MONITORING GLOBAL PROGRESS ON ADDRESSING ANTIMICROBIAL RESISTANCE

Analysis report of the second round of results of AMR country self-assessment survey 2018

Food and Agriculture Organization of the United Nations

WORLD ORGANISATION FOR ANIMAL HEALTH

World Health Organization

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Published by
the Food and Agriculture Organization of the United Nations
and
the World Organisation for Animal Health
and
the World Health Organization

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Monitoring global progress on addressing antimicrobial resistance: analysis report of
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ISBN 978-92-5-130800-4 (FAO)
ISBN 978-92-95108-80-6 (OIE)
ISBN 978-92-4-151442-2 (WHO)

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Acknowledgements

The Food and Agriculture Organization of the United Nations (FAO), the World Oragnisation for Animal Health (OIE) and the World Health Organization (WHO) would like to express its gratitude and appreciation to all countries (Appendix 1) that provided information to the survey activities at the national level in the area of antimicrobial resistance across the human, animal and plant health and environmental sectors.

The contribution of staff in WHO Regional and Country Offices has been invaluable- in gathering original data and information from Member States.

We would like to also thank the support and commitment of the FAO, OIE and WHO staff at the Headquarters.

The Tripartite acknowledges the invaluable contribution of Veronica Walford for her contributions in developing the survey questionnaire and the overall Tripartite monitoring and evaluation approach for AMR.

We also acknowledge the contribution of Steven J. Hoffman, Susan Rogers Van Katwyk and Prativa Baral from the Global Strategy Lab, at York University in Canada, for their analysis of the results, for developing the graphics and tables based on the data collected and for the initial draft of the report. Thanks also to Sue Hobbs who provided layout.

Executive Summary

The global tripartite self-assessment survey of country progress in addressing antimicrobial resistance (AMR) is a component of a broader approach for monitoring and evaluation of the global action plan on AMR. This report analyses the results of the second tripartite self-assessment survey. It has been developed and run by the three Tripartite organizations (Food and Agriculture Organization of the United Nations (FAO), World Organisation for Animal Health (OIE) and World Health Organization (WHO))[1] and reflects progress in the human, animal (terrestrial and aquatic), plant, food safety and environmental sectors. 154 countries out of 194 WHO Member States responded to this round of the self-assessment survey – a response rate of 79.4%.

When they endorsed the 2015 Global Action plan on AMR, all WHO Member States committed to the ambitious target of developing a multisectoral national action plan within two years. By May 2017, 79 countries reported that they had a plan, with a further 50 having a plan under development. While the 2017 target is still unmet, the second Tripartite self-assessment survey shows that progress has been sustained. 93 countries reported that they had a plan, and a further 51 have plans under development. Some of the non-respondents have also made progress, and the Tripartite, through its respective regional offices, is aware of at least seven other countries having national plans, taking the total to 100.

The establishment of a multisectoral group or groups is vital to ensuring coordinated and sustained action to address AMR. In 2017, 20% of countries reported that they had no coordination mechanism at all – this year that number has fallen to 15%. The number of countries with functioning coordination mechanisms almost doubled from 29 to 53, with 79 having a multisectoral group, but not regular focused meetings. The survey results show that a broader membership of multisectoral working groups is associated with substantially more progress across a range of human and non-human indicators.

While the majority of the top 10 chicken-, pork- and cattle-producing countries that responded to the survey (9 out of 10) have at minimum developed a national action plan (Level 3–5; survey questions for all domains were on a scale from A to E (analyzed as 1 to 5)), the survey response shows that in almost all domains – surveillance, education, monitoring and regulating consumption and use – more activity can be seen in the human sector. There is an urgent need for resource prioritization and more action in the animal and food sectors. Only 64 countries (41.6%) have limited the use of critically important antimicrobials (human and animal) for growth promotion in agriculture.

Substantial data is also missing from the environment and plant sectors. This is an emerging area of concern, and the issues and agenda for action are less clear. These sectors are often not represented in the multisectoral working group in many countries.

For the human sector, 105 countries report that they have a surveillance system in place and 68 have a system for tracking consumption of antimicrobials at national level. Whilst this is encouraging, only 61 countries have enrolled in the Global Antimicrobial Surveillance System (GLASS) with only a proportion of these submitting data to GLASS on resistance, or consumption data to WHO.

Much more progress around animal, plant and environmental surveillance is required, although steady progress is being achieved on antimicrobial use data intended for use in animals. Research and policy efforts to tackle AMR may be compromised without these data from both human and non-human sectors. Both axes of monitoring are needed to better understand and inform AMR interventions and policies.

[1] The Tripartite refers to an official collaboration between the three organizations under the Memorandum of Understanding found here http://www.who.int/foodsafety/areas_work/zoonose/concept-note/en/.

From the point of view of medicines safety, almost one-fifth of countries (18.2%) have no national policy or legislation regarding the quality, safety and efficacy of antimicrobial products, and their distribution, sale or use. Another 28 countries (18.2%) were unable to report whether they had these policies in place or not. Countries were not asked to report on the efficacy of regulation.

Progress with developing and implementing plans is greater in high-income than low-income countries but all countries have scope for improvement. No country is reporting established sustained capacity at scale in all domains, and only three countries are reporting level 3 or above in all domains (i.e. substantive action at scale). This survey does, however, show that there is action at scale on a wide range of domains in most countries. 103 countries reported that they were at level 3 or above in four or more questions, spanning more than one sector. Across all domains and sectors, there is less progress in low-income countries. Most countries now have national action plans but may require long-term development assistance to implement them at scale, together with measures to ensure long- term sustainability of these investments at national level.

As this is a self-assessment survey, it is possible that some countries reported progress in a very positive light. However, where joint external evaluations (JEE) have been held, scores have been compared and are broadly consistent with what has been reported in this survey. All countries' responses will be published in an open access database, offering scope for in-country review with civil society and other stakeholders.

Introduction

Antimicrobial resistance (AMR) is a grave threat to human health and economic development *[1]*. The overuse and misuse of antimicrobials in humans, animals and plants have accelerated the natural evolutionary processes by which microbes become resistant to antimicrobial treatments. Today, some infections have even been rendered untreatable by existing antimicrobials. Projections suggest that AMR is likely to exacerbate global economic inequality, with the economic costs disproportionately affecting poorer countries. On the animal side, the World Bank has projected significant decreases in international trade due to AMR as a result of decreases in the trade of livestock and livestock products; while on the human side, AMR could derail the Sustainable Development Goals, driving an estimated 24 million people into extreme poverty *[2]* and potentially resulting in tens of millions of deaths *[1]*.

Antimicrobial effectiveness is a global public good and must be protected by public authorities. Yet, two of the biggest risks to containing AMR are: 1) that support to AMR policies may not be sustained over decades, and 2) that historic divisions between human health and other sectors will hinder efforts to contain resistance *[2]*. Long-term commitments are needed in monitoring, surveillance, stewardship, and training to bring about substantial change in patterns of antimicrobial use *[3]* and in how waste and effluents are managed. A One Health approach – incorporating humans, animals, plants and the broader environment – is needed to ensure sufficient action *[4]*. Given the need to coordinate action among these sectors, government engagement in the problem is imperative. The necessary changes to global antimicrobial use exceed what can be achieved using individually targeted behaviour change strategies.

Countries are at different stages in responding to the growing threat posed by AMR. Some countries, including many European countries, have experience with AMR policies in human and animal sectors for more than two decades. Others have only recently acted to contain AMR. In the interest of engaging all countries, the World Health Organization (WHO), supported by the World Organisation for Animal Health (OIE) and the Food and Agriculture Organization of the United Nations (FAO), developed a Global Action Plan on AMR (GAP) in 2015 as a cross-sectoral approach to combatting AMR *[5]*. All countries approved the GAP and agreed to develop and implement national action plans on AMR by 2017. The importance of AMR was reaffirmed in 2016 at the United Nations (UN) General Assembly, where Heads of State committed their countries to work together to address AMR and implement the GAP *[6]*. The UN General Assembly also called upon WHO, FAO, OIE, regional and multilateral development banks, UN agencies, and civil society to support the development and implementation of national action plans and AMR activities at the national, regional, and global levels *[6]*. This has been done through the development of One Health tools and training materials *[21]*.

The World Health Assembly has also called on the WHO, FAO, OIE and other relevant partners to develop a framework for monitoring and evaluation to assist with the achievement of GAP Principle #5 *[7]*. As part of their response, WHO, OIE and FAO created a national self-assessment survey containing questions structured around the objectives of the GAP. The first wave of this survey was sent to WHO's 194 member countries in late 2016. Findings were reported to the World Health Assembly and the OIE World Assembly of Delegates in May 2017. The survey instrument was subsequently revised and a second wave was initiated in late 2017. Non-human health sectors (animal health, plant health, food production, food safety and the environment) were separated in the survey questions, some questions were made more specific, and the bar was raised on some indicators. As such, only a limited number of questions can be compared between 2016 and 2017. Countries were asked to submit a single official response, validated by all involved sectors, summarizing their national progress. Both surveys are available, in the database of results at http://www.who.int/antimicrobial-resistance/global-action-plan/database/en/.

In this report, we analyse countries' responses to the second wave of the tripartite survey and describe the current level of global progress (based on self-assessment) on AMR. We convey progress achieved towards the goals of the GAP across WHO regions and across country income groups to identify differences in progress. We also stratify by G20 status, including all European Union countries *[8]*. Where possible, we have compared responses from the 2016

to those from the 2017 survey. Finally, we explore progress in relation to key food-producing countries to examine whether the presence of a strong agricultural sector impacts progress made towards One Health goals at the national level. It is also important to note that although the survey did allow countries to report separately on animal health, plant health, food safety, food production and the environment for some questions, many countries chose just to report on the non-human sectors collectively. For this reason, in some cases comparison is made between the human health sector and the non-human health sectors collectively.

Survey participation

154 out of 194 WHO Member Countries represented (91.3% of the world's population)

154 countries responded to this second wave of the tripartite national self-assessment survey, covering 79.4% of WHO Member Countries and representing 91.3% of the world's population (WHO Member Countries and regions in Appendix 1). Coverage of countries within regions ranged from 61.7% of WHO's African Region (AFR) to 100% of WHO's South-East Asian Region (SEAR) (Table 1). Responses from these 154 countries also represent 95.9% of global GDP. The response rate for this second wave of the survey in 2017 was slightly higher than the first wave of the survey in 2016, when 151 countries responded. A detailed methodology for this analysis is presented in Appendix 2. The response rates for each survey question varied as some countries were able to provide data from more sectors than others; no-response was treated as its own category throughout the analysis, and non-response rates for each question are available in Appendix 3.

Table 1. Characteristics of Countries Participating in the Second Wave of the National Self-Assessment Survey, 2017

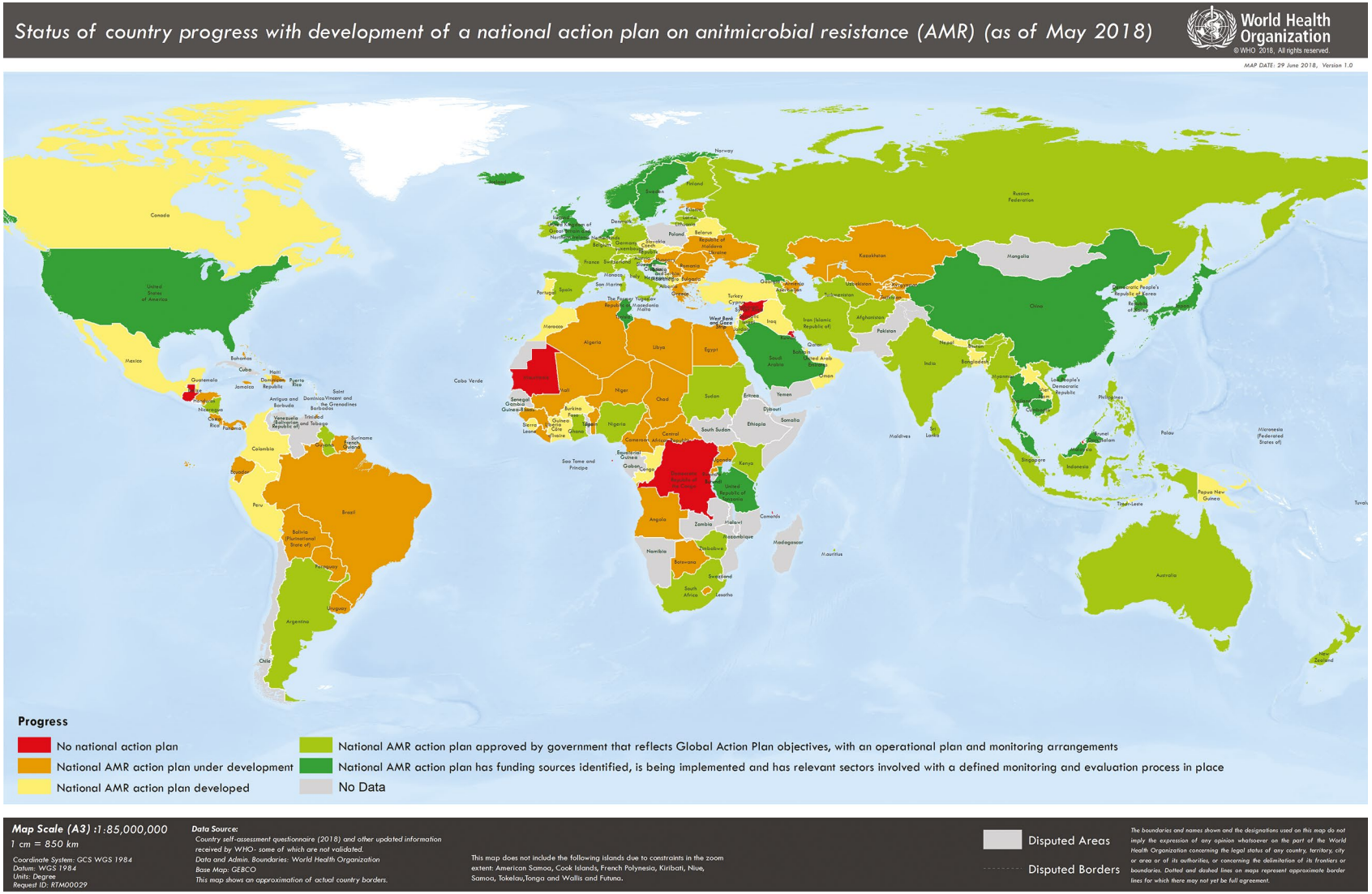
	Survey Respondents, n (%)	WHO member state representation (%)[1]
Countries	154	79.4%
WHO Region		
African Region (AFR)	29 (18.8%)	61.7%
Americas Region (AMER)	28 (18.2%)	80.0%
Eastern Mediterranean Region (EMR)	17 (11.0%)	81.0%
European Region (EUR)	50 (32.5%)	95%
South-East Asian Region (SEAR)	11 (7.1%)	100%
Western Pacific Region (WPR)	19 (12.3%)	70.4%
G20[2]		
G20 country	(26.6%)	—
Not G20 country	113 (73.4%)	—
Income Groups[3]		
High-income (HIC)	50 (32.5%)	64.9%
Upper-middle-income (UMIC)	44 (28.6%)	78.6%
Lower-middle-income (LMIC)	40 (26.0%)	75.5%
Lower income (LIC)	19 (12.3%)	61.3%

[1] Total number of WHO member states is 194. Total number of WHO member states regionally include: 47 in AFR, 35 in AMER, 21 in EMR, 53 in EUR, 11 in SEAR and 27 in WPR, as per **http://www.who.int/choice/demography/by_country/en/**. Total number of WHO member states per WB income group include: 77 in HIC, 56 in UMIC, 53 in LMIC and 31 in LIC, as per **https://data.worldbank.org/country**.

[2] Participating individual EU member states are included in the G20 grouping.

[3] No income group listed for Cook Islands.

Figure 1.


Status of country progress with development of a national action plan on anitmicrobial resistance (AMR) (as of May 2018)
World Health Organization
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MAP DATE: 29 June 2018, Version 1.0
Progress
No national action plan
National AMR action plan under development
National AMR action plan developed
National AMR action plan approved by government that reflects Global Action Plan objectives, with an operational plan and monitoring arrangements
National AMR action plan has funding sources identified, is being implemented and has relevant sectors involved with a defined monitoring and evaluation process in place
No Data
Map Scale (A3) :1:85,000,000
1 cm = 850 km
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
Request ID: RTM00029
Data Source:
Country self-assessment questionnaire (2018) and other updated information received by WHO- some of which are not validated.
Data and Admin. Boundaries: World Health Organization
Base Map: GEBCO
This map shows an approximation of actual country borders.
This map does not include the following islands due to constraints in the zoom extent: American Samoa, Cook Islands, French Polynesia, Kiribati, Niue, Samoa, Tokelau,Tonga and Wallis and Futuna.
Disputed Areas
Disputed Borders
The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

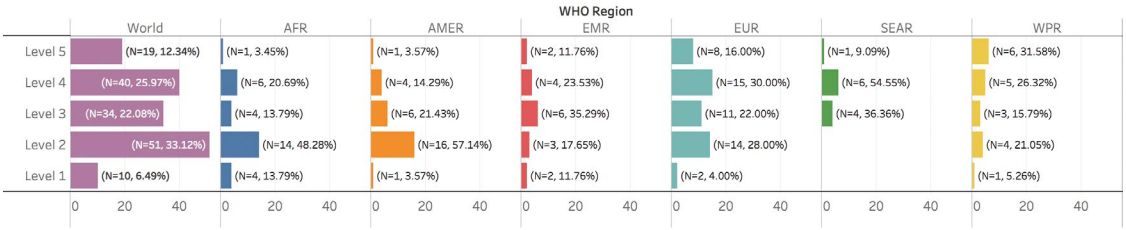
Development of national action plans

60% of countries have a multisectoral national action plan and 33% have a plan in development

Plans are becoming more robust with more countries putting in place monitoring and financing arrangements

Progress is being made in all regions of the world on the development of national action plans (Figure 1 and 2). To date, 93 countries (60.4%) have developed a national action plan on AMR. Among the 61 (39.6%) countries that have not yet developed a national action plan, 51 (33.1%) have a plan currently in development and 10 (6.5%) report having made no progress towards developing a national action plan. The ten respondent countries that have not yet taken any action to develop national action plans are predominantly a mix of small island states and fragile states across all regions (Figure 2); 4 are high-income countries, 4 are lower-middle income countries, and 2 are low-income countries. 59 countries (38.3%) have progressed to implementing their national action plans (Level 4–5); 40 (26.0%) of those countries have obtained government approval for the plan and created monitoring arrangements (i.e. "Level 4"), while 19 (12.3%) of those countries have funding identified and all relevant sectors engaged (i.e. "Level 5"). Many countries in EUR (n=23, 46.0%), SEAR (n=7, 63.6%) and WPR (n=11, 57.9%) are currently at Levels 4 and 5.

