WHO Strategic and Technical Advisory Group for Antimicrobial Resistance (STAG-AMR)

Report of the second meeting
14–16 June 2022
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Introduction

The World Health Organization (WHO) through the Antimicrobial Resistance Division, is leading, guiding and facilitating the Organization’s global response to antimicrobial resistance (AMR), based on the Global Action Plan on AMR (GAP), the 13th WHO General Program of Work and the Sustainable Development Goals (SDGs). Its major functions include the establishment and coordination of global mechanisms needed to drive political and systemic change and supporting Member States to build national capacities to implement their national action plans and reduce levels of antimicrobial resistance worldwide.

Mission and functions of the Strategic and Technical Advisory Group on AMR (STAG-AMR)

The STAG-AMR has the mandate of advising the WHO Director-General and the AMR Division on global policies and strategies to address AMR within the context of human health, while considering relevant World Health Assembly (WHA) resolutions and decisions. The STAG-AMR reports to the Director-General of WHO, and members are appointed by the Director-General. The Terms of Reference for STAG-AMR are provided at https://www.who.int/groups/strategic-and-technical-advisory-group-on-antimicrobial-resistance.

The STAG-AMR has the following functions:

1. To review progress and make recommendations in the implementation of WHO’s priority activities to tackle AMR in countries consistent with WHO’s mandate, relevant WHA resolutions and decisions, and the strategic objectives of the Global Action Plan on AMR;

2. To provide an independent evaluation of the major strategic, scientific and technical challenges and opportunities to be addressed by WHO in order to enhance progress in addressing AMR in the context of human health;

3. To review and make recommendations regarding the adequacy of WHO’s response to emerging national and global public health risks with regards to AMR;

4. To review and make recommendations on the status of linkages between AMR and other health interventions, and other relevant sectors;

5. To review and make recommendations on WHO’s engagement in partnerships to enhance the achievement of global AMR goals.
The second meeting of the STAG-AMR took place at WHO Headquarters, Geneva, from 14-16 June 2022. Fourteen members of STAG-AMR were able to join the meeting in person, three members joined the meeting via Zoom: Timothy Walsh, United Kingdom of Great Britain and Northern Ireland, Nandini Shetty, United Kingdom, and Zu Zhang, China. Two STAG-AMR members were unfortunately not available to join the meeting and sent apologies: Viroj Tangcharoenathsathien and Weil Ahmad Hayajneh. Forty invited observers joined the meeting virtually. The meeting was organized by the Office of the Assistant Director-General (ADG) of the AMR Division, in close collaboration with the Department of Global Coordination and Partnership (GCP) and the Department of Surveillance, Prevention and Control (SPC) of the Division.

Professor Gunnar Kahlmeter has been appointed by the WHO Director-General as STAG-AMR Chair for the period of 2020-2023. He is a clinical microbiologist who has worked in clinical microbiology and the field of antimicrobial resistance since the early 70s. He heads the Swedish national reference laboratory on phenotypic susceptibility testing of bacteria and is the head of the EUCAST Development Laboratory. Professor Sabiha Essack has been appointed as the Vice-Chair for STAG-AMR. She is the South African Research Chair in Antibiotic Resistance and One Health and is Professor in Pharmaceutical Sciences at the University of KwaZulu-Natal.

The STAG-AMR members were joined by WHO staff from technical units within Headquarters, AMR Regional Focal Points from all six WHO Regional Offices and colleagues from WHO Country Offices of India, Indonesia, Egypt, Jordan and Tajikistan. A wide range of Observers also joined the meeting via Zoom and were able to follow the presentations and discussions throughout the meeting. See Annex 1 for the list of participants.

The STAG-AMR were also joined by Dr Tedros Adhanom Ghebreyesus, Director-General, WHO and by Dr Zsuzsanna Jakab, Deputy Director-General, WHO, both of whom expressed their gratitude to members of STAG-AMR for giving their time and expertise, and their commitment to supporting the work of the Organization and its partners in addressing AMR.

