally agreed guidance for good production practices developed, adapted for implementation at local farm and food production level,

**E** - Nationwide implementation of plan to ensure good production practices and monitoring of impact on level of AM use, on animal health and welfare, and on production, with updating of plans and guidance in response to findings.

Source: WHO/OIE/FAO Global Database for Antimicrobial Resistance Country Self-Assessment<sup>24</sup>.

### 4.2 Optimising Antimicrobial Use

#### **Human Health**

EU guidelines set out key elements of prudent use of antimicrobials in human health.<sup>19</sup> Antimicrobial stewardship is a set of actions designed to optimise the appropriate use of antimicrobials and refers to all actors and stakeholders and their respective roles, responsibilities and interests.<sup>35</sup> The principles which underlie antimicrobial stewardship are applicable across the total healthcare system, encompassing both hospital and community settings. In both settings, there is a focus on changing the prescribing behaviour of physicians, improving communication skills and addressing the expectations of patients.<sup>36,37</sup> Following

a literature review and consultation with an international group of antimicrobial stewardship experts, a research group has recently suggested seven core elements for global hospital antimicrobial stewardship programmes.<sup>38</sup> (Box 3)

# Box 3: Suggested core elements and checklist items for global hospital antimicrobial stewardship programmes

1. **Senior hospital management leadership** towards antimicrobial stewardship; which formally identifies antimicrobial stewardship as a priority objective with dedicated financial support for antimicrobial stewardship activities and the necessary workforce

2. Accountability and responsibilities; a formal antimicrobials stewardship programme/ strategy and organisational multidisciplinary structure (e.g a committee) responsible for delivery. A formal document clearly defining roles, procedures of collaboration and responsibilities of team members, including the identification of a healthcare professional as a leader.

3. **Available expertise on infection management;** access to trained and experienced health professionals in infection management (diagnosis, prevention and treatment) and stewardship and the required laboratory/imaging services

4. **Education and practical training;** the provision of educational resources to support staff (including the antimicrobial stewardship team) training on how to optimise antimicrobial prescribing

5. Other actions aiming at responsible antimicrobial use; a multidisciplinary antimicrobial stewardship available which undertakes regular ward rounds, adequate information technology services, antimicrobial formularies, recommendations/guidelines for infection management, a written policy that requires prescribers to document an antimicrobial plan, audits/reviews of antimicrobial therapy,

6. **Monitoring and surveillance;** monitoring the quality and quantity of antimicrobial use, compliance with specific interviews put in place by stewardship team and antimicrobial susceptibility rates for key bacteria.

7. **Reporting and feedback;** sharing hospital-wide and facility specific reports on the quantity of antimicrobials use and results of audits/reviews of the quality of antimicrobial use communicated directly to prescribers.

#### Adapted from Pulcini C et al 201938

On a national level, regulation should be utilised to ensure the appropriate production, sales and use of antimicrobials. For example, many countries enforce legislation which makes nationally authorized antimicrobials "prescription-only status"; stating that a mandatory prescription is required to access antimicrobials.<sup>39</sup> It is also important that antimicrobial stewardship policies consider not just limiting inappropriate use of antimicrobials but also facilitating the equitable availability of appropriate access to appropriate antimicrobial when needed.40 Positively, 90% (27/30) of EU/EEA countries states have national antimicrobial policies and regulation in place, however there is still significant variation is the depth and detail of these policies, regulations and programmes between countries (Figure 5). The complexity of healthcare systems presents challenges to implementing a consistent approach to antimicrobial stewardship across both hospital and community settings.



To improve implementation, surveillance of antimicrobial use is a powerful tool especially when combined with feedback to healthcare providers in a timely and coherent manner.





A - No/weak national policy & regulations for antimicrobial stewardship,

**B** - National policy and regulations for antimicrobial stewardship developed & approved, that address use, availability and quality of antibiotics in the community and in health care settings,

**C** - National antimicrobial stewardship program is being implemented in some healthcare facilities,

**D** - Antimicrobial stewardship program is implemented in health care facilities nationwide. Legal/regulatory changes approved and publicised to regulate sales and products for human use, but not fully enforced. Antibiotic quality testing program operational,

**E** - Antimicrobial stewardship program is implemented in most health care facilities and in community. Regulations are enforced on access to antibiotics and use in human health. Monitoring and surveillance results are used to inform action and to update treatment guidelines and essential medicines lists.

Source: WHO/OIE/FAO Global Database for Antimicrobial Resistance Country Self-Assessment<sup>24</sup>.