Figure 2. Global and regional progress in the development of national action plans.



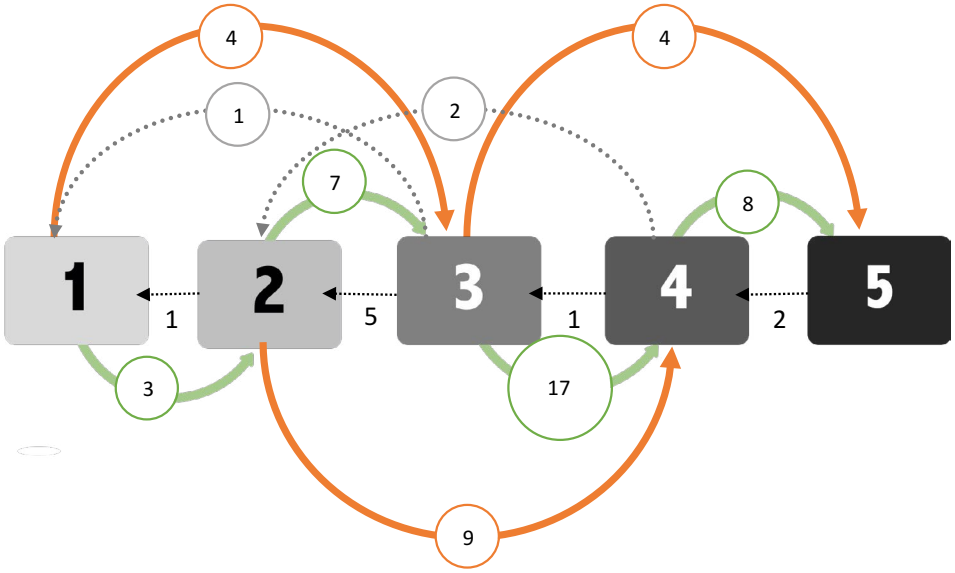
Level 5: National AMR action plan has funding sources identified, is being implemented and has relevant sectors involved with a defined monitoring and evaluation process in place.
Level 4: National AMR action plan approved by government that reflects Global Action Plan objectives, with an operational plan and monitoring arrangements.
Level 3: National AMR action plan developed.
Level 2: National AMR action plan under development.
Level 1: No national AMR action plan.

G20 members, who agreed in 2017 to lead by example in developing and implementing national action plans by the end of 2018 *[8]*, are collectively further ahead than non-G20 countries. Slightly more than 50% (n=26) of G20 countries are at Levels 4 and 5, and another 19.5% (n=8) have developed national action plans but not yet developed implementation plans or monitoring arrangements (Level 3). This contrasts with non-G20 countries, where 28.9% (n=33) of countries are at Levels 4 and 5, and 23.0% (n=26) are at Level 3.

Countries have clearly made substantial progress on developing and implementing national action plans since the first wave of the survey in 2016 (Figure 3). Of the 57 countries that reported being at Level 1 or 2 in 2016, 23 had progressed to Level 3 or higher by the 2017 survey. While 11 of these countries were high-income countries in Europe, 3 were lower-middle-income countries and 5 were low-income countries. At least 1 country in each WHO region finalized a national action plan. Many countries strengthened their management of AMR. Of the 46 countries that reported being at Level 3 in 2016 (having a plan), 17 of those countries had advanced to Level 4 by 2017 (implementation and monitoring arrangements) and 4 of those countries had advanced to Level 5 (funding for key activities). This means that there are now 19 countries with national action plans that are funded and being implemented with defined

monitoring and evaluation arrangements. Twelve countries re-evaluated their progress and scored themselves at a lower level than they had in 2016.

Figure 3. Country progress on the development of national action plans from 2016 to 2017. Forward arrows (unbroken arcs) indicate the number of countries that moved from a lower level to a higher level between 2016 and 2017. Backward arrows (dotted arcs) indicate the number of countries that lowered the reported level of their response between 2016 and 2017.



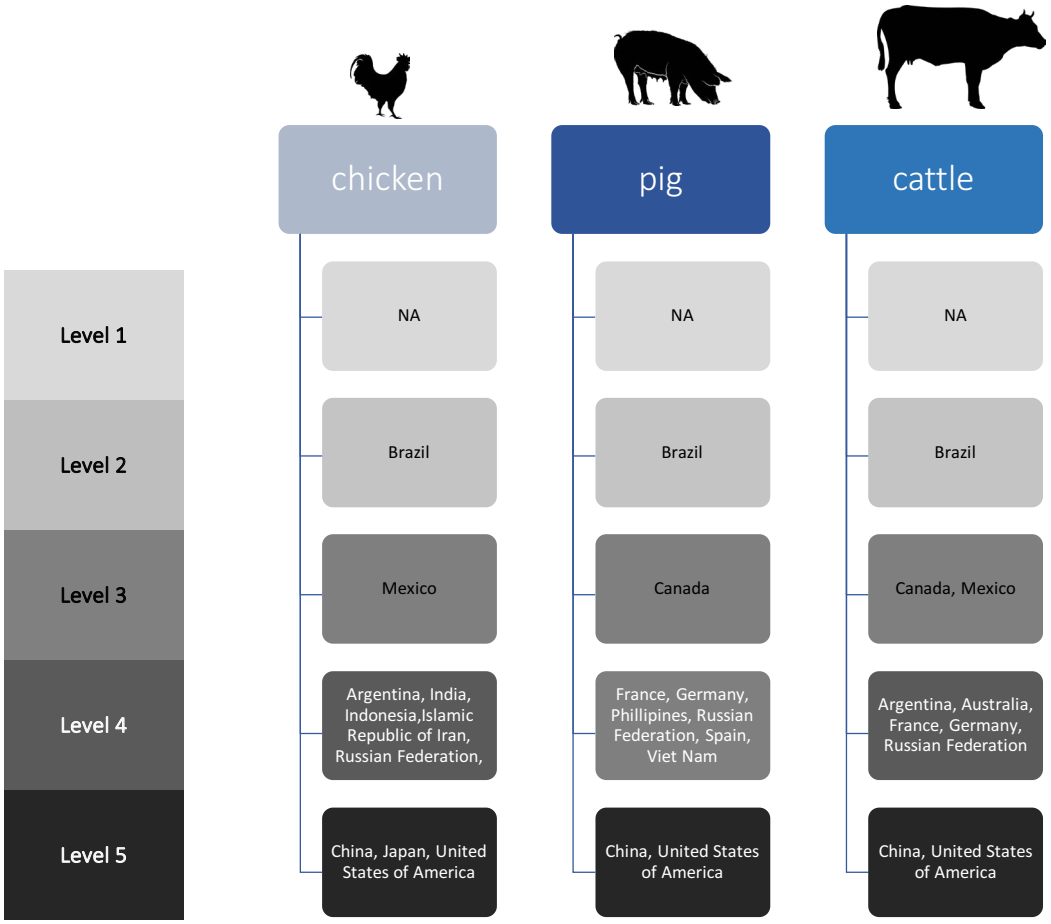
Level 1	Level 2	Level 3	Level 4	Level 5
No national AMR action plan.	*National AMR action plan under development*	*National AMR action plan developed.*	*National AMR action plan approved by government that reflects Global Action Plan objectives, with an operational plan and monitoring arrangements.*	*National AMR action plan has funding sources identified, is being implemented and has relevant sectors involved with a defined monitoring and evaluation process in place.*

Progress towards the development of national action plans appears high in those countries with large agricultural sectors (Figure 4). Among the top ten chicken-, pork- and cattle-producing countries that responded to the AMR survey,[2] 9 out of 10 have at minimum developed a national action plan (Level 3–5).

As might be expected, there is also a strong relationship between quantitative measures of governance and having a national action plan in place (Level 3–5). Countries demonstrating strong government effectiveness and performance – defined by the World Bank Development Research Group *[9]* as a positive perception of the quality of public and civil services, of policy formulation and implementation, and the government's commitment to such policies – show four times the odds of having a national action plan (OR = 4.2, p <0.0001) after adjusting for country income group status.

[2] : FAOStat **production** Data 2016 for **meat** (Chickens, Cattle and Pig); countries listed are top 10 among countries that responded to the tripartite AMR survey, and may not be the top 10 countries globally.

Figure 4. National action plan progress among the top 10 meat-producing countries (Chicken-Pig-Cattle) that responded to the survey.



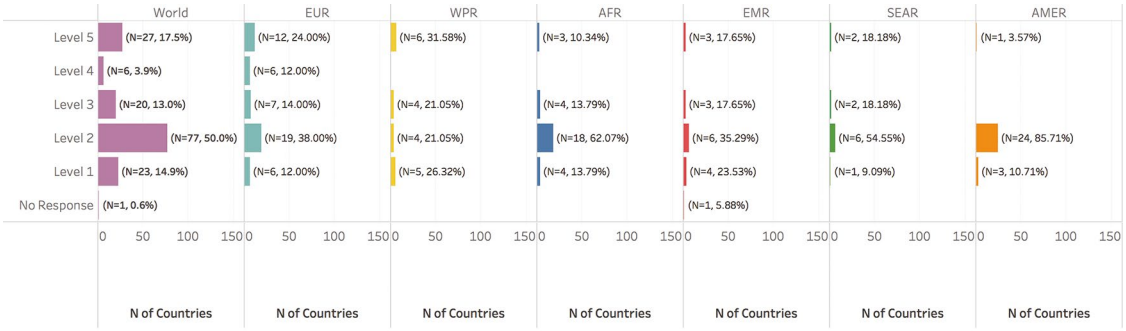
Multisectoral approaches to addressing AMR

Broad cross-sector engagement in the coordination group is associated with greater progress in implementation across all sectors.

50% of responding countries have a multisectoral AMR working group.

The establishment of a multisectoral working group was identified in the GAP as an important facilitator of a One Health approach to addressing AMR *[5]*. Thus far, there has been less progress on this indicator than on development of national action plans (Figure 5). Specifically, half of responding countries (n=77) have established a multisectoral AMR working group but those groups are not yet functioning (Level 2). When added to the 14.9% (N=23) of countries that have not yet established a working group (Level 1), it is clear that substantial progress is still needed to achieve this goal. Despite limited action in many countries, the number of countries with functioning (Level 3+) multisectoral working groups has nearly doubled since 2016, from 29 to 53 countries in 2017.

Figure 5. Global and regional progress in the establishment of multisectoral AMR working groups.



Level 5: Integrated approaches used to implement the national AMR action plan.
Level 4: Joint working on issues including agreement on common objectives, including restriction of use of critically important antimicrobials.
Level 3: 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.
Level 2: Multi-sectoral working group(s) or coordination committee on AMR established with Government leadership.
Level 1: No formal multi-sectoral governance or coordination mechanism exists.

Where working groups have been established, they typically include representatives from human health (n=147; 95.5%), animal health (n=141; 91.6%), and food safety (n=109; 70.8%). Representatives from other sectors including food production (n=90; 58.4%), environment (n=75; 48.7%), and plant health (n=62; 40.3%) are less frequently included. Table 2 shows the average number of participating sectors for working groups in each region. Countries with large working groups (defined as including at least 4 sectors) appear to have made more progress towards several GAP objectives than those countries with smaller multisectoral working groups (defined as including 3 or fewer sectors). This finding may reflect the strength of national interest in AMR and pressure to deliver on national action plan goals, leading to better performance; or it may reflect a recognition that investment and action across all sectors is necessary to achieve progress in any one sector. Interestingly, there is no correlation (p=0.99) between the size of the agricultural sector as a percentage of GDP and the size of countries' multisectoral working groups.

In terms of GAP objective 1, countries are more likely to have tailored AMR training courses (Level 3–5) if they have a large multisectoral working group (OR=2.6, p=0.01), and they are more likely to have AMR training and professional education available (Level 3–5) in the veterinary sector (OR=2.6, p=0.01). Notably, there is no significant

difference between these countries on the human AMR-awareness indicators. For GAP objective 2, countries with large multisectoral working groups have more than twice the odds (OR=2.4, p=0.01) of having a national monitoring system for antimicrobial consumption in the human health sector, although no such relationship exists for monitoring of antimicrobial use in other sectors. They are, however, more likely to score highly on the indicators related to GAP objective 3, having an infection prevention and control programme in human health (OR=2.2, p=0.03), as well as good health, management and hygiene practices to reduce the use of antimicrobials in animal and plant production and AMR transmission in food production (OR= 6.8, p<0.001). Countries with a large multisectoral working group are also more likely to have a national action plan in place (Level 3–5) (OR=2.2, p=0.02).

Table 2. Average number of participating sectors in multisectoral AMR working groups.

	Average N (SD)
Global, *N*	
Global, 154	4.05 (1.7)
WHO Region, *n*	
AMER, 28	4.32 (1.7)
AFR, 29	4.66 (1.5)
EUR, 50	3.94 (1.5)
EMR, 17	3.00 (1.7)
SEAR, 11	3.45 (1.9)
WPR, 19	4.32 (1.8)
G20, *n*	
G20 country, 41	4.46 (1.4)
Not G20 country, 113	3.90 (1.8)
Income Groupings, *n*	
HIC, 50	4.16 (1.7)
UMIC, 44	4.27 (1.4)
LMIC, 40	3.65 (1.8)
LIC, 19	3.65 (1.8)

Improving awareness and understanding of AMR (Global Action Plan Objective 1)

125 countries have some awareness raising activities about the risks of AMR in human health, but only 36 have campaigns in the animal sector.

10% more countries report incorporation of AMR into health worker education; In the animal sector 43% countries report no training for key stakeholders.

Raising awareness about AMR is a major goal of global guidance on AMR and, for human health in particular, is one of the strongest areas where there has been national action on AMR. Awareness-raising has been the area of implementation where many countries have started. Most countries have made at least some progress toward raising awareness in human health; across regions, between 40%-55% of countries have limited or small-scale AMR awareness campaigns targeting some (but not all) relevant stakeholders (Level 3); and 125 countries (81.2%) globally have achieved Level 3 or higher. There is evidently still room for progress, as most countries have not yet launched nationwide, government supported campaigns on AMR awareness in human health (Level 4), nor have they implemented strategies to change behaviour regarding AMR in target groups in human health (Level 5). Among countries with a developed national action plan (Level 3–5), the odds of having a nationwide (Level 4–5) awareness campaign in the human sector are 4.9 times higher ($p<0.0001$). Income also appears to have a significant impact on progress in awareness-raising; a much greater proportion of G20 countries are at Level 4 and 5 than non-G20 countries, and, where only 8% (n=4) of high-income countries are below Level 3, approximately 20% of countries in all other income groups are currently below Level 3.

Another area for improvement is awareness-raising in animal health and other non-human sectors, where 23.4% of countries (n=36) have conducted limited or small-scale AMR awareness campaigns (Level 3) and 15.6% (n=24) of countries have made no progress towards awareness-raising activities on relevant aspects of risks of AMR (Level 1). Progress on this indicator contrasts sharply with progress in the human health sector; only 70 countries have achieved Level 3 or higher on awareness-raising in non-human sectors, meaning that nearly twice as much activity is underway in human awareness-raising than in other sectors. Additionally, 19 respondent countries (12.3%) were unable to provide a response for this indicator, likely suggesting that they have also made limited progress on this indicator. Table 3 shows non-human sector progress on awareness-raising. Progress in these sectors is also highly linked to having a developed national action plan (Level 3–5). The odds of having a nationwide (Level 4–5) awareness campaign in the non-human sector are 10.1 times higher among countries with a national action plan ($p<0.001$). The bulk of activity underway in these sectors is within the animal sector, and to a lesser extent in food safety. Across regions and income groups, a large number of countries have made no progress (Level 1) on awareness-raising in plant health, food production, and the environment sectors. In the animal sector, AFR and AMER countries have greater room for improvement than the other regions in awareness-raising efforts; 31.0% (n=9) of AFR countries and 25.0% (n=7) of AMER countries have not made any progress on these objectives (Figure 6).

Most countries have some level of training on AMR available in the human health sector, though 22.7% (n=35) have only ad hoc training available. AMR is covered in some pre-service and in-service training in 39.0% (n=60) of countries, while 16.2% (n=25) of countries have AMR covered in pre-service training for all relevant health professional cadres, and available as continuing professional development to all human health workers nationwide (Level 4). There has been some improvement in this indicator since 2016, as 63% of countries reported having training at Level 3 or higher in 2017, compared to 53% in 2016.

Training on AMR in the veterinary sector is less common, particularly among non-G20 countries. Globally, 30.5% (n=47) of countries have no AMR training for veterinary professionals, while only a single G20 country reported no training. Slightly more than 40% of G20 countries are at Level 4 or 5 on AMR training for veterinary professionals, compared to only 9.7% (n=14) of non-G20 countries. EUR is the only WHO region where more than half of countries have AMR training for veterinary services (64.0%, n=32 at Level 3 or higher). Similarly, activity is limited in veterinary strengthening in all regions except EUR. Fewer than 20% of countries in all regions except EUR have progressed past the point of implementing a plan to strengthen capacity gaps in veterinary services responding to AMR.

Training on AMR in the plant health, food production, food safety and environment sectors was also low; 67 countries (43.5%) have had no training on AMR for key stakeholders (Level 1), and only 26 countries (16.9%) have achieved Level 3 or higher. Interestingly, there is no significant relationship between the size of the chicken, pork, or cattle industries and AMR training in the non-health sectors. As might be expected, G20 countries and high-income countries are further along than non-G20 and lower income countries; however, no group or region had more than a third of countries at Level 3 or higher.

Figure 6. Progress on raising awareness and understanding of AMR risks and response in animal health, plant health, food production, food safety, and environment sector

Raising awareness and understanding of antibiotic resistance risks and response in human health

Level 5: Focused, national scale government-supported activities implemented to change behaviour regarding antibiotic resistance in target groups in human health, both public and private sectors, with monitoring undertaken of their awareness and behaviour change over last 5 years.

Level 4: Nationwide, government-supported antibiotic awareness campaign targeting all or the majority of stakeholders.

Level 3: Limited or small-scale antibiotic resistance awareness campaign targeting some, but not all, relevant stakeholders (e.g. general public, doctors, pharmacists, nurses, medicine sellers).