Dr Balkhy reminded STAG-AMR members that they would be participating in their individual capacities without representing their affiliated institutions or any interest groups. All STAG members were asked in advance of the meeting to disclose any additional potential Conflicts of Interest related to the agenda. Due to changes in work positions, two of the STAG-AMR members were no longer able to maintain their positions as members of STAG-AMR, as the change in their work situation constituted a conflict of interest. These members are Lawrence Kerr and Otrida Kapona. WHO expressed its gratitude to them for all their valuable contributions to this advisory group.
At the STAG-AMR meeting in 2021, two members had declared potential conflicts of interest, and it was noted that the interests disclosed did not constitute a conflict for the purpose of the STAG meeting. With the updates provided on potential conflicts of interest before this meeting, no further conflicts were disclosed for the purpose of the STAG-AMR meeting.

All observers attending, virtually, had signed a confidentiality undertaking. The WHO Secretariat reminded all participants that the meeting was being recorded, for internal use only, and will remain strictly confidential. French interpretation was available.

**Meeting objectives**

At this second meeting, WHO requested STAG-AMR to review and advise on several areas of the WHO global AMR work. In addition, two special sessions were included during which STAG-AMR members heard examples from countries and regions on driving public health initiatives to address AMR at the country level. The agenda items are summarized below:

### Day 1
- Opening (Session 1)
- Updates from the Secretariat (Session 2: informative session)
- Implementation and next steps for the Fungal Priority Pathogens List (Session 3)

### Day 2
- WHO Global AMR Research Agenda in the Human Health Sector (Session 4)
- Updates from the Secretariat Cont. (Session 5: informative session)
- National periodic AMR prevalence surveys for AMR burden, trend analysis and (multisectoral) research projects (Session 6)
- Considerations from STAG-AMR for the Global Regulators’ Summit on Antibiotic Use in Humans and Animals (Session 7)
- Updates on IPC Survey and Global Strategy (Session 8)

### Day 3
- Agreement on observations and recommendations (Session 9)
- Closure
Each STAG-AMR meeting session began with an introductory presentation by WHO staff. Comments and suggested recommendations were provided by two STAG-AMR members serving as session discussants, followed by comments and recommendations offered by other STAG-AMR members, and additional comments by other participants/observers. The STAG-AMR members serving as session discussants developed draft written observations and recommendations, with the assistance of WHO technical focal points and the Chair. The draft written observations and recommendations were shared for review with the STAG-AMR members. Their comments were consolidated by the WHO Secretariat and presented on the 3rd day of the meeting for final discussion and agreement and are summarized by the WHO Secretariat in this report. The consolidated report was reviewed by the STAG-AMR Chair and by STAG-AMR Members. The report is submitted by the Chair of the STAG-AMR Chair and the Assistant-Director General of the Antimicrobial Resistance Division to the Deputy Director-General and the Director-General of WHO.

This report provides a summary of the Second meeting of STAG-AMR, with a focus on the conclusions and recommendations provided by STAG-AMR to WHO for the topics addressed. The report is posted on the WHO website.
Summary of Sessions with STAG-AMR conclusions and recommendations

Session 1: Opening

Dr Hanan Balkhy, Assistant Director-General AMR opened the second official meeting of the WHO STAG-AMR, welcoming members of the STAG-AMR, representatives from the six WHO Regions, technical focal points at WHO Headquarters and invited observers. She noted that since the adoption of the Global Action Plan on Antimicrobial resistance by the WHA in 2015, a total of 157 member states and territories have now established their multisectoral AMR National Action Plans (NAP). Although there has been progress, many challenges remain and the request for support from countries to WHO and partners is higher than ever. She stressed that data shows that only 20% of the countries had fully funded the implementation of their plans and of these, 78% of the countries were high income or upper-middle income countries. The COVID-19 pandemic has underscored the urgency of controlling AMR through interventions such as infection prevention and control, laboratory strengthening, surveillance, antimicrobial stewardship, and water, sanitation and hygiene using a programmatic and sustainable approach. Furthermore, she noted, it was important to leverage ongoing global COVID-19 response measures to address AMR.

Session 2: Updates from the Secretariat (informative session)

Dr Kitty van Weezenbeek, Director, Department of Surveillance, Prevention and Control of AMR, provided an overview of progress on new WHO initiatives that address crucial AMR response gaps at country level. She began with a summary of the progress of National Action Plan (NAP) implementation presenting an overview of the results of the 2021 Tripartite Antimicrobial Resistance Country Self-Assessment Survey (TrACSS). Although significant progress was seen in terms of the number of countries having NAPs, only 20% of these are fully funded and progress across each sector remains fragmented. This reflects the lack of a coherent programmatic response at country level, with many countries struggling to establish fully functional multisectoral working groups.