### Animal Health

The European Commission has published guidelines on the key elements for the prudent use of antimicrobials in veterinary medicine.<sup>41</sup> Integrated analysis undertaken by the ECDC, EFSA, EMA has shown the link between antimicrobial consumption and antimicrobial resistance of bacteria in food-producing animals and in humans.<sup>42</sup> Recent trends in Europe, across 25 countries, have seen an overall decline in sales of veterinary antimicrobials by 20.1% between 2011 and 2016, although in six countries sales increased

by over 5% in this period (a range of 7.9% to 67.7%)<sup>43</sup>. There are a number of possible alternatives to antibiotics in animals which are being explored, including vaccines, other immunomodulators, bacteriophages, lysins, hydrolases, antimicrobial peptides, plant extracts, quorum sensing inhibitors, biofilm inhibitors, bacterial virulence inhibitors, enzymes, pre-, proand symbiotics. Moreover, exploring new approaches to animal husbandry management and improving biosecurity and hygiene practices, while encouraging the prudent use of antimicrobials in animals, is essential.<sup>44,45</sup> Certain countries have shown that multimodal strategies including the active surveillance of AMR and antimicrobial usage at farm level, benchmarking and feedback to vets and farmers and educational programmes have drastically lowered antimicrobial usage.<sup>46,47</sup> Positively, in 80% (24/30) of EU/EEA countries a prescription is required for antimicrobial use in animals, and in 57% (17/30) of EU/EEA countries antimicrobials are only used to control or treat infectious diseases, under veterinary supervision. While more progress can be made, limiting the use of antibiotics in the agriculture sector can be challenging due to different regulatory systems, measurement issues and surveillance and monitoring challenges.



#### Figure 6: Progress of EU/EEA countries in optimising antimicrobial use in animal and plant health

**A** - No national policy or legislation regarding the quality and efficacy of antimicrobials and their use in animals, and crops.

**B** - National policy for antimicrobial stewardship and governance developed, that addresses appropriate use, availability and quality of antimicrobials for animal use.

**C** - Legislation and regulations approved on import, marketing authorisation, production, distribution and prudent use of high-quality veterinary medicinal products including antimicrobials, based on international standards.

**D** - Implementation of legislation and regulations on responsible and prudent use of antimicrobials in animals and ensuring safe food supplies. Prescriptions are required for antimicrobial use in animals. Use of antimicrobials for animal growth promotion has been phased out.



**E** - Antimicrobials given to animals are only used to control or treat infectious diseases, under veterinary supervision. Regulations are enforced on access to antimicrobials and their use in animals, crop production, and to otherwise prevent food contamination with antimicrobial residues in compliance with Codex Alimentarius standards.

Source: WHO/OIE/FAO Global Database for Antimicrobial Resistance Country Self-Assessment 24.

# 5. Strengthening Implementation of 'One Health' AMR National Action Plans

The UN Interagency Coordination Group on Antimicrobial Resistance (IACG) recently concluded that currently the greatest challenge in AMR is not designing a national action plan but implementing it.<sup>48</sup> The contrasting cultures, behaviours and incentives of each sector and relevant stakeholders is what makes the successful implementation of AMR national action plans so challenging. To overcome this, a key strategy to strengthening implementation is to improve governance. Little research has been done so far on the topic of governance and AMR national action plans. However, lessons can be learned from health system governance, a commonly used framework dissects health system governance into five dimensions; Transparency, Accountability, Participation, Integrity and Capacity (TAPIC).<sup>49</sup> Many of these principles are relevant when considering governance in the context of national AMR policy. Adapting the framework, five domains of governance can be understood as essential towards strengthening the implementation of AMR national action plans; Leadership, Transparency, Responsibility, Participation and Capacity.

#### Leadership

Strong commitment and political will is an important enabler for successful implementation of AMR national action plans. This should include the strategic vision necessary for oversight and awareness of any gaps or failures which need to be addressed. Effective leadership can also encourage the buy-in and involvement of necessary sectors and stakeholders required and can facilitate the other domains of good governance which follow.

#### Transparency

Transparency regarding the development, participation and progress of AMR national action plans is crucial to good governance and encourages successful implementation. This means that the plan itself, progress reports, surveillance data and funding available should be freely available, ideally in an understandable format to encourage public engagement, improved political awareness and civil society involvement in AMR policy.<sup>50</sup> Most countries now publish annual progress reports of their AMR national action plans, which is an important strategy to increase accountability. However, a positive culture of learning from mistakes and reinforcing effective action should be encouraged.