Level 2: Some activities in parts of the country to raise awareness about risks of antibiotic resistance and actions that can be taken to address it.

Level 1: No significant awareness-raising activities on antibiotic resistance.

Raising awareness and understanding of AMR risks and response in animal health, plant health, food production, food safety, and environment sectors

Level 5: Focused, national scale government supported activities implemented to change behavior of relevant stakeholders.

Level 4: Nationwide, government-supported antimicrobial resistance awareness campaign targeting all or the majority of relevant stakeholders within sector.

Level 3: Limited or small-scale antimicrobial resistance awareness campaign targeting some but not all relevant stakeholders within sector.

Level 2: Some activities in parts of the country to raise awareness about risks of antimicrobial resistance and actions that can be taken to address it.

Level 1: No significant awareness-raising activities on relevant aspects of risks of antimicrobial resistance.

Strengthening the knowledge and evidence base through surveillance and research (Global Action Plan Objective 2)

103 countries report that they have a national surveillance system in humans.

67 countries collect at least some data in animals, but only 41 have systematic data collection.

Few countries have surveillance of AMR underway in plants or the environment.

Figure 7 shows global progress on the development of antimicrobial consumption monitoring systems and AMR surveillance systems across sectors. It is important to note that the mid-point (Level 3) on the human and non-human scales differ. For AMR surveillance in the human sector, Level 3 indicates that countries have national AMR surveillance activities in place for common bacterial pathogens that link patient information with susceptibility testing, with a national reference laboratory that participates in external quality assurance; in the non-human sector, Level 3 indicates that some AMR data is collected locally but may not be collected using standardized approaches and lacks national coordination and/or quality management. On the non-human side, the animal sector is the furthest along; 67 countries (43.5%) are at Level 3 or higher, followed by the food sector with 60 countries (38.9%) at Level 3 or higher. This contrasts sharply with the human sector, where most countries have established an AMR surveillance system for common bacterial pathogens in humans; more than two-thirds of responding countries (n=105, 68.2%) have achieved Level 3 or higher. In the environment and plant sectors, most countries have no system in place for surveillance (n=60 and n=70, respectively), and many countries were unable to provide responses to the question (n=59 and n=60, respectively). There is significant variation between regions, with almost 90% of countries in AMER and EUR reporting a national surveillance system for resistance in humans, but only 30% in AFR. This is associated with income level: 42% of low-income countries either reported no system, or did not respond.

In terms of monitoring antimicrobial consumption, we estimate that 3.5 billion people, or 46.4% of the global population, live in countries that have a monitoring system for human antimicrobial consumption where, at minimum, total sales of antimicrobials are monitored at the national level and/or there is monitoring of antibiotic use at the sub-national level (Level 3 or higher). These monitoring systems are key to enabling the study of AMR interventions and to detecting trends in the consumption of antimicrobials overall, yet 29.2% (n=45) of countries have not put any system in place for monitoring antimicrobial use in humans. EUR and WPR are the only regions where most countries report having achieved Level 3 or higher on this indicator; in the other four WHO regions, more than half of countries are below Level 3 (i.e., SEAR 90.9%, AFR 79.3%, EMR 64.7%, AMER 57.1%). There is a clear gradient among income groups on monitoring of antimicrobial consumption; 70.0% of high-income countries, 54.6% of upper-middle-income countries, 15.0% of lower-middle-income countries, and 10.5% of low-income countries report having achieved a Level 3 or better. A similar gradient exists for monitoring the consumption of antimicrobials in the animal health sector; 68.0% of high-income countries, 34.1% of upper-middle-income countries, 25.0% of lower-middle-income countries, and 15.8% of low-income countries report having achieved a Level 3 or better. Systems for monitoring the use of antimicrobials in the plant sector exist only in 11 high-income countries (22%) and 3 upper-middle-income countries (6.8%). In parallel, over 140 countries responded to the OIE's second phase of data collection on antimicrobial agents intended for use in animals, with 107 providing quantitative data on amounts *[20]*.

For human health, although many countries report that they have national systems for monitoring resistance patterns and consumption and use, a smaller proportion are actually enrolled in GLASS, or reporting data to WHO. Substantially more are reporting data on consumption in the animal sector to OIE.

Figure 7. Global status: development of monitoring systems for antimicrobial use and surveillance systems for antimicrobial resistance in human and non-human sectors by number of countries.

Response Definitions:
National monitoring system for consumption and rational use of antimicrobials in human health.
Level 5 - On a regular basis (every year/two years) data is collected and reported on:
a) Antimicrobial sales or consumption at national level for human use; and
b) Antibiotic prescribing and appropriate/rational use, in a representative sample of health facilities, public and private.
Level 4 - Prescribing practices and quality of antibiotic use are monitored in a national sample of healthcare settings.
Level 3- Total sales of antimicrobials are monitored at national level and/or some monitoring of antibiotic use at sub-national level.
Level 2 - System designed for surveillance of antimicrobial use, that includes monitoring national level sales or consumption of antibiotics in health services.
Level 1- No national plan or system for monitoring use of antimicrobials.

National monitoring system for antimicrobials intended to be used in animals (sales/use).
Level 5- Data on antimicrobials used under veterinary supervision in animals are available at farm level, for individual animal species.
Level 4 - On a regular basis, data is collected and reported to the OIE on the total quantity of antimicrobials sold for/used in animals nationally, by antimicrobial class, by species (aquatic or terrestrial), method of administration, and by type of use (therapeutic or growth promotion).
Level 3 - Data collected and reported on total quantity of AMs sold for/used in animals and their intended type of use (therapeutic or growth promotion).
Level 2- Plan agreed for monitoring quantities of antimicrobials sold for/used in animals, based on OIE standards.
Level 1- No national plan or system for monitoring sales/use of antimicrobials in animals.

National monitoring system for antimicrobial use in plant production.
Level 5 - On a regular basis, data is collected and reported on total quantity of AM use in crop production, by AM class.
Level 4 - Data collected and reported on total quantity of AM used nationally in plant production.
Level 3- Data collected and reported on quantity of AM used in some subsectors of plant production.
Level 2- Plan agreed for monitoring quantities of antimicrobial sales or use in plant production.
Level 1- No national plan or system for monitoring use of antimicrobials in plants.

Response Definitions:
National surveillance system for antimicrobial resistance in humans.
Level 5 - The national AMR surveillance system integrates surveillance of AMR across sectors, and generates regular reports.
Level 4 - There is a functioning national AMR surveillance system covering antibiotics in hospitals and outpatient clinics, with external quality assurance, and a national coordinating centre producing reports on resistance levels.
Level 3 - National AMR surveillance activities are in place for common bacterial pathogens that link patient information with susceptibility testing, with a national reference laboratory that participates in external quality assurance.
Level 2 - AMR data is collated locally for common bacteria, but may not use a standardised approach and lacks national coordination and/or quality management.
Level 1- No capacity for generating data and reporing on antibiotic resistance (antibiotic susceptibility testing and accompanying clinical and epidemiological data collection).

National surveillance system for antimicrobial resistance in animals, plans, food, and environment.
Level 5 - National system of surveillance of AMR established for priority pathogens and for relevant commensal bacteria which follows quality assurance processes in line with intergovernmental standards. Laboratories that report for AMR surveillance follow quality assurance processes.
Level 4 - Priority pathogentic/commensal bacterial species have been identified for surveillance. Data systematically collected and reported on levels of resistance in at least 2 of those bacterial species, involving a laboratory that follows quality management processes, e.g. proficiency testing.
Level 3 - Some AMR data is collected locally but may not use a standardised approach and lacks national coordination and.or quality management.
Level 2 - National plan for monitoring AMR but capacity (including laboratory) for surveillance and reporting data on AMR is lacking.
Level 1 - No national plan for a system of monitoring AMR is available.

Reducing the incidence of infection through effective sanitation, hygiene and infection prevention measures (Global Action Plan Objective 3)

90 Countries report that they have a national infection prevention and control programme and national guidelines available.

48 Countries have a national plan for good production practices in the animal health sector.

Lack of basic water, sanitation and hand washing in health facilities is a major issue in Africa, and some countries in SEAR and EMR.

Preventing infection, such that antimicrobials are not needed, is a central pillar of the GAP. Substantial progress in addressing AMR is expected through measures such as immunization, infection prevention and control (IPC) procedures and, enhanced biosecurity in healthcare facilities, and on farms, and environmental sanitation in the community.

More than half of countries report having taken action to reduce the incidence of infection through sanitation, hygiene and infection prevention measures. 58.4% (n=90) of countries have achieved a Level 3 or higher on the IPC indicator in human health (i.e. a national IPC programme or operational plan are available and national guidelines for IPC in healthcare are available and disseminated) and 14.9% (n=23) globally have reached Level 5 where compliance and effectiveness are evaluated and published. There is a relationship between progress on this indicator and government healthcare spending; for every 1% increase in government healthcare spending as a percentage of GDP, the odds of a country having a functioning IPC programme are 1.3 times higher (p=0.003).

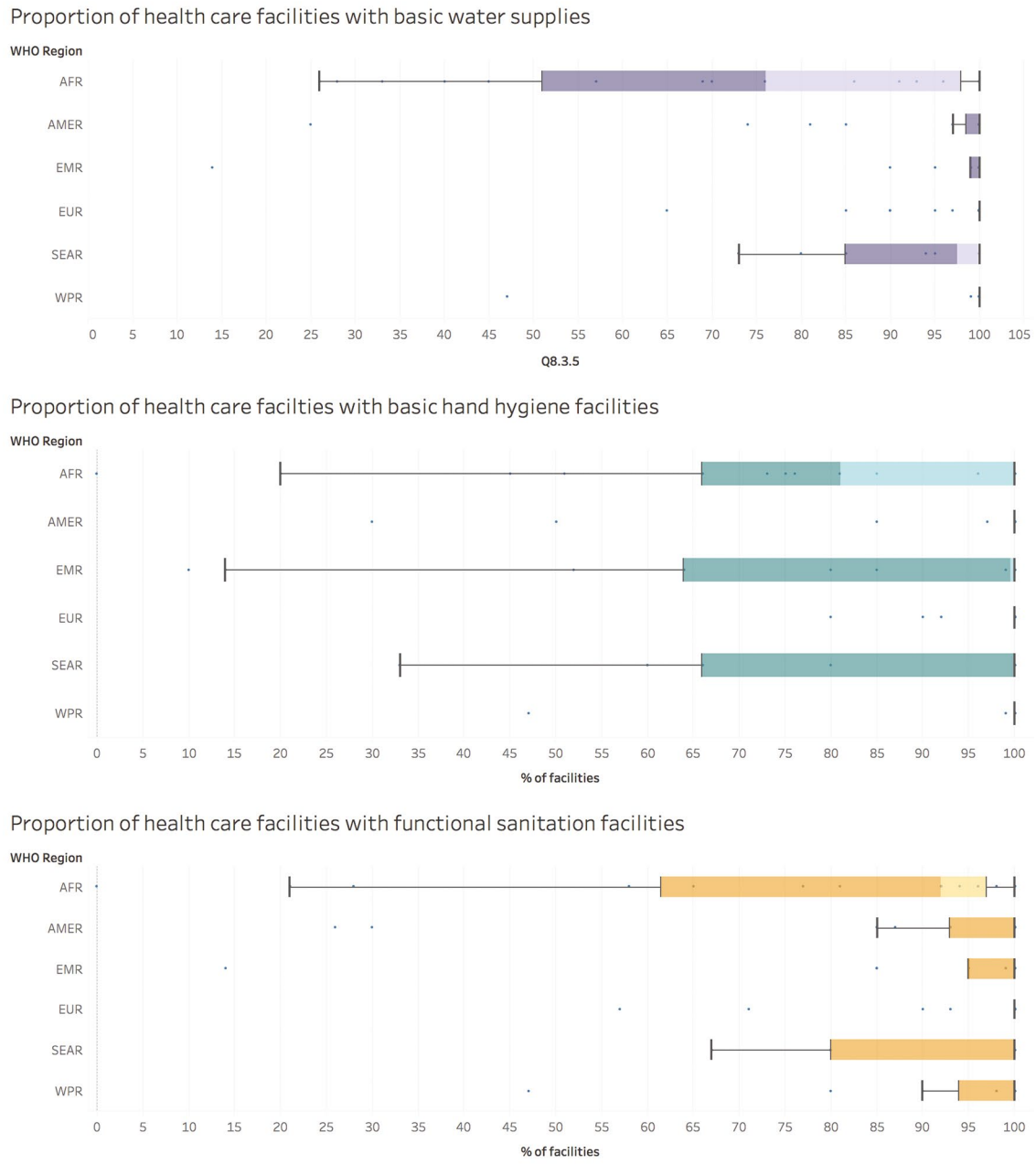
In non-human sectors, the animal and food sectors showed the most activity; 31.2% (n=48) of countries had a national plan for the animal sector, 26.6% (n=41) countries had a national plan for the food production sector, and 24.7% (n=38) of countries had a national plan for the food safety sector, whereas 11.0% and 7.8% of countries had a national plan for the plant and environment sectors, respectively.

Vaccination coverage in many countries is still low. The average pneumococcus vaccine immunization rate was 87.4% for high-income countries, 65.2% for upper-middle-income countries, 70.8% for lower-middle-income countries and 70.8% for low-income countries. Across WHO regions, the average vaccination rate is lowest in SEAR (59.3%) and WPR (64.3%), and highest in AMER (80.4%) and EUR (81.1%). The average Haemophilus influenzae type b (Hib) vaccine immunization rate is higher across country income groups and regions. The average rate was 94.4% for high-income countries, 84.4% for upper-middle-income countries, 83.2% for lower-middle-income countries and 83.2% for low-income countries. The difference in vaccination rates across regions is lower for Hib vaccination; all regions have an average vaccination rate between 83.6% (AMER) and 92.2% (EUR).

Access to basic water supplies, basic hand hygiene facilities and functional sanitation facilities are also lacking in healthcare centres in many parts of the world (Figure 8). Lack of access to basic water supplies is particularly

pronounced in AFR, where the median proportion of healthcare facilities with access to basic water supplies is 76%; the median in all other regions is 100% except for SEAR (97.5%). Regional variation is pronounced, and lack of access to water, sanitation and handwashing is primarily an issue for low- and lower-middle-income countries. Across these three indicators, 50% of countries in each region cluster are close to 100% of healthcare facilities having these basic sanitation features, while the other half of countries span a large range, particularly in AFR, EMR, and SEAR. Countries were not asked to report on utilization of these facilities.

Figure 8. Regional proportions of healthcare facilities with water and sanitation facilities. The width of the coloured box indicates the interquartile range. The median is represented at the intersection of the darker colour (Q2) and lighter colour (Q3); where many countries have provided the same response, one or both of these colours may not be visible. The whiskers indicate 1.5 times the interquartile range, and individual data points are indicated by small dots.



Optimizing the use of antimicrobial medicines in human and animal health (Global Action Plan Objective 4)

123 countries have policies requiring a prescription for antibiotic use in humans.

64 countries have limited the use of antibiotics for growth promotion in agriculture.

10 countries have regulations in place that would limit environmental contamination with antibiotics (78 have more general regulations).

The GAP calls upon all countries to conserve antimicrobial effectiveness by ensuring the provision of stewardship programmes, removing incentives that encourage antimicrobial overuse, and implementing policies and regulations to preserve antimicrobial effectiveness *[5,11]*. The second wave of this national self-assessment survey shows that there has been some action on this front, but there is also substantial room for improvement. For example, 123 countries (79.9%) have policies in place to regulate the sale of antimicrobials including the requirement of a prescription for human use, which is a policy that has been shown to be effective in reducing antimicrobial use in some parts of the world *[12,13]*. Yet these policies are less common in low-income countries, where only 52.6% of countries (n=10) have these policies. 102 countries (66.2%) have policies to optimize antimicrobial use at Level 3 or higher; however, only 7 countries globally have reached Level 5 and are systematically sending data back to prescribers, another policy shown to reduce antimicrobial prescribing among physicians *[14]*. However, 26.6% of responding countries (n=41) have guidelines in place to enable appropriate use of antimicrobials or optimize antibiotic use (Level 4–5) in human health facilities.

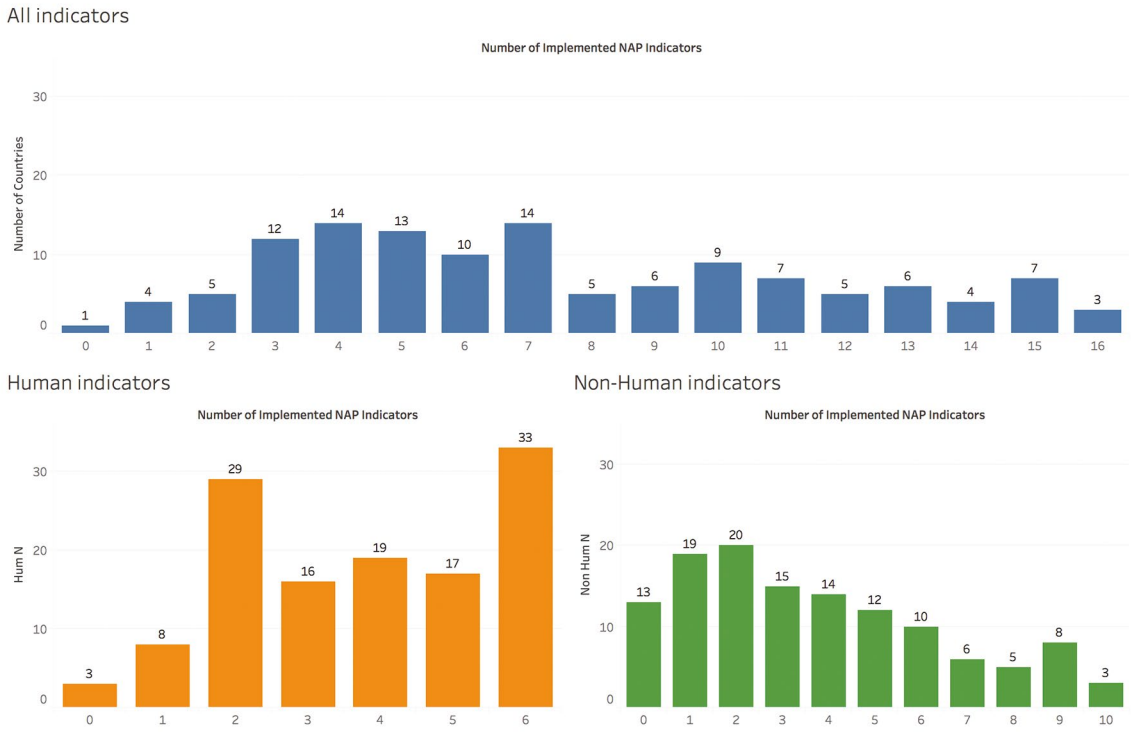
There is substantial room for improvement on regulating the use of antimicrobials in non-human sectors. While 50.6% of countries (n=78) have regulations in place to prevent environmental contamination generally, only 10 of these countries have regulations that could limit the discharge of antimicrobial residues into the environment. This level of regulation is insufficient to protect the environment from the hazards of antimicrobial production. From a point of view of regulatory oversight of the supply chain and market approvals, nearly one-fifth of countries (18.2%, n=28) have no national policy or legislation regarding the quality, safety and efficacy of antimicrobial products, and their distribution, sale or use, and another 28 countries (18.2%) were unable to report whether they had these policies in place. The need for progress is buoyed by ongoing concerns about the quality of antimicrobials, the rise in substandard and falsified medicines globally, and the impact of consuming these substandard or falsified products on animal and human health.