The Global Action Plan on AMR of 2015 while extensive in its scope, did not address some issues that have since emerged as key: governance, laboratory strengthening, the patient perspective and the need to integrate AMR into broader health systems such as primary health care, universal health coverage and pandemic preparedness. In response, WHO is now
encouraging a programmatic public health approach that recognizes the interdependence of the six building blocks: political commitment and governance that brings leadership, funding, education, human resources and use of data; access to early diagnosis in a quality assured laboratory network; access to appropriate treatment; prevention of infection including IPC and vaccination; an uninterrupted supply chain for both treatment and diagnostics; and, surveillance and evidence generation.

In March 2022, WHO launched the WHO AMR NAP Implementation Handbook which contains the six practical steps at country level as well as tools and guidance on leadership for multisectoral coordination, costing and budgeting, webinars on NAP implementation and monitoring and evaluation, a community of practice platform and a checklist for implementation at each step. There is currently a high demand for capacity-building workshops, webinars, e-learning modules and peer-to-peer exchange.

The people-centred framework for AMR is being developed to address the hurdles patients face at each stage of the health-care system. WHO has established three-level (HQ, regional and country office) working groups to analyze the challenges at country level, particularly those faced by vulnerable population groups, and identify the priority interventions. Civil society will also be engaged.

Diagnostic capacity for bacterial and fungal infections and AMR is also being strengthened, putting the laboratory at the heart of the AMR response. Working closely with regional laboratory networks, the WHO Diagnostic Initiative will build a WHO strategic and operational framework, monitor AMR laboratory capacity globally, develop a global AMR laboratory network with an External Quality Assessment (EQA) programme and drive research and innovation with a focus on bacterial and fungal infectious diseases and new diagnostics.

The next phase of the Global Antimicrobial Resistance and Use Surveillance System (GLASS) is underway and with the following priority workstreams: accelerating the generation of representative AMR data in low- and middle-income countries, with AMR prevalence surveys; integrated surveillance; enhanced representativeness and quality of routine surveillance; expansion of surveillance of antimicrobial consumption and use, including in the community; AMR attributable mortality measurement and guidance on the use of data at local, national and global levels. The next-generation IT data platform (GLASS 2.0) will be launched in 2023. GLASS-EAR for emerging AMR reporting and risk assessment will also be reviewed.

A technical assistance mechanism, “AMR TEAM”, is being established and a global strategy on drug resistant bacterial infections in the human health sector will be brought to the World Health Assembly for endorsement.
Haileyesus Getahun, Director, AMR Global Coordination Department and Quadripartite Joint Secretariat on AMR (QJS) provided an update on addressing the One Health response through quadripartite joint activities on AMR, global governance structures and political engagement and One Health antimicrobial awareness, access, research and development, and regulation.

On 17 March 2022, the United Nations Environment Programme (UNEP) officially joined the Quadripartite Alliance formalizing long-standing working relationships. The QJS now has dedicated staff from WHO, the Food and Agriculture Organization of the United Nations (FAO), UNEP and the World Organisation for Animal Health (WOAH, formerly OIE). The Quadripartite Strategic Framework for collaboration on AMR was published in 2022 with a clear goal, two objectives and an overarching defined impact on country capacities.

The Quadripartite is developing the AMR economic and investment case and determining the cost and benefits of AMR response across different sectors. A package of priority interventions and a toolkit for developing country investment cases will follow. The Quadripartite is also advancing integrated surveillance of AMR and use across all sectors. A technical working group is providing technical advice to the Quadripartite and the Global Leaders Group on AMR (GLG), revising definitions and practice and defining priority needs particularly for low- and middle-income countries (LMICs).

Through its funding, the AMR Multi-partner Trust Fund (MPTF) is catalyzing sustainable national multisectoral action by supporting projects in 10 countries, and expanding support to an additional five countries. 26 million US dollars have been raised so far for joint activities of the Quadripartite in partnership with governments. Dr Getahun recognized that extending the Quadripartite collaboration to the regional and country level is challenging but that multisectoral activities in countries are supporting that integration.