#### Responsibility

Designing an AMR national action plan with specific, measurable, achievable, relevant and time-bound (SMART) objectives can facilitate clarity about responsibility. A useful application of SMART objectives is the setting of targets at national, sector, organisation or individual level. However, the success of SMART objectives relies upon designating organisations and/or individuals' responsibility for implementation. These may be politicians and ministers at national and sectoral level, healthcare providers or chief executives at organisational level and physicians, veterinarians or farmers at an individual level. Responsibility is also important between countries, as countries have a mutual responsibility to tackle AMR within their own borders to prevent the spread of resistant pathogens internationally.

# Participation

The necessitated 'One Health' approach recommended for AMR national action plans requires the participation of stakeholders across the human, animal and environmental health sectors. This is necessary during design and implementation to avoid initiatives and programmes operating in silos. A recommended approach taken by many countries is to use a national intersectoral coordinating mechanisms (ICM), which offers a forum for relevant ministries and organisation to coordinate their actions. However, participation and coordination is also relevant within sectors, for example in human health across healthcare systems (primary, secondary and long-term care), as well as between public and private providers.<sup>51</sup> Most EU/EEA countries (87%, 26/30) have at least an intersectoral working group, however only 37% (11/30) of countries have progressed to use an integrated 'One Health' approach during implementation of their national action plan. (Figure 7)





A - No formal multi-sectoral governance or coordination mechanism exists.

**B** - Multi-sectoral working group(s) or coordination committee on AMR established with Government leadership. **C** - Multi-sectoral working group(s) is (are) functional, with clear terms of reference; regular meetings, and funding for working group(s). Activities and reporting/ accountability arrangements are defined.

**D** - Joint working on issues including agreement on common objectives, including restriction of use of critically important antimicrobials.

**E** - Integrated approaches used to implement the national AMR action plan.

Source: WHO/OIE/FAO Global Database for Antimicrobial Resistance Country Self-Assessment<sup>24</sup>.



#### Capacity

Many countries struggle to implement AMR national action plans due to a lack of available financial and human resources. For example, the median number of infection prevention and control nurses per 250 hospital beds varies significantly across Europe (Figure 8). However, despite this variation in human and financial resources available, progress is achievable. The Organisation for Economic Co-operation and Development (OECD) recently modelled the cost-effectiveness of six policies including IPC measures and stewardship programmes in human healthcare, and estimated that investing only 2 USD PPP per capita per year in a comprehensive package of all six policies would avoid about 47 000 deaths per year in OECD countries.<sup>52</sup> Some countries may also lack surveillance capacity due to the lack of availability of the necessary infrastructure and technical expertise required. This is a major barrier to successful implementation of AMR national action plans, as surveillance of both AMR and antimicrobial usage is essential to monitor and evaluate implementation of policies contained within any AMR national action plan.

# Figure 8: Median number of infection prevention and control (IPC) nurse full-time equivalent (FTE) per 250 hospital beds (n=1205 acute care hospitals), ECDC PPS 2016–2017



\*Country representativeness of PPS data was poor for Bulgaria and the Netherlands.

\*\* Norway used a national PPs protocol.

Source: ECDC PPS of HAI and antimicrobial use in European acute care hospitals 2016-2017 (preliminary results)

#### 6. Encouraging Solidarity between Countries

Across Europe there is a spectrum of countries with well-developed to less-well-developed national action plans at different stages of implementation. There are also similar countries with well-developed national action plans with large differences in AMR and antimicrobial usage rates. This could reflect different starting points but also could reflect different approaches to governance. More successful countries at tackling AMR benefit from high-level political commitment and leadership, effective coordination between human, animal and environmental health sectors as well as wide stakeholder engagement which increases participation and legitimacy. However, there is still more that can be done to identify the enablers and barriers across countries which affect successful implementation of national action plans.

AMR doesn't respect borders as it can spread through international travel, the export of animals and retail products and the environment.<sup>53</sup> To reduce the global spread of AMR, there is an incentive for countries to work together and more can be done to facilitate partnerships which would encourage solidarity across Europe and beyond. Countries which have been more successful at reducing AMR and antimicrobial usage can mentor other countries by sharing experiences and lessons learned regarding what works and doesn't work and in what context. The EC can play a key role in facilitating these partnerships between countries, in conjunction with global efforts undertaken by WHO, FAO, OIE and others. This can build further on the current efforts of the EC and WHO Regional Office for Europe which work together to support the implementation of national action plans. The WHO/OIE/FAO Global Database for Antimicrobial Resistance Country Self-Assessment is an important first step to identifying countries which face similar challenges that can form partnerships to share experiences, further develop their national action plans and strengthen the successful implementation of AMR policies.



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