Finally, only 64 countries (41.6%) have limited the use of critically important antimicrobials (human and animal) for growth promotion in animal production. 39 of these countries are in high-income countries and of these 33 are in WHO's EUR region. By contrast, only 3 AFR countries (10.3%) and 7 AMER countries (25.0%) have taken these steps. Interestingly, the presence of these regulations does not appear to be correlated with the presence of animal health representatives in the country's multi-sectoral AMR working group.

Overall implementation and monitoring

There has been concern that countries are developing plans, but not moving into the implementation phase. This survey suggests that most countries are actually acting at scale in several domains. Among countries who achieved a Level 2 or higher on the national action plan indicator and the multisectoral engagement indicators, we calculated the level of implementation (Level 3 or higher) across the remaining 16 key domains (or questions in survey) (Figure 9). Three EUR countries (i.e. Austria, Norway, and The Netherlands) report implementation across all main survey domains, and seven countries have implemented actions in 15 of the 16 i.e. Denmark, Finland, Korea, Malaysia, Sweden, Spain, and the United States of America. One country had achieved a Level 2 or higher on the national action and multisectoral engagement domain but reported no other activity. The number of countries who have implemented all domains in the human sector is higher, reflecting the need to scale up action to address AMR in animals, plants and the environment.

Figure 9. Total implementation across 16 key human and non-human NAP indicators.



Implementation across human and non-human sectors. The 16 main indicators were used to calculate the level of implementation for each country; 6 indicators were specific to the human sector, and 10 indicators were specific to the non-human sector. Countries were marked as implemented if they had achieved a Level 3 or higher on an indicator.

Summary of global progress

There has been sustained progress in the development of national action plans and action to address AMR, even if the ambitious target of having national AMR action plans for every country by 2017 was not achieved. To date, more than half of responding countries (n=93, 60.4%) have developed national action plans, and an additional 51 countries (33.1%) reported being in the process of developing them.

The real challenge now is to ensure that national action plans are not only developed but also implemented, funded and supported by monitoring and evaluation systems. It should be noted that this analysis focuses on self-reported data by national governments, which may be optimistic about country progress. However, it appears that most G20 countries are on track to meet the commitment they made in 2017 to develop and implement national action plans by the end of 2018. Ideally, those countries that have implemented or will implement plans over the course of 2018 will be in a position to lead by example and provide other countries with technical and financial support .

The findings from this national self-assessment survey clearly show how important the One Health approach is to AMR and the importance of multi-sector working. Countries with large multisectoral AMR working groups also report more advanced systems for taking action to address AMR in human and non-human sectors. This may reflect the maturity and levels of investment in the programmes. Ensuring that all sectors are playing their part will be important for future progress. Currently, there appears to be more action at scale in the human sector compared to non-human sectors. Substantial work is needed to ensure that non-human sectors are able to attain a similar level of participation in global action.

As of May 2017, only 61 countries have enrolled in WHO's GLASS surveillance system *[15]*, compared to the 105 countries who report having a surveillance system in place nationally. Data sharing and global surveillance were key elements of GAP objective 2, and those countries that have surveillance systems but are not yet participating in GLASS could amplify the impact of their efforts by joining. Given that 43 countries reported having no AMR surveillance system for humans, it is also clear that there are some regions where capacity to detect resistance could be strengthened, especially AFR and EMR. Countries in these regions could be supported to improve their surveillance capacity, as resistance that emerges in these regions is likely to spread quickly to other regions.

In contrast, the finding that only 46.4% of the human population lives in countries that monitor antimicrobial consumption or use in humans is less encouraging. Efforts to contain AMR will be greatly advanced by decreasing antimicrobial consumption [1,16]. WHO will release the first report on antibiotic consumption in November 2018. In the new version of WHO's Essential Medicines List, antibiotics are classified according to whether they should be used as first-line treatment (i.e. "Access"), used with more caution (i.e. "Watch"), or used only when absolutley necessary (i.e. "Reserve"). Countries should track and benchmark their consumption patterns according to this classification.

62 countries responding to this survey reported that they had systems to collect national level data on use in animals. This contrasts with OIE's data source on antimicrobial use where over 140 countries responded to the OIE's second phase of data collection on antimicrobial agents intended for use in animals, with 107 providing quantitative data on amounts. This may reflect adisconnect at country level with those completing this survey being unaware of the process that informed the OIE.

Limited availability of monitoring data for antimicrobial use poses challenges for conducting analyses. The available data are insufficient to examine whether there were relationships between rates of antimicrobial use and progress on GAP goals. Limited data to link national policies with real-world decreases in antimicrobial use and resistance will continue to be a challenge until greater coverage of national systems for data collection is achieved and global databases are more established.

Despite the substantial progress that has been achieved in fulfilling the GAP and containing AMR at county level, there is much still to be done. Activities that have been initiated need to be scaled up, sustained and mainstreamed into ongoing plans and budgets . Systems for monitoring and reporting progress need to be strengthened. Countries should also work to ensure that their national surveillance data is disseminated through global data-sharing platforms, in line with their commitments in the GAP, to support global and regional action in this area. It is encouraging that most countries are developing multisectoral working groups, but action and investment is needed to ensure that non-human sectors progress faster. The animal, agriculture and environment sectors must be further engaged in AMR prevention efforts to ensure that a One Health approach can be pursued and so that the world can meet its AMR goals. The Tripartite Organizations have signed a Memorandum of Understanding showing their commitment to support action at global and country level *[22]*.

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Appendix 1: WHO Member States

Countries that responded to the survey marked with *

Countries counted for our study as G20 (G 20 plus participating countries from the European Union) are marked with +

Regional Office for Africa (AFR)	Regional office for the Eastern Mediterranean (EMR)	Regional Office for Europe (EUR)	Regional office for South East Asia (SEAR)	Regional office for the Western Pacific (WPR)	Regional office for the Americas (AMER)
Algeria*	Afghanistan*	Albania*	Bangladesh*	Australia*+	Antigua and Babuda *
Angola*	Bahrain*	Andorra	Bhutan*	Bruinei Darussalam*	Argentina*+
Benin*	Djubouti	Armenia*	Democratic People's Republic of Korea*	Cambodia*	Bahamas (the) *
Botswana*	Egypt*	Austria*+	India*+	China*+	Barbados*
Burkina Faso*	Iran, Islamic Republic of*	Azerbaijan*	Indonesia*+	Cook Islands*	Belize*
Burundi	Iraq*	Belarus*	Maldives*	Fiji	Bolivia (Plurinational State of) *
Cameroon*	Jordan*	Belgium*+	Myanmar*	Japan*+	Brazil*+
Cape Verde	Kuwait*	Bosnia and Herzegovina	Nepal*	Kiribati	Canada*+
Central African Republic*	Lebanon*	Bulgaria*+	Sri Lanka*	Lao People's Democratic Republic*	Chile
Chad*	Libya*	Croatia*+	Thailand*	Malaysia*	Colombia*
Comoros	Morocco*	Cyprus*+	Timor-Leste*	Marshall Islands	Costa Rica*
Congo*	Oman*	Czech Republic*+		Micronesia, Federation States of*	Cuba
Côte d'Ivoire*	Pakistan	Denmark*+		Mongolia	Dominica*
Democratic Republic of Congo*	Qatar*	Estonia*+		Naaru	Dominican Republic (the) *
Equatorial Guinea	Saudi Arabia*+	Finland*+		New Zealand*	Ecuador*
Eritrea	Somalia	France*+		Niue	El Savador
Ethiopia	Sudan*	Georgia*		Palau*	Grenada
Gabon	Syrian Arab Republic*	Germany*+		Papua New Guinea*	Guatemala*
Gambia	Tunisia*	Greece*+		Philippines*	Guyana*
Ghana*	United Arab Emirates*	Hungary*+		Republic of Korea*+	Haiti*
Guinea*	Yemen	Iceland*		Samoa*	Honduras*
Guinea-Bissau		Ireland*+		Singapore*	Jamaica*
Kenya*		Israel*		Solomon Islands	Mexico*+
Lesotho*		Italy*+		Tokelau	Nicaragua*
Liberia*		Kazakhstan*		Tonga*	Panama*
Madagascar		Kyrgyzstan*		Tuvalu*	Paraguay*
Malawi		Latvia*+		Vanuatu	Peru*
Mali*		Lithuania*		Viet Nam*	Saint Kitts and Nevis
Mauritania*		Luxembourg*+			Saint Lucia
Mauritius*		Malta*+			Saint Vincent and the Grenadines*
		Monaco*			

Regional Office for Africa (AFR)	Regional office for the Eastern Mediterranean (EMR)	Regional Office for Europe (EUR)	Regional office for South East Asia (SEAR)	Regional office for the Western Pacific (WPR)	Regional office for the Americas (AMER)
Mauritania*		Montenegro*			Suriname*
Mauritius*		Netherlands*+			Trinidad and Tobago*
Mozambique		Norway*			United States of America*+
Namibia		Poland			Uruguay*
Niger*		Portugal*+			Venezuela (Bolivarian Republic of)
Nigeria*		Republic of Moldova*			
Rwanda*		Romania*+			
Sao Tome and Principe*		Russian Federation*+			
Senegal		San Marino*			
Seychelles		Serbia*			
Sierra Leone*		Slovakia*+			
South Africa*+		Slovenia*+			
Swaziland		Spain*+			
Togo		Sweden*+			
Uganda*		Switzerland*			
United Republic of Tanzania*		Tajikistan*			
Zambia		The former Yugoslav Republic of Macedonia*			
Zimbabwe*		Turkey*+			
		Turkmenistan*			
		Ukraine*			
		United Kingdom of Great Britain and Northern Ireland*+			
		Uzbekistan*			

Appendix 2: Methods

I. Survey Design and Distribution

The global monitoring questionnaire and this tripartite country self-assessment survey exercise is a component of a broader approach for monitoring and evaluation of the AMR global action plan. The purpose of this monitoring exercise is to review and summarize country progress in implementing key actions to address AMR, for reporting annually at global level. It is also intended to encourage national-level review of country progress and help identify priorities for next steps. The first round of country progress monitoring took place during late 2016- early 2017 and results are published online with open access[3]. The first year aimed to gather baseline data and test the process and questionnaire. [4]

Comments from countries on the process and content during year one was collected and some questions in the second year 2017-18 questionnaire[5] have been modified from the first version to reflect feedback. Changes have primarily sought to decrease ambiguity. One significant change is that the second version of the questionnaire more clearly separates out responses for different sectors (human health, animal health, plant health, food production, food safety and environment).

The self-assessment survey was composed of 9 broad questions, aimed to evaluate the progress made by countries with regards to four GAP 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; and 4) Optimize the use of antimicrobial medicines in human and animal health. Questions were structured with responses ranging from A (minimal progress) to E (substantial progress). For this report, the A-E spectrum was converted into Levels 1–5, with responses framed as progress towards Level 5.

The earlier 2016 survey followed a similar structure. However, several changes were made between the 2016 and 2017 surveys, including changes to the questions, wording of responses, and in some cases changes to the level of the response. As a result, only a few questions were comparable between years, namely: the presence of a multi-sectoral collaboration in addressing AMR (4.1); country-progress with the development of a national action plan on AMR (5.1); training and professional education in the human health sector (6.3); progress with strengthening the veterinary sector (6.6); and the presence of a national monitoring system for consumption and rational use of antimicrobials in human health (7.1).

The questionnaire was sent to WHO regional offices on 1 November 2017 through which it was shared with the country offices and AMR focal points in the Ministries of Health. Information emails were also shared by FAO and OIE to their counterparts in the countries to ensure coordination across the sectors. Each country was asked to submit one official response, validated by all sectors involved, which summarizes national progress. Countries had to submit a response online via a unique link provided per country to avoid multiple responses and versions. From the beginning of April 2018, a process of data validation was undertaken. All country responses were sent back to the responders for validation and at this point some countries chose to amend their responses. The survey was closed and all responses locked as of 10 May 2018.

[3] http://www.who.int/antimicrobial-resistance/global-action-plan/database/en/
[4] http://www.who.int/antimicrobial-resistance/global-action-plan/AMR-self-assessment-2016/en/
[5] http://www.who.int/antimicrobial-resistance/global-action-plan/AMR-self-assessment-2017/en/

II. Independent variables

Countries were divided into six regions as defined by WHO (i.e., AFR, AMER, EMR, EUR, SEAR, WPR) and income groups as defined by the World Bank (i.e., high income countries (HIC), upper middle-income countries (UMIC), lower-middle-income countries (LMIC) and low-income countries (LIC)). Cook Islands, a WHO member state that responded to the survey, does not have an income group classification from the World Bank. Countries with G20 membership include: Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, Republic of Korea, Russian Federation, Saudi Arabia, South Africa, Turkey, United Kingdom, United States, and participating countries from the European Union (Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Greece, Hungary, Ireland, Latvia, Luxembourg, Malta, Netherlands, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden), resulting in 41 G20 members for the purposes of this analysis.

The following variables were incorporated from the World Bank database and were used following the World Bank's definitions: GDP (current USD), GDP per capita (current USD), and total population (2016, n). Variables to capture country-specific governance were incorporated from the World Bank's Worldwide Governance Indicators (WGI) project, which aggregate indicators across six dimensions of governance through the reporting of perceptions provided by many respondents (institutes, think tanks, non-governmental and international organizations, as well as private sector firms). These six dimensions include: voice and accountability; political stability; government effectiveness; regulatory quality; rule of law; and control of corruption. The scale used for the estimate of each of these indicators range from -2.5 (weak) to +2.5 (strong) governance performance. Kaufmann et al.'s WGI methodology paper details the underlying data sources used as well as the definition and the interpretation of these indicators *[1]*.

The following variables were incorporated from FAO's database on livestock primary production in 2016[6]: Meat, cattle (item code 867), Meat, chicken (item code 1058) and Meat, pig (item code 1035). The top 10 producing countries were defined as producing the ten highest amount (in tonnes) of cattle, chicken and pig meat from the 154 countries that responded to the survey.

The following variable was incorporated from WHO's database: domestic general government health expenditure (2015, % of GDP).

A large multi-sectoral working group was defined as a group with four or more of any of the following sectors actively involved in developing and implementing the AMR national action plan: human health; animal health; plant health; food production; food safety; and environment.

Some of the analyses required that survey responses be dichotomized: Level 3 was used as the threshold unless otherwise stated, whereby Levels 1 and 2 indicate minimal progress and Levels 3, 4, and 5 indicate greater progress.

For variables with data from multiple years, the latest available year was included.

III. Analysis

R Studio 3.4.2 (R Foundation for Statistical Computing) and SAS 9.4 (SAS Institute Inc.) were used for data preparation and analysis.

Descriptive statistics were tabulated for all of the survey responses, globally for all 154 respondents, as well as through stratifications by WHO Regions, World Bank income groups and G20 membership (Appendix 2).

Various relationships were explored between multisectoral engagement to addressing AMR, a country's progress with its development of a national action plan on AMR, the four AMR objectives emphasized by the survey, and a number of variables of interest including government health spending, strengths of industries (chicken, pig, cattle,

[6] http://www.fao.org/faostat/en/#data/QL

food), country population, strength of governance and the presence of large multisectoral working groups. Logistic regression was used to calculate the odds ratio and p-value to determine the significance of these relationships. For the purposes of this report, statistical significance was defined as having a $p < 0.05$.

A country was defined as being covered by a satisfactory monitoring or surveillance system if their responses indicated they were at Level 3 or higher. As a result, the global population covered by a surveillance or monitoring system was estimated by dividing the combined population of countries at Levels 3–5 by the global population in 2016.

While most dichotomized relationships used Level 3 and higher as a satisfactory threshold, the analysis of the relationship between progress in the development and implementation of a national action plan and the presence of a satisfactory large-scale awareness campaign required that the threshold for the latter be advanced to Level 4-5.

The total and average number of participating sectors in the development and implementation of national action plans was calculated by assigning one point for each of the sectors involved (i.e., human health, animal health, plant health, food production, food safety, and environment) and performing the corresponding descriptive analyses.

An implementation score was calculated for those countries that scored at least a Level 2 on indicator 4.1 (multi-sectoral working group) and 5.1 (national action plan development). Indicators 6.1, 6.3, 7.1, 7.4, 8.1, and 9.1 were considered human-sector indicators, and indicators 6.2, 6.4, 6.5, 6.6, 7.2, 7.3, 7.5, 8.2, 9.2, and 9.3 were considered non-human indicators. Countries were considered as having achieved "implementation" if they scored a Level 3 or higher on these indicators, resulting in scores from 0 (i.e., no implementation) to 16 (i.e., full implementation) by adding the number of indicators for which the scoring threshold (level 3) was achieved.

[1] Kaufmann D, Kraay A, Mastruzzi M. The Worldwide Governance Indicators: A Summary of Methodology, Data and Analytical Issues. World Bank Development Research Group. World Bank Policy Research Working Paper No. 5430. 2010. [Available from: **http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1682130**. Dataset available to download from http://info.worldbank.org/governance/wgi/index.aspx#home.]