The Global Leaders Group on AMR, co-chaired by H.E. Mia Amor Mottley, Prime Minister of Barbados, and H.E. Sheikh Hasina, Prime Minister of Bangladesh is the leading mechanism to raise political attention and action at the highest level. The GLG action plan has six key priorities: political action, transforming systems, surveillance, financing, research and development, and environmental dimensions of AMR. A series of information notes and calls to action has been issued. The GLG played a significant role in the successful conclusion of the CODEX AMR Intergovernmental Task Force and successfully advocated for a United Nations General Assembly (UNGA) High-level meeting on AMR, confirmed for 2024. The GLG consistently engages with G7 and G20 primarily on financing and the inclusion of AMR in the pandemic treaty negotiations.
Another major forthcoming event is the Third Ministerial Conference on AMR to be held in Muscat, Oman, 24-25 November 2022. As with the previous two high-level conferences, the Government of Oman is committed to defining high-level and lasting outcomes for this third meeting. Discussions between the Quadripartite and the Government of the Sultanate of Oman on the agenda and potential outcomes are underway.

The Quadripartite is focused on scaling up awareness raising globally and building on the success of the “Go Blue” Global Campaign during World Antimicrobial Awareness Week (WAAW) 2021. A global consultation in June and July 2022 will build consensus on language and messaging across sectors. Civil society can play a role in bringing a human face to AMR and the partnership platform will serve as a forum for engagement among civil society, private sector and government. The Quadripartite is defining a One Health research agenda to direct scientific interest and funding towards the most urgent priorities at the interface of the various sectors. A One Health Assessment Tool for AMR-relevant legislation is being piloted to enable countries to evaluate their legal framework to address AMR using a One Health approach. A major global regulators’ summit for human and animal medicines is planned (see Session 8).

The 7th revision of the Critically Important Antimicrobials for Human Medicine (“CIA list”) is underway in collaboration with FAO, WOAH and UNEP to develop a single harmonized list for humans and animals. Reviews of the pipelines of antibiotics, antifungals and vaccines against priority bacterial pathogens have also recently been concluded. Results from the antibiotic pre-clinical and clinical pipeline are concerning showing little improvement. The SECURE global antibiotic facility has now been recognized by the G7 as a key “pull” mechanism in expanding sustainable access to antibiotics to all interested countries. The WHO Priority Bacterial Pathogen List, last published in 2017 to steer R&D funding and activities, will be updated in 2022 informed by data on AMR from the Institute for Health Metrics and Evaluation (IHME). It will address public health interventions and transmission prevention in humans, animals and the environment.

WHO Regional Office for South-East Asia

Dr Stephan Jost and Dr Ben Sihombing, AMR Advisers in the WHO Regional Office for South-East Asia, delivered a presentation on WHO’s support to countries’ implementation of national action plans on AMR in the South-East Asia Region. The region has 11 countries with approximately 25% of the global population and up to one-third of the disease burden.

WHO is supporting countries to accelerate implementation and monitoring of national action plans on AMR across the five objectives of the Global Action Plan on AMR. This includes supporting countries to incorporate AMR materials into pre-service and in-service training curricula, to rollout the "Go Blue" campaign, to expand sentinel sites for AMR surveillance and
to provide External Quality Assessment (EQA) for national reference laboratories, to support surveillance for antimicrobial use and consumption, and to adopt the AWaRe categorization. The WHO Regional Office for South-East Asia is a member of the Asia Pacific Tripartite, comprising regional offices of FAO, WOAH and WHO, who work jointly to promote cross-sectoral collaboration. UNEP is expected to join this year. A key challenge with Quadripartite collaboration at country level is that UNEP and WOAH do not have a presence in most countries.

WHO Regional Office for Africa

Dr Ali Ahmed Yahaya, AMR Adviser in the WHO Regional Office for Africa, presented lessons learned on the use of the WHO costing and budgeting tool for national action plans on AMR in Sierra Leone. According to 2020 TrACSS data, only 20% of countries have costed and fully budgeted national action plans. The tool helps countries to understand the cost of activities, what is already funded and how to leverage additional funding. It is pragmatic and flexible, encourages prioritization, uses a modular approach, maps existing funds and enhances advocacy and resource mobilization.