Appendix 3: Tables

Table 1. Multi-sectoral Approach to Addressing AMR

	No Response	Level 1	Level 2	Level 3	Level 4	Level 5
Global (N)	1 (0.65%)	23 (14.94%)	77 (50.00%)	20 (12.99%)	6 (3.90%)	27 (17.53%)
Region						
AFR (n)	0 (0.00%)	4 (13.79%)	18 (62.07%)	4 (13.79%)	0 (0.00%)	3 (10.34%)
AMER (n)	0 (0.00%)	3 (10.71%)	24 (85.71%)	0 (0.00%)	0 (0.00%)	1 (3.57%)
EMR (n)	1 (5.88%)	4 (23.53%)	6 (35.29%)	3 (17.65%)	0 (0.00%)	3 (17.65%)
EUR (n)	0 (0.00%)	6 (12.00%)	19 (38.00%)	7 (14.00%)	6 (12.00%)	12 (24.00%)
SEAR (n)	0 (0.00%)	1 (9.09%)	6 (54.55%)	2 (18.18%)	0 (0.00%)	2 (18.18%)
WPR (n)	0 (0.00%)	5 (26.32%)	4 (21.05%)	4 (21.05%)	0 (0.00%)	6 (31.58%)
G20						
No	1 (0.88%)	18 (15.93%)	66 (58.41%)	14 (12.39%)	3 (2.65%)	11 (9.73%)
Yes	0 (0.00%)	5 (12.20%)	11 (26.83%)	6 (14.63%)	3 (7.32%)	16 (39.02%)
Income Group						
High income	0 (0.00%)	6 (12.00%)	16 (32.00%)	8 (16.00%)	4 (8.00%)	16 (32.00%)
Upper middle income	0 (0.00%)	9 (20.45%)	21 (47.73%)	5 (11.36%)	2 (4.55%)	7 (15.91%)
Lower middle income	1 (2.50%)	4 (10.00%)	27 (67.50%)	6 (15.00%)	0 (0.00%)	2 (5.00%)
Low income	0 (0.00%)	4 (21.05%)	12 (63.16%)	1 (5.26%)	0 (0.00%)	2 (10.53%)
NA	0 (0.00%)	0 (0.00%)	1 (100.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)

Table 2. Sectors Actively Involved in Developing and Implementing AMR National Action Plan

	Animal		Environment		Food Production		Food Safety		Human		Plant	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Global (N)	13 (8.44%)	141 (91.56%)	79 (51.3%)	75 (48.7%)	64 (41.56%)	90 (58.44%)	45 (29.22%)	109 (70.78%)	7 (4.55%)	147 (95.45%)	92 (59.74%)	62 (40.26%)
Region												
AFR (n)	1 (3.45%)	28 (96.55%)	4 (13.79%)	25 (86.21%)	11 (37.93%)	18 (62.07%)	10 (34.48%)	19 (65.52%)	2 (6.9%)	27 (93.1%)	11 (37.93%)	18 (62.07%)
AMER (n)	2 (7.14%)	26 (92.86%)	14 (50%)	14 (50%)	11 (39.29%)	17 (60.71%)	6 (21.43%)	22 (78.57%)	1 (3.57%)	27 (96.43%)	13 (46.43%)	15 (53.57%)
EMR (n)	3 (17.65%)	14 (82.35%)	13 (76.47%)	4 (23.53%)	11 (64.71%)	6 (35.29%)	10 (58.82%)	7 (41.18%)	1 (5.88%)	16 (94.12%)	13 (76.47%)	4 (23.53%)
EUR	4 (8%)	46 (92%)	33 (66%)	17 (34%)	18 (36%)	32 (64%)	7 (14%)	43 (86%)	3 (6%)	47 (94%)	38 (76%)	12 (24%)
SEAR (n)	1 (9.09%)	10 (90.91%)	7 (63.64%)	4 (36.36%)	7 (63.64%)	4 (36.36%)	6 (54.55%)	5 (45.45%)	0 (0%)	11 (100%)	7 (63.64%)	4 (36.36%)
WPR (n)	2 (10.53%)	17 (89.47%)	8 (42.11%)	11 (57.89%)	6 (31.58%)	13 (68.42%)	6 (31.58%)	13 (68.42%)	0 (0%)	19 (100%)	10 (52.63%)	9 (47.37%)
G20												
No	12 (10.62%)	101 (89.38%)	61 (53.98%)	52 (46.02%)	54 (47.79%)	59 (52.21%)	40 (35.4%)	73 (64.6%)	6 (5.31%)	107 (94.69%)	64 (56.64%)	49 (43.36%)
Yes	1 (2.44%)	40 (97.56%)	18 (43.9%)	23 (56.1%)	10 (24.39%)	31 (75.61%)	5 (12.2%)	36 (87.8%)	1 (2.44%)	40 (97.56%)	28 (68.29%)	13 (31.71%)
Income Group												
High income	4 (8%)	46 (92%)	25 (50%)	25 (50%)	16 (32%)	34 (68%)	12 (24%)	38 (76%)	2 (4%)	48 (96%)	33 (66%)	17 (34%)
Upper middle income	2 (4.55%)	42 (95.45%)	24 (54.55%)	20 (45.45%)	15 (34.09%)	29 (65.91%)	9 (20.45%)	35 (79.55%)	1 (2.27%)	43 (97.73%)	25 (56.82%)	19 (43.18%)
Lower middle income	6 (15%)	34 (85%)	25 (62.5%)	15 (37.5%)	23 (57.5%)	17 (42.5%)	14 (35%)	26 (65%)	3 (7.5%)	37 (92.5%)	23 (57.5%)	17 (42.5%)
Low income	1 (5.26%)	18 (94.74%)	5 (26.32%)	14 (73.68%)	10 (52.63%)	9 (47.37%)	10 (52.63%)	9 (47.37%)	1 (5.26%)	18 (94.74%)	10 (52.63%)	9 (47.37%)
NA	0 (0%)	1 (100%)	0 (0%)	1 (100%)	0 (0%)	1 (100%)	0 (0%)	1 (100%)	0 (0%)	1 (100%)	1 (100%)	0 (0%)

Table 3. Country Progress with Development of a National Action Plan on AMR

	Level 1	Level 2	Level 3	Level 4	Level 5
Global (N)	10 (6.49%)	51 (33.12%)	34 (22.08%)	40 (25.97%)	19 (12.34%)
Region					
AFR (n)	4 (13.79%)	14 (48.28%)	4 (13.79%)	6 (20.69%)	1 (3.45%)
AMER (n)	1 (3.57%)	16 (57.14%)	6 (21.43%)	4 (14.29%)	1 (3.57%)
EMR (n)	2 (11.76%)	3 (17.65%)	6 (35.29%)	4 (23.53%)	2 (11.76%)
EUR (n)	2 (4%)	14 (28%)	11 (22%)	15 (30%)	8 (16%)
SEAR (n)	0 (0%)	0 (0%)	4 (36.36%)	6 (54.55%)	1 (9.09%)
WPR (n)	1 (5.26%)	4 (21.05%)	3 (15.79%)	5 (26.32%)	6 (31.58%)
G20					
No	10 (8.85%)	44 (38.94%)	26 (23.01%)	24 (21.24%)	9 (7.96%)
Yes	0 (0%)	7 (17.07%)	8 (19.51%)	16 (39.02%)	10 (24.39%)
Income Group					
High income	4 (8%)	10 (20%)	10 (20%)	15 (30%)	11 (22%)
Upper middle income	0 (0%)	20 (45.45%)	12 (27.27%)	8 (18.18%)	4 (9.09%)
Lower middle income	4 (10%)	12 (30%)	7 (17.5%)	14 (35%)	3 (7.5%)
Low income	2 (10.53%)	9 (47.37%)	5 (26.32%)	2 (10.53%)	1 (5.26%)
NA	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)

Table 4. Linkages of the national action plan on AMR to other existing action plans, strategies or targets related to HIV, tuberculosis, malaria or neglected tropical diseases.

	Linkage to Other Plans			HIV			Malaria			NTD			TB		
	No Response	No	Yes	No Response	No	Yes	No Response	No	Yes	No Response	No	Yes	No Response	No	Yes
Global (N)	26 (16.88%)	78 (50.65%)	50 (32.47%)	98 (63.64%)	20 (12.99%)	36 (23.38%)	98 (63.64%)	32 (20.78%)	24 (15.58%)	98 (63.64%)	46 (29.87%)	10 (6.49%)	98 (63.64%)	9 (5.84%)	47 (30.52%)
Region															
AFR (n)	9 (31.03%)	11 (37.93%)	9 (31.03%)	19 (65.52%)	1 (3.45%)	9 (31.03%)	19 (65.52%)	3 (10.34%)	7 (24.14%)	19 (65.52%)	7 (24.14%)	3 (10.34%)	19 (65.52%)	1 (3.45%)	9 (31.03%)
AMER (n)	5 (17.86%)	10 (35.71%)	13 (46.43%)	15 (53.57%)	0 (0%)	13 (46.43%)	15 (53.57%)	4 (14.29%)	9 (32.14%)	15 (53.57%)	9 (32.14%)	4 (14.29%)	15 (53.57%)	0 (0%)	13 (46.43%)
EMR (n)	3 (17.65%)	8 (47.06%)	6 (35.29%)	11 (64.71%)	3 (17.65%)	3 (17.65%)	11 (64.71%)	5 (29.41%)	1 (5.88%)	11 (64.71%)	6 (35.29%)	0 (0%)	11 (64.71%)	1 (5.88%)	5 (29.41%)
EUR (n)	4 (8%)	34 (68%)	12 (24%)	34 (68%)	10 (20%)	6 (12%)	34 (68%)	14 (28%)	2 (4%)	34 (68%)	15 (30%)	1 (2%)	34 (68%)	4 (8%)	12 (24%)
SEAR (n)	0 (0%)	7 (63.64%)	4 (36.36%)	6 (54.55%)	3 (27.27%)	2 (18.18%)	6 (54.55%)	2 (18.18%)	3 (27.27%)	6 (54.55%)	4 (36.36%)	1 (9.09%)	6 (54.55%)	2 (18.18%)	3 (27.27%)
WPR (n)	5 (26.32%)	8 (42.11%)	6 (31.58%)	13 (68.42%)	3 (15.79%)	3 (15.79%)	13 (68.42%)	4 (21.05%)	2 (10.53%)	13 (68.42%)	5 (26.32%)	1 (5.26%)	13 (68.42%)	1 (5.26%)	5 (26.32%)
G20															
No	24 (21.24%)	52 (46.02%)	37 (32.74%)	73 (64.6%)	14 (12.39%)	26 (23.01%)	73 (64.6%)	22 (19.47%)	18 (15.93%)	73 (64.6%)	31 (27.43%)	9 (7.96%)	73 (64.6%)	5 (4.42%)	35 (30.97%)
Yes	2 (4.88%)	26 (63.41%)	13 (31.71%)	25 (60.98%)	6 (14.63%)	10 (24.39%)	25 (60.98%)	10 (24.39%)	6 (14.63%)	25 (60.98%)	15 (36.59%)	1 (2.44%)	25 (60.98%)	4 (9.76%)	12 (29.27%)
Income Group															
High income	5 (10%)	37 (74%)	8 (16%)	39 (78%)	6 (12%)	5 (10%)	39 (78%)	8 (16%)	3 (6%)	39 (78%)	11 (22%)	0 (0%)	39 (78%)	3 (6%)	8 (16%)
Upper middle income	6 (13.64%)	15 (34.09%)	23 (52.27%)	20 (45.45%)	6 (13.64%)	18 (40.91%)	20 (45.45%)	15 (34.09%)	9 (20.45%)	20 (45.45%)	20 (45.45%)	4 (9.09%)	20	2	22

	Linkage to Other Plans			HIV			Malaria			NTD			TB		
	No Response	No	Yes	No Response	No	Yes	No Response	No	Yes	No Response	No	Yes	No Response	No	Yes
Global (N)	26 (16.88%)	78 (50.65%)	50 (32.47%)	98 (63.64%)	20 (12.99%)	36 (23.38%)	98 (63.64%)	32 (20.78%)	24 (15.58%)	98 (63.64%)	46 (29.87%)	10 (6.49%)	98 (63.64%)	9 (5.84%)	47 (30.52%)
NA	0 (0%)	1 (100%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)

Table 5. Raising Awareness and Understanding of AMR – Human Health

	Level 1	Level 2	Level 3	Level 4	Level 5	No Response
Global (N)	5 (3.25%)	21 (13.64%)	69 (44.81%)	39 (25.32%)	17 (11.04%)	3 (1.95%)
Region						
AFR (n)	3 (10.34%)	6 (20.69%)	15 (51.72%)	3 (10.34%)	0 (0%)	2 (6.9%)
AMER (n)	1 (3.57%)	9 (32.14%)	14 (50%)	3 (10.71%)	1 (3.57%)	0 (0%)
EMR (n)	1 (5.88%)	2 (11.76%)	7 (41.18%)	6 (35.29%)	0 (0%)	1 (5.88%)
EUR (n)	0 (0%)	3 (6%)	18 (36%)	14 (28%)	15 (30%)	0 (0%)
SEAR (n)	0 (0%)	0 (0%)	6 (54.55%)	4 (36.36%)	1 (9.09%)	0 (0%)
WPR (n)	0 (0%)	1 (5.26%)	9 (47.37%)	9 (47.37%)	0 (0%)	0 (0%)
G20						
No	5 (4.42%)	16 (14.16%)	57 (50.44%)	26 (23.01%)	6 (5.31%)	3 (2.65%)
Yes	0 (0%)	5 (12.2%)	12 (29.27%)	13 (31.71%)	11 (26.83%)	0 (0%)
Income Group						
High income	0 (0%)	4 (8%)	17 (34%)	16 (32%)	13 (26%)	0 (0%)
Upper middle income	1 (2.27%)	8 (18.18%)	20 (45.45%)	12 (27.27%)	3 (6.82%)	0 (0%)
Lower middle income	2 (5%)	7 (17.5%)	19 (47.5%)	9 (22.5%)	1 (2.5%)	2 (5%)
Low income	2 (10.53%)	2 (10.53%)	13 (68.42%)	1 (5.26%)	0 (0%)	1 (5.26%)
NA	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)

Table 6. Raising Awareness and Understanding of AMR – Other Non-Human Sectors (all%)

	Level 1	Level 2	Level 3	Level 4	Level 5	No Response
Global (N)	24 (15.58%)	41 (26.62%)	36 (23.38%)	26 (16.88%)	8 (5.19%)	19 (12.34%)
Region						
AFR (n)	7 (24.14%)	11 (37.93%)	6 (20.69%)	3 (10.34%)	0 (0%)	2 (6.9%)
AMER (n)	7 (25%)	14 (50%)	1 (3.57%)	2 (7.14%)	0 (0%)	4 (14.29%)
EMR (n)	2 (11.76%)	3 (17.65%)	5 (29.41%)	2 (11.76%)	1 (5.88%)	4 (23.53%)
EUR (n)	3 (6%)	11 (22%)	16 (32%)	9 (18%)	6 (12%)	5 (10%)
SEAR (n)	3 (27.27%)	0 (0%)	3 (27.27%)	1 (9.09%)	1 (9.09%)	3 (27.27%)
WPR (n)	2 (10.53%)	2 (10.53%)	5 (26.32%)	9 (47.37%)	0 (0%)	1 (5.26%)
G20						
No	23 (20.35%)	34 (30.09%)	27 (23.89%)	14 (12.39%)	2 (1.77%)	13 (11.5%)
Yes	1 (2.44%)	7 (17.07%)	9 (21.95%)	12 (29.27%)	6 (14.63%)	6 (14.63%)
Income Group						
High income	2 (4%)	11 (22%)	9 (18%)	13 (26%)	6 (12%)	9 (18%)
Upper middle income	6 (13.64%)	14 (31.82%)	9 (20.45%)	10 (22.73%)	1 (2.27%)	4 (9.09%)
Lower middle income	10 (25%)	11 (27.5%)	12 (30%)	1 (2.5%)	1 (2.5%)	5 (12.5%)
Low income	6 (31.58%)	5 (26.32%)	6 (31.58%)	1 (5.26%)	0 (0%)	1 (5.26%)
NA	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)

Table 7. Raising Awareness and Understanding of AMR – Other Non-Human Sectors (Animal, Environment%)

	Animal						Environment					
	Level 1	Level 2	Level 3	Level 4	Level 5	No Response	Level 1	Level 2	Level 3	Level 4	Level 5	No Response
Global (N)	22 (14.29%)	41 (26.62%)	38 (24.68%)	24 (15.58%)	12 (7.79%)	17 (11.04%)	47 (30.52%)	20 (12.99%)	21 (13.64%)	4 (2.6%)	1 (0.65%)	61 (39.61%)
Region												
AFR (n)	9 (31.03%)	8 (27.59%)	8 (27.59%)	2 (6.9%)	0 (0%)	2 (6.9%)	14 (48.28%)	5 (17.24%)	6 (20.69%)	0 (0%)	0 (0%)	4 (13.79%)
AMER (n)	7 (25%)	14 (50%)	2 (7.14%)	1 (3.57%)	1 (3.57%)	3 (10.71%)	10 (35.71%)	5 (17.86%)	2 (7.14%)	1 (3.57%)	0 (0%)	10 (35.71%)
EMR (n)	2 (11.76%)	3 (17.65%)	4 (23.53%)	2 (11.76%)	1 (5.88%)	5 (29.41%)	5 (29.41%)	2 (11.76%)	1 (5.88%)	0 (0%)	0 (0%)	9 (52.94%)
EUR (n)	2 (4%)	12 (24%)	13 (26%)	12 (24%)	8 (16%)	3 (6%)	8 (16%)	4 (8%)	8 (16%)	2 (4%)	1 (2%)	27 (54%)
SEAR (n)	1 (9.09%)	1 (9.09%)	4 (36.36%)	1 (9.09%)	2 (18.18%)	2 (18.18%)	4 (36.36%)	1 (9.09%)	1 (9.09%)	0 (0%)	0 (0%)	5 (45.45%)
WPR (n)	1 (5.26%)	3 (15.79%)	7 (36.84%)	6 (31.58%)	0 (0%)	2 (10.53%)	6 (31.58%)	3 (15.79%)	3 (15.79%)	1 (5.26%)	0 (0%)	6 (31.58%)
G20												
No	22 (19.47%)	32 (28.32%)	28 (24.78%)	13 (11.5%)	4 (3.54%)	14 (12.39%)	37 (32.74%)	14 (12.39%)	14 (12.39%)	3 (2.65%)	0 (0%)	45 (39.82%)
Yes	0 (0%)	9 (21.95%)	10 (24.39%)	11 (26.83%)	8 (19.51%)	3 (7.32%)	10 (24.39%)	6 (14.63%)	7 (17.07%)	1 (2.44%)	1 (2.44%)	16 (39.02%)
Income Group												
High income	2 (4%)	13 (26%)	11 (22%)	13 (26%)	8 (16%)	3 (6%)	10 (20%)	11 (22%)	9 (18%)	2 (4%)	1 (2%)	17 (34%)
Upper middle income	7 (15.91%)	14 (31.82%)	7 (15.91%)	9 (20.45%)	2 (4.55%)	5 (11.36%)	19 (43.18%)	2 (4.55%)	5 (11.36%)	1 (2.27%)	0 (0%)	17 (38.64%)
Lower middle income	9 (22.5%)	9 (22.5%)	13 (32.5%)	0 (0%)	2 (5%)	7 (17.5%)	12 (30%)	3 (7.5%)	3 (7.5%)	0 (0%)	0 (0%)	22 (55%)
Low income	4 (21.05%)	5 (26.32%)	7 (36.84%)	1 (5.26%)	0 (0%)	2 (10.53%)	6 (31.58%)	4 (21.05%)	4 (21.05%)	0 (0%)	0 (0%)	5 (26.32%)
NA	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)

Table 8. Raising Awareness and Understanding of AMR – Other Non-Human Sectors (Food Production, Food Safety%)

	Food Production						Food Safety					
	Level 1	Level 2	Level 3	Level 4	Level 5	No Response	Level 1	Level 2	Level 3	Level 4	Level 5	No Response
Global (N)	33 (21.43%)	25 (16.23%)	24 (15.58%)	20 (12.99%)	7 (4.55%)	45 (29.22%)	37 (24.03%)	29 (18.83%)	30 (19.48%)	18 (11.69%)	6 (3.9%)	34 (22.08%)
Region												
AFR (n)	13 (44.83%)	5 (17.24%)	5 (17.24%)	0 (0%)	0 (0%)	6 (20.69%)	13 (44.83%)	5 (17.24%)	5 (17.24%)	0 (0%)	0 (0%)	6 (20.69%)
AMER (n)	9 (32.14%)	7 (25%)	2 (7.14%)	2 (7.14%)	1 (3.57%)	7 (25%)	9 (32.14%)	9 (32.14%)	2 (7.14%)	3 (10.71%)	1 (3.57%)	4 (14.29%)
EMR (n)	4 (23.53%)	2 (11.76%)	1 (5.88%)	2 (11.76%)	0 (0%)	8 (47.06%)	4 (23.53%)	3 (17.65%)	3 (17.65%)	0 (0%)	0 (0%)	7 (41.18%)
EUR (n)	3 (6%)	7 (14%)	11 (22%)	9 (18%)	6 (12%)	14 (28%)	6 (12%)	8 (16%)	13 (26%)	10 (20%)	5 (10%)	8 (16%)
SEAR (n)	1 (9.09%)	3 (27.27%)	2 (18.18%)	0 (0%)	0 (0%)	5 (45.45%)	2 (18.18%)	1 (9.09%)	4 (36.36%)	0 (0%)	0 (0%)	4 (36.36%)
WPR (n)	3 (15.79%)	1 (5.26%)	3 (15.79%)	7 (36.84%)	0 (0%)	5 (26.32%)	3 (15.79%)	3 (15.79%)	3 (15.79%)	5 (26.32%)	0 (0%)	5 (26.32%)
G20												
No	31 (27.43%)	18 (15.93%)	17 (15.04%)	10 (8.85%)	0 (0%)	37 (32.74%)	31 (27.43%)	22 (19.47%)	20 (17.7%)	9 (7.96%)	0 (0%)	31 (27.43%)
Yes	2 (4.88%)	7 (17.07%)	7 (17.07%)	10 (24.39%)	7 (17.07%)	8 (19.51%)	6 (14.63%)	7 (17.07%)	10 (24.39%)	9 (21.95%)	6 (14.63%)	3 (7.32%)
Income Group												
High income	3 (6%)	9 (18%)	9 (18%)	13 (26%)	7 (14%)	9 (18%)	6 (12%)	12 (24%)	8 (16%)	11 (22%)	6 (12%)	7 (14%)
Upper middle income	11 (25%)	5 (11.36%)	9 (20.45%)	6 (13.64%)	0 (0%)	13 (29.55%)	11 (25%)	7 (15.91%)	13 (29.55%)	5 (11.36%)	0 (0%)	8 (18.18%)
Lower middle income	12 (30%)	7 (17.5%)	4 (10%)	0 (0%)	0 (0%)	17 (42.5%)	12 (30%)	7 (17.5%)	7 (17.5%)	1 (2.5%)	0 (0%)	13 (32.5%)
Low income	7 (36.84%)	4 (21.05%)	2 (10.53%)	0 (0%)	0 (0%)	6 (31.58%)	8 (42.11%)	3 (15.79%)	2 (10.53%)	0 (0%)	0 (0%)	6 (31.58%)
NA	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)

Table 9. Raising Awareness and Understanding of AMR – Other Non-Human Sectors (Plants%)

	Plant					
	Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**No Response**
Global (N)	50 (32.47%)	21 (13.64%)	18 (11.69%)	4 (2.6%)	3 (1.95%)	58 (37.66%)
Region						
AFR (n)	12 (41.38%)	7 (24.14%)	4 (13.79%)	0 (0%)	0 (0%)	6 (20.69%)
AMER (n)	13 (46.43%)	3 (10.71%)	3 (10.71%)	1 (3.57%)	1 (3.57%)	7 (25%)
EMR (n)	6 (35.29%)	2 (11.76%)	1 (5.88%)	1 (5.88%)	0 (0%)	7 (41.18%)
EUR (n)	10 (20%)	2 (4%)	7 (14%)	0 (0%)	2 (4%)	29 (58%)
SEAR (n)	4 (36.36%)	3 (27.27%)	0 (0%)	0 (0%)	0 (0%)	4 (36.36%)
WPR (n)	5 (26.32%)	4 (21.05%)	3 (15.79%)	2 (10.53%)	0 (0%)	5 (26.32%)
G20						
No	38 (33.63%)	20 (17.7%)	11 (9.73%)	4 (3.54%)	2 (1.77%)	38 (33.63%)
Yes	12 (29.27%)	1 (2.44%)	7 (17.07%)	0 (0%)	1 (2.44%)	20 (48.78%)
Income Group						
High income	12 (24%)	5 (10%)	9 (18%)	2 (4%)	3 (6%)	19 (38%)
Upper middle income	18 (40.91%)	6 (13.64%)	4 (9.09%)	1 (2.27%)	0 (0%)	15 (34.09%)
Lower middle income	13 (32.5%)	6 (15%)	3 (7.5%)	0 (0%)	0 (0%)	18 (45%)
Low income	7 (36.84%)	4 (21.05%)	2 (10.53%)	0 (0%)	0 (0%)	6 (31.58%)
NA	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)

Table 10. Training and Professional Education on AMR – Human Health

	Level 1	Level 2	Level 3	Level 4	Level 5	No Response
Global (N)	17 (11.04%)	35 (22.73%)	60 (38.96%)	25 (16.23%)	13 (8.44%)	4 (2.6%)
Region						
AFR (n)	11 (37.93%)	3 (10.34%)	12 (41.38%)	0 (0%)	2 (6.9%)	1 (3.45%)
AMER (n)	0 (0%)	10 (35.71%)	17 (60.71%)	0 (0%)	1 (3.57%)	0 (0%)
EMR (n)	2 (11.76%)	5 (29.41%)	5 (29.41%)	3 (17.65%)	0 (0%)	2 (11.76%)
EUR (n)	1 (2%)	9 (18%)	15 (30%)	14 (28%)	10 (20%)	1 (2%)
SEAR (n)	2 (18.18%)	3 (27.27%)	5 (45.45%)	1 (9.09%)	0 (0%)	0 (0%)
WPR (n)	1 (5.26%)	5 (26.32%)	6 (31.58%)	7 (36.84%)	0 (0%)	0 (0%)
G20						
No	17 (15.04%)	28 (24.78%)	45 (39.82%)	12 (10.62%)	7 (6.19%)	4 (3.54%)
Yes	0 (0%)	7 (17.07%)	15 (36.59%)	13 (31.71%)	6 (14.63%)	0 (0%)
Income Group						
High income	0 (0%)	8 (16%)	18 (36%)	17 (34%)	7 (14%)	0 (0%)
Upper middle income	2 (4.55%)	10 (22.73%)	20 (45.45%)	7 (15.91%)	4 (9.09%)	1 (2.27%)
Lower middle income	9 (22.5%)	12 (30%)	15 (37.5%)	0 (0%)	1 (2.5%)	3 (7.5%)
Low income	6 (31.58%)	5 (26.32%)	7 (36.84%)	0 (0%)	1 (5.26%)	0 (0%)
NA	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)

Table 11. Training and Professional Education on AMR – Veterinary

	Level 1	Level 2	Level 3	Level 4	Level 5	No Response
Global (N)	47 (30.52%)	42 (27.27%)	26 (16.88%)	14 (9.09%)	14 (9.09%)	11 (7.14%)
Region						
AFR (n)	19 (65.52%)	3 (10.34%)	4 (13.79%)	0 (0%)	2 (6.9%)	1 (3.45%)
AMER (n)	9 (32.14%)	13 (46.43%)	2 (7.14%)	1 (3.57%)	1 (3.57%)	2 (7.14%)
EMR (n)	8 (47.06%)	5 (29.41%)	2 (11.76%)	0 (0%)	0 (0%)	2 (11.76%)
EUR (n)	4 (8%)	11 (22%)	14 (28%)	9 (18%)	9 (18%)	3 (6%)
SEAR (n)	3 (27.27%)	4 (36.36%)	1 (9.09%)	2 (18.18%)	1 (9.09%)	0 (0%)
WPR (n)	4 (21.05%)	6 (31.58%)	3 (15.79%)	2 (10.53%)	1 (5.26%)	3 (15.79%)
G20						
No	46 (40.71%)	29 (25.66%)	18 (15.93%)	6 (5.31%)	5 (4.42%)	9 (7.96%)
Yes	1 (2.44%)	13 (31.71%)	8 (19.51%)	8 (19.51%)	9 (21.95%)	2 (4.88%)
Income Group						
High income	6 (12%)	13 (26%)	9 (18%)	8 (16%)	11 (22%)	3 (6%)
Upper middle income	14 (31.82%)	14 (31.82%)	8 (18.18%)	4 (9.09%)	0 (0%)	4 (9.09%)
Lower middle income	14 (35%)	13 (32.5%)	6 (15%)	1 (2.5%)	2 (5%)	4 (10%)
Low income	13 (68.42%)	2 (10.53%)	3 (15.79%)	0 (0%)	1 (5.26%)	0 (0%)
NA	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)

Table 12. Training and Professional Education on AMR – Farming, Food, Environment

	Level 1	Level 2	Level 3	Level 4	Level 5	No Response
Global (N)	67 (43.51%)	45 (29.22%)	20 (12.99%)	4 (2.6%)	2 (1.3%)	16 (10.39%)
Region						
AFR (n)	19 (65.52%)	6 (20.69%)	1 (3.45%)	0 (0%)	2 (6.9%)	1 (3.45%)
AMER (n)	13 (46.43%)	10 (35.71%)	3 (10.71%)	0 (0%)	0 (0%)	2 (7.14%)
EMR (n)	10 (58.82%)	3 (17.65%)	0 (0%)	0 (0%)	0 (0%)	4 (23.53%)
EUR (n)	14 (28%)	14 (28%)	14 (28%)	4 (8%)	0 (0%)	4 (8%)
SEAR (n)	5 (45.45%)	6 (54.55%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
WPR (n)	6 (31.58%)	6 (31.58%)	2 (10.53%)	0 (0%)	0 (0%)	5 (26.32%)
G20						
No	56 (49.56%)	33 (29.2%)	8 (7.08%)	1 (0.88%)	2 (1.77%)	13 (11.5%)
Yes	11 (26.83%)	12 (29.27%)	12 (29.27%)	3 (7.32%)	0 (0%)	3 (7.32%)
Income Group						
High income	17 (34%)	13 (26%)	13 (26%)	3 (6%)	0 (0%)	4 (8%)
Upper middle income	18 (40.91%)	17 (38.64%)	5 (11.36%)	1 (2.27%)	0 (0%)	3 (6.82%)
Lower middle income	18 (45%)	11 (27.5%)	2 (5%)	0 (0%)	1 (2.5%)	8 (20%)
Low income	14 (73.68%)	4 (21.05%)	0 (0%)	0 (0%)	1 (5.26%)	0 (0%)
NA	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)

Table 13. Progress with Strengthening Veterinary Services

	Level 1	Level 2	Level 3	Level 4	Level 5	No Response
Global (N)	27 (17.53%)	44 (28.57%)	31 (20.13%)	21 (13.64%)	18 (11.69%)	13 (8.44%)
Region						
AFR (n)	7 (24.14%)	13 (44.83%)	2 (6.9%)	5 (17.24%)	1 (3.45%)	1 (3.45%)
AMER (n)	4 (14.29%)	9 (32.14%)	7 (25%)	3 (10.71%)	3 (10.71%)	2 (7.14%)
EMR (n)	4 (23.53%)	4 (23.53%)	5 (29.41%)	1 (5.88%)	0 (0%)	3 (17.65%)
EUR (n)	9 (18%)	6 (12%)	11 (22%)	9 (18%)	12 (24%)	3 (6%)
SEAR (n)	1 (9.09%)	6 (54.55%)	2 (18.18%)	2 (18.18%)	0 (0%)	0 (0%)
WPR (n)	2 (10.53%)	6 (31.58%)	4 (21.05%)	1 (5.26%)	2 (10.53%)	4 (21.05%)
G20						
No	21 (18.58%)	39 (34.51%)	25 (22.12%)	12 (10.62%)	5 (4.42%)	11 (9.73%)
Yes	6 (14.63%)	5 (12.2%)	6 (14.63%)	9 (21.95%)	13 (31.71%)	2 (4.88%)
Income Group						
High income	7 (14%)	7 (14%)	12 (24%)	6 (12%)	15 (30%)	3 (6%)
Upper middle income	10 (22.73%)	11 (25%)	12 (27.27%)	7 (15.91%)	1 (2.27%)	3 (6.82%)
Lower middle income	4 (10%)	18 (45%)	5 (12.5%)	6 (15%)	1 (2.5%)	6 (15%)
Low income	6 (31.58%)	8 (42.11%)	2 (10.53%)	2 (10.53%)	1 (5.26%)	0 (0%)
NA	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)

Table 14. National Monitoring System for Antimicrobials Use/Consumption – Human Health

	Level 1	Level 2	Level 3	Level 4	Level 5	No Response
Global (N)	45 (29.22%)	37 (24.03%)	26 (16.88%)	15 (9.74%)	27 (17.53%)	4 (2.6%)
Region						
AFR (n)	13 (44.83%)	10 (34.48%)	4 (13.79%)	1 (3.45%)	0 (0%)	1 (3.45%)
AMER (n)	13 (46.43%)	3 (10.71%)	7 (25%)	3 (10.71%)	1 (3.57%)	1 (3.57%)
EMR (n)	6 (35.29%)	5 (29.41%)	4 (23.53%)	1 (5.88%)	0 (0%)	1 (5.88%)
EUR (n)	3 (6%)	11 (22%)	10 (20%)	6 (12%)	19 (38%)	1 (2%)
SEAR (n)	4 (36.36%)	6 (54.55%)	0 (0%)	1 (9.09%)	0 (0%)	0 (0%)
WPR (n)	6 (31.58%)	2 (10.53%)	1 (5.26%)	3 (15.79%)	7 (36.84%)	0 (0%)
G20						
No	42 (37.17%)	32 (28.32%)	15 (13.27%)	11 (9.73%)	9 (7.96%)	4 (3.54%)
Yes	3 (7.32%)	5 (12.2%)	11 (26.83%)	4 (9.76%)	18 (43.9%)	0 (0%)
Income Group						
High income	8 (16%)	7 (14%)	10 (20%)	5 (10%)	20 (40%)	0 (0%)
Upper middle income	9 (20.45%)	11 (25%)	12 (27.27%)	6 (13.64%)	6 (13.64%)	0 (0%)
Lower middle income	17 (42.5%)	13 (32.5%)	3 (7.5%)	3 (7.5%)	0 (0%)	4 (10%)
Low income	11 (57.89%)	6 (31.58%)	1 (5.26%)	1 (5.26%)	0 (0%)	0 (0%)
NA	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)

Table 15. National Monitoring System for Antimicrobials – Sales/Use in Animals

	Level 1	Level 2	Level 3	Level 4	Level 5	No Response
Global (N)	49 (31.82%)	32 (20.78%)	26 (16.88%)	30 (19.48%)	6 (3.9%)	11 (7.14%)
Region						
AFR (n)	15 (51.72%)	7 (24.14%)	2 (6.9%)	3 (10.34%)	0 (0%)	2 (6.9%)
AMER (n)	12 (42.86%)	7 (25%)	5 (17.86%)	2 (7.14%)	0 (0%)	2 (7.14%)
EMR (n)	8 (47.06%)	2 (11.76%)	3 (17.65%)	2 (11.76%)	0 (0%)	2 (11.76%)
EUR (n)	4 (8%)	6 (12%)	12 (24%)	19 (38%)	6 (12%)	3 (6%)
SEAR (n)	2 (18.18%)	7 (63.64%)	2 (18.18%)	0 (0%)	0 (0%)	0 (0%)
WPR (n)	8 (42.11%)	3 (15.79%)	2 (10.53%)	4 (21.05%)	0 (0%)	2 (10.53%)
G20						
No	48 (42.48%)	24 (21.24%)	18 (15.93%)	13 (11.5%)	1 (0.88%)	9 (7.96%)
Yes	1 (2.44%)	8 (19.51%)	8 (19.51%)	17 (41.46%)	5 (12.2%)	2 (4.88%)
Income Group						
High income	6 (12%)	7 (14%)	9 (18%)	19 (38%)	6 (12%)	3 (6%)
Upper middle income	13 (29.55%)	13 (29.55%)	9 (20.45%)	6 (13.64%)	0 (0%)	3 (6.82%)
Lower middle income	18 (45%)	8 (20%)	6 (15%)	4 (10%)	0 (0%)	4 (10%)
Low income	12 (63.16%)	4 (21.05%)	2 (10.53%)	1 (5.26%)	0 (0%)	0 (0%)
NA	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)

Table 16. National Monitoring System for Antimicrobial Use – Plant Production

	Level 1	Level 2	Level 3	Level 4	Level 5	No Response
Global (N)	88 (57.14%)	9 (5.84%)	9 (5.84%)	2 (1.3%)	3 (1.95%)	43 (27.92%)
Region						
AFR (n)	19 (65.52%)	4 (13.79%)	0 (0%)	0 (0%)	0 (0%)	6 (20.69%)
AMER (n)	18 (64.29%)	1 (3.57%)	3 (10.71%)	1 (3.57%)	0 (0%)	5 (17.86%)
EMR (n)	11 (64.71%)	1 (5.88%)	0 (0%)	0 (0%)	0 (0%)	5 (29.41%)
EUR (n)	25 (50%)	2 (4%)	3 (6%)	0 (0%)	2 (4%)	18 (36%)
SEAR (n)	8 (72.73%)	1 (9.09%)	1 (9.09%)	0 (0%)	0 (0%)	1 (9.09%)
WPR (n)	7 (36.84%)	0 (0%)	2 (10.53%)	1 (5.26%)	1 (5.26%)	8 (42.11%)
G20						
No	69 (61.06%)	8 (7.08%)	3 (2.65%)	1 (0.88%)	1 (0.88%)	31 (27.43%)
Yes	19 (46.34%)	1 (2.44%)	6 (14.63%)	1 (2.44%)	2 (4.88%)	12 (29.27%)
Income Group						
High income	24 (48%)	1 (2%)	6 (12%)	2 (4%)	3 (6%)	14 (28%)
Upper middle income	26 (59.09%)	3 (6.82%)	3 (6.82%)	0 (0%)	0 (0%)	12 (27.27%)
Lower middle income	23 (57.5%)	2 (5%)	0 (0%)	0 (0%)	0 (0%)	15 (37.5%)
Low income	15 (78.95%)	3 (15.79%)	0 (0%)	0 (0%)	0 (0%)	1 (5.26%)
NA	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)

Table 17. National Surveillance System for AMR – Humans

	Level 1	Level 2	Level 3	Level 4	Level 5	No Response
Global (N)	11 (7.14%)	32 (20.78%)	66 (42.86%)	24 (15.58%)	15 (9.74%)	6 (3.90%)
Region						
AFR (n)	7 (24.14%)	11 (37.93%)	7 (24.14%)	2 (6.9%)	0 (0%)	2 (6.90%)
AMER (n)	0 (0%)	3 (10.71%)	23 (82.14%)	2 (7.14%)	0 (0%)	0 (0%)
EMR (n)	1 (5.88%)	8 (47.06%)	4 (23.53%)	2 (11.76%)	1 (5.88%)	1 (5.88%)
EUR (n)	0 (0%)	5 (10%)	18 (36%)	12 (24%)	12 (24%)	3 (6.00%)
SEAR (n)	1 (9.09%)	2 (18.18%)	6 (54.55%)	2 (18.18%)	0 (0%)	0 (0.00%)
WPR (n)	2 (10.53%)	3 (15.79%)	8 (42.11%)	4 (21.05%)	2 (10.53%)	0 (0.00%)
G20						
No	11 (9.73%)	31 (27.43%)	48 (42.48%)	14 (12.39%)	4 (3.54%)	5(4.42%)
Yes	0 (0%)	1 (2.44%)	18 (43.9%)	10 (24.39%)	11 (26.83%)	1 (2.44%)
Income Group						
High income	1 (2%)	4 (8%)	20 (40%)	12 (24%)	13 (26%)	0 (0.00%)
Upper middle income	0 (0%)	9 (20.45%)	25 (56.82%)	7 (15.91%)	2 (4.55%)	1 (2.27%)
Lower middle income	6 (15%)	13 (32.5%)	12 (30%)	5 (12.5%)	0 (0%)	4 (10.00%)
Low income	4 (21.05%)	6 (31.58%)	8 (42.11%)	0 (0%)	0 (0%)	1 (5.26%)
NA	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)

Table 18. National Surveillance System for AMR – All, Animals

	All						Animals					
	Level 1	Level 2	Level 3	Level 4	Level 5	No Response	Level 1	Level 2	Level 3	Level 4	Level 5	No Response
Global (N)	39 (25.32%)	26 (16.88%)	26 (16.88%)	15 (9.74%)	18 (11.69%)	30 (19.48%)	38 (24.68%)	28 (18.18%)	26 (16.88%)	19 (12.34%)	22 (14.29%)	21 (13.64%)
Region												
AFR (n)	13 (44.83%)	6 (20.69%)	6 (20.69%)	1 (3.45%)	0 (0%)	3 (10.34%)	14 (48.28%)	5 (17.24%)	6 (20.69%)	2 (6.9%)	0 (0%)	2 (6.9%)
AMER (n)	9 (32.14%)	8 (28.57%)	2 (7.14%)	3 (10.71%)	2 (7.14%)	4 (14.29%)	9 (32.14%)	5 (17.86%)	6 (21.43%)	3 (10.71%)	1 (3.57%)	4 (14.29%)
EMR (n)	9 (52.94%)	1 (5.88%)	3 (17.65%)	0 (0%)	1 (5.88%)	3 (17.65%)	7 (41.18%)	1 (5.88%)	4 (23.53%)	0 (0%)	1 (5.88%)	4 (23.53%)
EUR (n)	4 (8%)	5 (10%)	8 (16%)	7 (14%)	14 (28%)	12 (24%)	3 (6%)	8 (16%)	4 (8%)	10 (20%)	18 (36%)	7 (14%)
SEAR (n)	1 (9.09%)	3 (27.27%)	3 (27.27%)	0 (0%)	0 (0%)	4 (36.36%)	1 (9.09%)	4 (36.36%)	3 (27.27%)	1 (9.09%)	0 (0%)	2 (18.18%)
WPR (n)	3 (15.79%)	3 (15.79%)	4 (21.05%)	4 (21.05%)	1 (5.26%)	4 (21.05%)	4 (21.05%)	5 (26.32%)	3 (15.79%)	3 (15.79%)	2 (10.53%)	2 (10.53%)
G20												
No	38 (33.63%)	22 (19.47%)	20 (17.7%)	7 (6.19%)	5 (4.42%)	21 (18.58%)	37 (32.74%)	25 (22.12%)	21 (18.58%)	8 (7.08%)	4 (3.54%)	18 (15.93%)
Yes	1 (2.44%)	4 (9.76%)	6 (14.63%)	8 (19.51%)	13 (31.71%)	9 (21.95%)	1 (2.44%)	3 (7.32%)	5 (12.2%)	11 (26.83%)	18 (43.9%)	3 (7.32%)
Income Group												
High income	6 (12%)	3 (6%)	5 (10%)	8 (16%)	15 (30%)	13 (26%)	7 (14%)	3 (6%)	6 (12%)	11 (22%)	20 (40%)	3 (6%)
Upper middle income	10 (22.73%)	12 (27.27%)	9 (20.45%)	6 (13.64%)	2 (4.55%)	5 (11.36%)	11 (25%)	11 (25%)	8 (18.18%)	5 (11.36%)	1 (2.27%)	8 (18.18%)
Lower middle income	14 (35%)	8 (20%)	7 (17.5%)	0 (0%)	1 (2.5%)	10 (25%)	12 (30%)	10 (25%)	9 (22.5%)	1 (2.5%)	1 (2.5%)	7 (17.5%)
Low income	9 (47.37%)	3 (15.79%)	5 (26.32%)	1 (5.26%)	0 (0%)	1 (5.26%)	8 (42.11%)	3 (15.79%)	3 (15.79%)	2 (10.53%)	0 (0%)	3 (15.79%)
NA	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
%	0	0	0	0	0	100	0	100	0	0	0	0

Table 19. National Surveillance System for AMR – Environment, Food

	Environment						Food					
	Level 1	Level 2	Level 3	Level 4	Level 5	No Response	Level 1	Level 2	Level 3	Level 4	Level 5	No Response
Global (N)	60 (38.96%)	20 (12.99%)	12 (7.79%)	2 (1.3%)	1 (0.65%)	59 (38.31%)	40 (25.97%)	14 (9.09%)	18 (11.69%)	17 (11.04%)	25 (16.23%)	40 (25.97%)
Region												
AFR (n)	17 (58.62%)	3 (10.34%)	3 (10.34%)	1 (3.45%)	0 (0%)	5 (17.24%)	17 (58.62%)	2 (6.9%)	3 (10.34%)	1 (3.45%)	0 (0%)	6 (20.69%)
AMER (n)	15 (53.57%)	3 (10.71%)	2 (7.14%)	1 (3.57%)	0 (0%)	7 (25%)	9 (32.14%)	4 (14.29%)	4 (14.29%)	4 (14.29%)	2 (7.14%)	5 (17.86%)
EMR (n)	7 (41.18%)	2 (11.76%)	0 (0%)	0 (0%)	0 (0%)	8 (47.06%)	6 (35.29%)	1 (5.88%)	3 (17.65%)	0 (0%)	1 (5.88%)	6 (35.29%)
EUR (n)	14 (28%)	3 (6%)	4 (8%)	0 (0%)	1 (2%)	28 (56%)	2 (4%)	2 (4%)	4 (8%)	10 (20%)	20 (40%)	12 (24%)
SEAR (n)	2 (18.18%)	4 (36.36%)	0 (0%)	0 (0%)	0 (0%)	5 (45.45%)	2 (18.18%)	1 (9.09%)	3 (27.27%)	1 (9.09%)	0 (0%)	4 (36.36%)
WPR (n)	5 (26.32%)	5 (26.32%)	3 (15.79%)	0 (0%)	0 (0%)	6 (31.58%)	4 (21.05%)	4 (21.05%)	1 (5.26%)	1 (5.26%)	2 (10.53%)	7 (36.84%)
G20												
No	47 (41.59%)	13 (11.5%)	7 (6.19%)	2 (1.77%)	1 (0.88%)	43 (38.05%)	39 (34.51%)	11 (9.73%)	15 (13.27%)	7 (6.19%)	5 (4.42%)	36 (31.86%)
Yes	13 (31.71%)	7 (17.07%)	5 (12.2%)	0 (0%)	0 (0%)	16 (39.02%)	1 (2.44%)	3 (7.32%)	3 (7.32%)	10 (24.39%)	20 (48.78%)	4 (9.76%)
Income Group												
High income	19 (38%)	4 (8%)	7 (14%)	1 (2%)	1 (2%)	18 (36%)	5 (10%)	2 (4%)	3 (6%)	10 (20%)	22 (44%)	8 (16%)
Upper middle income	16 (36.36%)	8 (18.18%)	2 (4.55%)	0 (0%)	0 (0%)	18 (40.91%)	11 (25%)	6 (13.64%)	9 (20.45%)	5 (11.36%)	2 (4.55%)	11 (25%)
Lower middle income	15 (37.5%)	6 (15%)	1 (2.5%)	0 (0%)	0 (0%)	18 (45%)	14 (35%)	4 (10%)	4 (10%)	1 (2.5%)	1 (2.5%)	16 (40%)
Low income	10 (52.63%)	1 (5.26%)	2 (10.53%)	1 (5.26%)	0 (0%)	5 (26.32%)	10 (52.63%)	1 (5.26%)	2 (10.53%)	1 (5.26%)	0 (0%)	5 (26.32%)
NA	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Table 20. National Surveillance System for AMR – Plants

	Plant				
	Level 1	**Level 2**	**Level 3**	**Level 4**	**No Response**
Global (N)	70 (45.45%)	15 (9.74%)	6 (3.9%)	3 (1.95%)	60 (38.96%)
Region					
AFR (n)	18 (62.07%)	1 (3.45%)	3 (10.34%)	1 (3.45%)	6 (20.69%)
AMER (n)	18 (64.29%)	3 (10.71%)	1 (3.57%)	0 (0%)	6 (21.43%)
EMR (n)	7 (41.18%)	2 (11.76%)	0 (0%)	0 (0%)	8 (47.06%)
EUR (n)	15 (30%)	2 (4%)	1 (2%)	2 (4%)	30 (60%)
SEAR (n)	5 (45.45%)	2 (18.18%)	0 (0%)	0 (0%)	4 (36.36%)
WPR (n)	7 (36.84%)	5 (26.32%)	1 (5.26%)	0 (0%)	6 (31.58%)
G20					
No	54 (47.79%)	11 (9.73%)	5 (4.42%)	3 (2.65%)	40 (35.4%)
Yes	16 (39.02%)	4 (9.76%)	1 (2.44%)	0 (0%)	20 (48.78%)
Income Group					
High income	21 (42%)	3 (6%)	3 (6%)	2 (4%)	21 (42%)
Upper middle income	20 (45.45%)	6 (13.64%)	0 (0%)	0 (0%)	18 (40.91%)
Lower middle income	19 (47.5%)	4 (10%)	1 (2.5%)	0 (0%)	16 (40%)
Low income	10 (52.63%)	1 (5.26%)	2 (10.53%)	1 (5.26%)	5 (26.32%)
No Response	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)

Table 21. Infection Prevention and Control – Human Health Care

	Level 1	Level 2	Level 3	Level 4	E	No Response
Global (N)	18 (11.69%)	41 (26.62%)	42 (27.27%)	25 (16.23%)	23 (14.94%)	5 (3.25%)
Region						
AFR (n)	6 (20.69%)	12 (41.38%)	8 (27.59%)	2 (6.9%)	0 (0%)	1 (3.45%)
AMER (n)	7 (25%)	8 (28.57%)	11 (39.29%)	2 (7.14%)	0 (0%)	0 (0%)
EMR (n)	1 (5.88%)	4 (23.53%)	3 (17.65%)	3 (17.65%)	4 (23.53%)	2 (11.76%)
EUR (n)	2 (4%)	8 (16%)	12 (24%)	12 (24%)	14 (28%)	2 (4%)
SEAR (n)	1 (9.09%)	4 (36.36%)	4 (36.36%)	2 (18.18%)	0 (0%)	0 (0%)
WPR (n)	1 (5.26%)	5 (26.32%)	4 (21.05%)	4 (21.05%)	5 (26.32%)	0 (0%)
G20						
No	16 (14.16%)	36 (31.86%)	32 (28.32%)	15 (13.27%)	10 (8.85%)	4 (3.54%)
Yes	2 (4.88%)	5 (12.2%)	10 (24.39%)	10 (24.39%)	13 (31.71%)	1 (2.44%)
Income Group						
High income	5 (10%)	6 (12%)	8 (16%)	14 (28%)	16 (32%)	1 (2%)
Upper middle income	4 (9.09%)	15 (34.09%)	14 (31.82%)	5 (11.36%)	6 (13.64%)	0 (0%)
Lower middle income	5 (12.5%)	13 (32.5%)	15 (37.5%)	3 (7.5%)	1 (2.5%)	3 (7.5%)
Low income	4 (21.05%)	7 (36.84%)	5 (26.32%)	2 (10.53%)	0 (0%)	1 (5.26%)
NA	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)

Table 22. Practices to Reduce the Use of Antimicrobials in Animal and Plant Production and AMR transmission in Food Production

	All						Animal					
	Level 1	Level 2	Level 3	Level 4	Level 5	No Response	Level 1	Level 2	Level 3	Level 4	Level 5	No Response
Global (N)	21 (13.64%)	67 (43.51%)	21 (13.64%)	7 (4.55%)	10 (6.49%)	28 (18.18%)	15 (9.74%)	73 (47.4%)	28 (18.18%)	11 (7.14%)	9 (5.84%)	18 (11.69%)
Region												
AFR (n)	5 (17.24%)	15 (51.72%)	6 (20.69%)	0 (0%)	0 (0%)	3 (10.34%)	4 (13.79%)	13 (44.83%)	8 (27.59%)	0 (0%)	0 (0%)	4 (13.79%)
AMER (n)	4 (14.29%)	15 (53.57%)	3 (10.71%)	1 (3.57%)	0 (0%)	5 (17.86%)	3 (10.71%)	16 (57.14%)	6 (21.43%)	0 (0%)	0 (0%)	3 (10.71%)
EMR (n)	3 (17.65%)	6 (35.29%)	2 (11.76%)	0 (0%)	1 (5.88%)	5 (29.41%)	2 (11.76%)	7 (41.18%)	4 (23.53%)	0 (0%)	0 (0%)	4 (23.53%)
EUR (n)	5 (10%)	21 (42%)	3 (6%)	3 (6%)	9 (18%)	9 (18%)	4 (8%)	24 (48%)	3 (6%)	7 (14%)	8 (16%)	4 (8%)
SEAR (n)	1 (9.09%)	4 (36.36%)	2 (18.18%)	0 (0%)	0 (0%)	4 (36.36%)	1 (9.09%)	2 (18.18%)	5 (45.45%)	1 (9.09%)	0 (0%)	2 (18.18%)
WPR (n)	3 (15.79%)	6 (31.58%)	5 (26.32%)	3 (15.79%)	0 (0%)	2 (10.53%)	1 (5.26%)	11 (57.89%)	2 (10.53%)	3 (15.79%)	1 (5.26%)	1 (5.26%)
G20												
No	20 (17.7%)	54 (47.79%)	16 (14.16%)	2 (1.77%)	2 (1.77%)	19 (16.81%)	14 (12.39%)	61 (53.98%)	18 (15.93%)	3 (2.65%)	1 (0.88%)	16 (14.16%)
Yes	1 (2.44%)	13 (31.71%)	5 (12.2%)	5 (12.2%)	8 (19.51%)	9 (21.95%)	1 (2.44%)	12 (29.27%)	10 (24.39%)	8 (19.51%)	8 (19.51%)	2 (4.88%)
Income Group												
High income	2 (4%)	18 (36%)	3 (6%)	6 (12%)	9 (18%)	12 (24%)	1 (2%)	22 (44%)	6 (12%)	9 (18%)	9 (18%)	3 (6%)
Upper middle income	6 (13.64%)	22 (50%)	8 (18.18%)	1 (2.27%)	1 (2.27%)	6 (13.64%)	5 (11.36%)	24 (54.55%)	8 (18.18%)	2 (4.55%)	0 (0%)	5 (11.36%)
Lower middle income	8 (20%)	17 (42.5%)	7 (17.5%)	0 (0%)	0 (0%)	8 (20%)	5 (12.5%)	20 (50%)	10 (25%)	0 (0%)	0 (0%)	5 (12.5%)
Low income	5 (26.32%)	9 (47.37%)	3 (15.79%)	0 (0%)	0 (0%)	2 (10.53%)	4 (21.05%)	6 (31.58%)	4 (21.05%)	0 (0%)	0 (0%)	5 (26.32%)
NA	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Table 23. Practices to reduce the use of antimicrobials in Animal and Plant Production and AMR transmission in Food Production (Environment, Food Production%)

	Environment						Food Production				
	Level 1	Level 2	Level 3	Level 4	Level 5	No Response	Level 1	Level 2	Level 3	Level 4	Level 5
Global (N)	40 (25.97%)	27 (17.53%)	8 (5.19%)	2 (1.3%)	2 (1.3%)	75 (48.7%)	23 (14.94%)	46 (29.87%)	20 (12.99%)	12 (7.79%)	9 (5.84%)
Region											
AFR (n)	12 (41.38%)	7 (24.14%)	4 (13.79%)	0 (0%)	0 (0%)	6 (20.69%)	8 (27.59%)	9 (31.03%)	6 (20.69%)	0 (0%)	0 (0%)
AMER (n)	11 (39.29%)	3 (10.71%)	0 (0%)	1 (3.57%)	0 (0%)	13 (46.43%)	6 (21.43%)	10 (35.71%)	4 (14.29%)	0 (0%)	0 (0%)
EMR (n)	6 (35.29%)	1 (5.88%)	1 (5.88%)	1 (5.88%)	0 (0%)	8 (47.06%)	5 (29.41%)	5 (29.41%)	1 (5.88%)	1 (5.88%)	0 (0%)
EUR (n)	6 (12%)	9 (18%)	2 (4%)	0 (0%)	2 (4%)	31 (62%)	1 (2%)	17 (34%)	3 (6%)	7 (14%)	8 (16%)
SEAR (n)	2 (18.18%)	3 (27.27%)	0 (0%)	0 (0%)	0 (0%)	6 (54.55%)	1 (9.09%)	2 (18.18%)	2 (18.18%)	1 (9.09%)	0 (0%)
WPR (n)	3 (15.79%)	4 (21.05%)	1 (5.26%)	0 (0%)	0 (0%)	11 (57.89%)	2 (10.53%)	3 (15.79%)	4 (21.05%)	3 (15.79%)	1 (5.26%)
G20											
No	33 (29.2%)	20 (17.7%)	6 (5.31%)	2 (1.77%)	1 (0.88%)	51 (45.13%)	22 (19.47%)	35 (30.97%)	14 (12.39%)	4 (3.54%)	1 (0.88%)
Yes	7 (17.07%)	7 (17.07%)	2 (4.88%)	0 (0%)	1 (2.44%)	24 (58.54%)	1 (2.44%)	11 (26.83%)	6 (14.63%)	8 (19.51%)	8 (19.51%)
Income Group											
High income	9 (18%)	11 (22%)	2 (4%)	0 (0%)	2 (4%)	26 (52%)	2 (4%)	16 (32%)	4 (8%)	9 (18%)	9 (18%)
Upper middle income	14 (31.82%)	4 (9.09%)	1 (2.27%)	2 (4.55%)	0 (0%)	23 (52.27%)	8 (18.18%)	13 (29.55%)	6 (13.64%)	3 (6.82%)	0 (0%)
Lower middle income	10 (25%)	7 (17.5%)	2 (5%)	0 (0%)	0 (0%)	21 (52.5%)	7 (17.5%)	11 (27.5%)	7 (17.5%)	0 (0%)	0 (0%)
Low income	7 (36.84%)	4 (21.05%)	3 (15.79%)	0 (0%)	0 (0%)	5 (26.32%)	6 (31.58%)	5 (26.32%)	3 (15.79%)	0 (0%)	0 (0%)
NA	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)

Table 24. Practices to reduce the use of antimicrobials in Animal and Plant Production and AMR transmission in Food Production (Food Safety, Plant)

	Food Safety						Plant					
	Level 1	Level 2	Level 3	Level 4	Level 5	No Response	Level 1	Level 2	Level 3	Level 4	Level 5	No Response
Global (N)	23 (14.94%)	53 (34.42%)	18 (11.69%)	14 (9.09%)	6 (3.9%)	40 (25.97%)	36 (23.38%)	43 (27.92%)	11 (7.14%)	3 (1.95%)	3 (1.95%)	58 (37.66%)
Region												
AFR (n)	9 (31.03%)	9 (31.03%)	5 (17.24%)	0 (0%)	0 (0%)	6 (20.69%)	10 (34.48%)	8 (27.59%)	4 (13.79%)	0 (0%)	0 (0%)	7 (24.14%)
AMER (n)	5 (17.86%)	12 (42.86%)	4 (14.29%)	0 (0%)	0 (0%)	7 (25%)	7 (25%)	13 (46.43%)	3 (10.71%)	0 (0%)	0 (0%)	5 (17.86%)
EMR (n)	4 (23.53%)	5 (29.41%)	1 (5.88%)	1 (5.88%)	0 (0%)	6 (35.29%)	6 (35.29%)	3 (17.65%)	1 (5.88%)	0 (0%)	0 (0%)	7 (41.18%)
EUR (n)	3 (6%)	19 (38%)	4 (8%)	7 (14%)	6 (12%)	11 (22%)	10 (20%)	5 (10%)	1 (2%)	2 (4%)	3 (6%)	29 (58%)
SEAR (n)	1 (9.09%)	3 (27.27%)	1 (9.09%)	2 (18.18%)	0 (0%)	4 (36.36%)	1 (9.09%)	5 (45.45%)	1 (9.09%)	0 (0%)	0 (0%)	4 (36.36%)
WPR (n)	1 (5.26%)	5 (26.32%)	3 (15.79%)	4 (21.05%)	0 (0%)	6 (31.58%)	2 (10.53%)	9 (47.37%)	1 (5.26%)	1 (5.26%)	0 (0%)	6 (31.58%)
G20												
No	21 (18.58%)	40 (35.4%)	12 (10.62%)	6 (5.31%)	1 (0.88%)	33 (29.2%)	29 (25.66%)	35 (30.97%)	8 (7.08%)	1 (0.88%)	2 (1.77%)	38 (33.63%)
Yes	2 (4.88%)	13 (31.71%)	6 (14.63%)	8 (19.51%)	5 (12.2%)	7 (17.07%)	7 (17.07%)	8 (19.51%)	3 (7.32%)	2 (4.88%)	1 (2.44%)	20 (48.78%)
Income Group												
High income	3 (6%)	18 (36%)	4 (8%)	9 (18%)	6 (12%)	10 (20%)	9 (18%)	13 (26%)	3 (6%)	2 (4%)	3 (6%)	20 (40%)
Upper middle income	8 (18.18%)	15 (34.09%)	7 (15.91%)	3 (6.82%)	0 (0%)	11 (25%)	12 (27.27%)	15 (34.09%)	2 (4.55%)	1 (2.27%)	0 (0%)	14 (31.82%)
Lower middle income	6 (15%)	13 (32.5%)	5 (12.5%)	2 (5%)	0 (0%)	14 (35%)	9 (22.5%)	9 (22.5%)	4 (10%)	0 (0%)	0 (0%)	18 (45%)
Low income	6 (31.58%)	6 (31.58%)	2 (10.53%)	0 (0%)	0 (0%)	5 (26.32%)	6 (31.58%)	5 (26.32%)	2 (10.53%)	0 (0%)	0 (0%)	6 (31.58%)
NA	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Table 25. Optimizing Antimicrobial Use – Human Health

	Level 1	Level 2	Level 3	Level 4	Level 5	No Response
Global (N)	25 (16.23%)	23 (14.94%)	61 (39.61%)	34 (22.08%)	7 (4.55%)	4 (2.6%)
Region						
AFR (n)	8 (27.59%)	6 (20.69%)	11 (37.93%)	2 (6.9%)	0 (0%)	2 (6.9%)
AMER (n)	8 (28.57%)	2 (7.14%)	15 (53.57%)	2 (7.14%)	0 (0%)	1 (3.57%)
EMR (n)	2 (11.76%)	4 (23.53%)	9 (52.94%)	2 (11.76%)	0 (0%)	0 (0%)
EUR (n)	3 (6%)	6 (12%)	18 (36%)	16 (32%)	6 (12%)	1 (2%)
SEAR (n)	2 (18.18%)	5 (45.45%)	2 (18.18%)	2 (18.18%)	0 (0%)	0 (0%)
WPR (n)	2 (10.53%)	0 (0%)	6 (31.58%)	10 (52.63%)	1 (5.26%)	0 (0%)
G20						
No	22 (19.47%)	21 (18.58%)	50 (44.25%)	14 (12.39%)	2 (1.77%)	4 (3.54%)
Yes	3 (7.32%)	2 (4.88%)	11 (26.83%)	20 (48.78%)	5 (12.2%)	0 (0%)
Income Group						
High income	5 (10%)	2 (4%)	18 (36%)	19 (38%)	6 (12%)	0 (0%)
Upper middle income	7 (15.91%)	6 (13.64%)	21 (47.73%)	9 (20.45%)	1 (2.27%)	0 (0%)
Lower middle income	8 (20%)	11 (27.5%)	14 (35%)	4 (10%)	0 (0%)	3 (7.5%)
Low income	5 (26.32%)	4 (21.05%)	8 (42.11%)	1 (5.26%)	0 (0%)	1 (5.26%)
NA	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)

Table 26. Optimizing Antimicrobial Use – Animal & Plant Health

	All						Animal						Plant					
	Level 1	Level 2	Level 3	Level 4	Level 5	No Response	Level 1	Level 2	Level 3	Level 4	Level 5	No Response	Level 1	Level 2	Level 3	Level 4	Level 5	No Response
Global (N)	28 (18.18%)	40 (25.97%)	34 (22.08%)	7 (4.55%)	17 (11.04%)	28 (18.18%)	24 (15.58%)	42 (27.27%)	35 (22.73%)	12 (7.79%)	20 (12.99%)	21 (13.64%)	39 (25.32%)	28 (18.18%)	16 (10.39%)	4 (2.6%)	3 (1.95%)	39 (25.32%)
Region																		
	7 (24.14%)	9 (31.03%)	9 (31.03%)	0 (0%)	0 (0%)	4 (13.79%)	8 (27.59%)	10 (34.48%)	7 (24.14%)	0 (0%)	0 (0%)	4 (13.79%)	9 (31.03%)	8 (27.59%)	4 (13.79%)	0 (0%)	0 (0%)	9 (31.03%)
AMRO (n)	4 (14.29%)	13 (46.43%)	3 (10.71%)	1 (3.57%)	2 (7.14%)	5 (17.86%)	4 (14.29%)	12 (42.86%)	5 (17.86%)	2 (7.14%)	2 (7.14%)	3 (10.71%)	8 (28.57%)	5 (17.86%)	5 (17.86%)	2 (7.14%)	0 (0%)	8 (28.57%)
EMRO (n)	5 (29.41%)	4 (23.53%)	3 (17.65%)	2 (11.76%)	0 (0%)	3 (17.65%)	4 (23.53%)	3 (17.65%)	5 (29.41%)	2 (11.76%)	0 (0%)	3 (17.65%)	6 (35.29%)	3 (17.65%)	1 (5.88%)	0 (0%)	0 (0%)	6 (35.29%)
EURO (n)	4 (8%)	8 (16%)	10 (20%)	4 (8%)	15 (30%)	9 (18%)	2 (4%)	7 (14%)	11 (22%)	6 (12%)	17 (34%)	7 (14%)	8 (16%)	3 (6%)	2 (4%)	2 (4%)	3 (6%)	8 (16%)
SEARO (n)	2 (18.18%)	3 (27.27%)	2 (18.18%)	0 (0%)	0 (0%)	4 (36.36%)	2 (18.18%)	4 (36.36%)	2 (18.18%)	1 (9.09%)	0 (0%)	2 (18.18%)	3 (27.27%)	4 (36.36%)	0 (0%)	0 (0%)	0 (0%)	3 (27.27%)
WPRO (n)	6 (31.58%)	3 (15.79%)	7 (36.84%)	0 (0%)	0 (0%)	3 (15.79%)	4 (21.05%)	6 (31.58%)	5 (26.32%)	1 (5.26%)	1 (5.26%)	2 (10.53%)	5 (26.32%)	5 (26.32%)	4 (21.05%)	0 (0%)	0 (0%)	5 (26.32%)
G20																		
No	11 (9.73%)	32 (28.32%)	21 (18.58%)	22 (19.47%)	8 (7.08%)	19 (16.81%)	24 (21.24%)	39 (34.51%)	24 (21.24%)	4 (3.54%)	4 (3.54%)	18 (15.93%)	35 (30.97%)	26 (23.01%)	8 (7.08%)	0 (0%)	1 (0.88%)	35 (30.97%)
Yes	6 (14.63%)	3 (7.32%)	11 (26.83%)	14 (34.15%)	2 (4.88%)	5 (12.2%)	0 (0%)	3 (7.32%)	11 (26.83%)	8 (19.51%)	16 (39.02%)	3 (7.32%)	4 (9.76%)	2 (4.88%)	8 (19.51%)	4 (9.76%)	2 (4.88%)	4 (9.76%)
Income Group																		
High income	5 (10%)	8 (16%)	6 (12%)	4 (8%)	16 (32%)	11 (22%)	4 (8%)	8 (16%)	9 (18%)	6 (12%)	19 (38%)	4 (8%)	12 (24%)	5 (10%)	6 (12%)	2 (4%)	3 (6%)	12 (24%)
Upper middle income	6 (13.64%)	13 (29.55%)	15 (34.09%)	2 (4.55%)	1 (2.27%)	7 (15.91%)	7 (15.91%)	12 (27.27%)	14 (31.82%)	4 (9.09%)	1 (2.27%)	6 (13.64%)	11 (25%)	9 (20.45%)	5 (11.36%)	2 (4.55%)	0 (0%)	11 (25%)

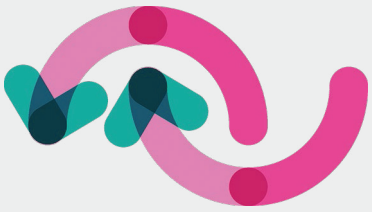
	All						Animal						Plant					
	Level 1	Level 2	Level 3	Level 4	Level 5	No Response	Level 1	Level 2	Level 3	Level 4	Level 5	No Response	Level 1	Level 2	Level 3	Level 4	Level 5	No Response
Lower middle income	12 (30%)	13 (32.5%)	7 (17.5%)	1 (2.5%)	0 (0%)	7 (17.5%)	9 (22.5%)	16 (40%)	7 (17.5%)	2 (5%)	0 (0%)	6 (15%)	11 (27.5%)	8 (20%)	2 (5%)	0 (0%)	0 (0%)	11 (27.5%)
Low income	5 (26.32%)	6 (31.58%)	6 (31.58%)	0 (0%)	0 (0%)	2 (10.53%)	4 (21.05%)	5 (26.32%)	5 (26.32%)	0 (0%)	0 (0%)	5 (26.32%)	5 (26.32%)	5 (26.32%)	3 (15.79%)	0 (0%)	0 (0%)	5 (26.32%)
NA	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Table 27. Legislation/Regulations to Prevent Contamination of the Environment with Antimicrobials

	Level 1	Level 2	Level 3	Level 4	Level 5	No Response
Global (N)	17 (11.04%)	35 (22.73%)	32 (20.78%)	36 (23.38%)	10 (6.49%)	24 (15.58%)
Region						
AFR (n)	3 (10.34%)	11 (37.93%)	7 (24.14%)	3 (10.34%)	1 (3.45%)	4 (13.79%)
AMER (n)	2 (7.14%)	13 (46.43%)	3 (10.71%)	3 (10.71%)	3 (10.71%)	4 (14.29%)
EMR (n)	1 (5.88%)	2 (11.76%)	5 (29.41%)	3 (17.65%)	2 (11.76%)	4 (23.53%)
EUR (n)	5 (10%)	3 (6%)	11 (22%)	20 (40%)	4 (8%)	7 (14%)
SEAR (n)	2 (18.18%)	4 (36.36%)	3 (27.27%)	1 (9.09%)	0 (0%)	1 (9.09%)
WPR (n)	4 (21.05%)	2 (10.53%)	3 (15.79%)	6 (31.58%)	0 (0%)	4 (21.05%)
G20						
No	11 (9.73%)	32 (28.32%)	21 (18.58%)	22 (19.47%)	8 (7.08%)	19 (16.81%)
Yes	6 (14.63%)	3 (7.32%)	11 (26.83%)	14 (34.15%)	2 (4.88%)	5 (12.2%)
Income Group						
High income	6 (12%)	5 (10%)	8 (16%)	22 (44%)	3 (6%)	6 (12%)
Upper middle income	4 (9.09%)	12 (27.27%)	11 (25%)	8 (18.18%)	2 (4.55%)	7 (15.91%)
Lower middle income	5 (12.5%)	11 (27.5%)	7 (17.5%)	5 (12.5%)	4 (10%)	8 (20%)
Low income	2 (10.53%)	6 (31.58%)	6 (31.58%)	1 (5.26%)	1 (5.26%)	3 (15.79%)
NA	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Table 28. Country Use Policy & Regulatory Status

	Use not authorized for growth promotion		Regulations – Prescription/Sale	
	No	Yes	No	Yes
Global (N)	90 (58.44%)	64 (41.56%)	31 (20.13%)	123 (79.87%)
Region				
AFR (n)	26 (89.66%)	3 (10.34%)	10 (34.48%)	19 (65.52%)
AMER (n)	21 (75%)	7 (25%)	6 (21.43%)	22 (78.57%)
EMR (n)	9 (52.94%)	8 (47.06%)	5 (29.41%)	12 (70.59%)
EUR (n)	17 (34%)	33 (66%)	5 (10%)	45 (90%)
SEAR (n)	6 (54.55%)	5 (45.45%)	2 (18.18%)	9 (81.82%)
WPR (n)	11 (57.89%)	8 (42.11%)	3 (15.79%)	16 (84.21%)
G20				
No	81 (71.68%)	32 (28.32%)	28 (24.78%)	85 (75.22%)
Yes	9 (21.95%)	32 (78.05%)	3 (7.32%)	38 (92.68%)
Income Group				
High income	11 (22%)	39 (78%)	4 (8%)	46 (92%)
Upper middle income	31 (70.45%)	13 (29.55%)	7 (15.91%)	37 (84.09%)
Lower middle income	31 (77.5%)	9 (22.5%)	11 (27.5%)	29 (72.5%)
Low income	16 (84.21%)	3 (15.79%)	9 (47.37%)	10 (52.63%)
NA	1 (100%)	0 (0%)	0 (0%)	1 (100%)



World Health Organization

For more information contact:
World Health Organization
Antimicrobial Resistance Secretariat
Avenue Appia 20
1211 Geneva 27
Switzerland
E-mail: whoamrsecretariat@who.int
Web site: http://www.who.int/antimicrobial-resistance/en/

ISBN 978-92-5-130800-4
9 789251 308004
CA0486EN/1/07.18