The findings from the piloting of the tool in Sierra Leone include: 111 activities under 56 objectives prioritized, and a two-year operational plan with priority activities developed with an estimated cost of US$ 2.15 million, of which surveillance accounted for 60%. One key lesson learned in Sierra Leone is that while simple, the tool needs practical, hands-on training to master. Furthermore, strong multisectoral stakeholder involvement is essential to the process. Activities should be prioritized based on a country’s context and should guide the development of an operational and costed plan, which will support resource mobilization. It is envisaged that the Government of Sierra Leone will leverage the foundation laid by the costed national action plan to guide ongoing resource mobilization to enhance containment of AMR. Policy briefs with costed strategies and actions will also be developed to bolster the investment case for resource mobilization and stress the urgency of action to address AMR.

WHO Regional Office for Europe

Dr Danilo Lo Fo Wong, AMR Advisor in the WHO Regional Office for Europe, provided an overview of laboratory capacity building as a main building block for a comprehensive response to AMR, using the experience of the European region as an example. Laboratory results are essential to guide patient treatment, inform action at various levels, monitor effectiveness of interventions, detect (re)emerging resistance and uncover trends and sources.

Key challenges to surveillance include sampling issues (e.g. low blood sampling frequency),
data issues (e.g. paper-based records) and quality issues (e.g. experience and expertise, availability of materials). There are also limited manufacturers to provide laboratory supplies operating in the local market and low demand for laboratory supplies for susceptibility testing. WHO is supporting countries to build capacity on standardized laboratory methods, quality management and data recording and management. WHO also provides resources (protocols, tools, videos, experts) and supports surveillance network activities at national and subregional levels.

AMR surveillance has significantly expanded throughout Europe over the past years. A key lesson learned is that, depending on the surveillance objective, AMR surveillance of urinary tract infections can be an easy, inexpensive catalyst to building laboratory capacity for surveillance which may provide trends over time similar to surveillance of blood stream infections. It is essential to increase the flow of samples, improve confidence in the laboratory, build laboratory capacity and create demand by stimulating routine sampling. Lessons learned in surveillance capacity building is that the quality of surveillance data should be indicated in publications so that shortfalls can become focus areas for future surveillance efforts. Capacity-building efforts should also be tiered and tailored.

Dr Lo Fo Wong posed two questions to STAG-AMR members: 1) How do we increase the demand for laboratory diagnostics to inform treatment decisions? 2) Can or should we develop AMR action plans for sub-national levels?

STAG-AMR members reflected on the presentations made by WHO regional offices. They highlighted the importance of WHO collaborating with professional societies at national and regional level to advance work on AMR and to establish regional platforms for countries to share best practices. The STAG-AMR expressed support for the development of AMR action plans at sub-national levels. They also recognized the need to address laboratory capacity challenges in rural communities and challenges associated with private and public laboratories, including poor communication channels and paid commission to clinicians. Laboratory capacity building in countries must serve the lowest economic sectors.

Session 3: Implementation/Next steps Fungal priority pathogen list

Dr Hatim Sati (Technical Officer, WHO/AMR) presented the first WHO fungal priority pathogens list (WHO FPPL). The presentation covered the background, the rationale, and the objectives for developing the first WHO FPPL. Dr Sati highlighted the increasing concern around fungal pathogens and the challenges associated with invasive fungal infections, the
limited treatment options, the limited access to treatment and diagnostics, and the emergence of antifungal resistance. He explained that the goal of the list is to direct, and prioritize interventions, and research and development investments towards the areas of unmet public health needs. The presentation also described the Multiple Criteria Decision Analyses (MCDA) methodology used, and the global participatory approach followed in developing the list. Finally, Dr Sati shared the topline results of the prioritization study including main knowledge gaps, public health unmet needs, and other implementation considerations. The presentation was concluded with questions to the STAG-AMR concerning the identified areas for action: laboratory and surveillance capacities, research and innovation, and public health interventions.

The session was supplemented with two presentations from discussants.

Dr Jameela Al Salman (STAG-AMR member discussant) introduced the action, interventions and strategies proposed for implementation across the identified areas: surveillance, research and development and innovation, and public health.

Dr Tim Eckmanns (STAG-AMR member discussant) discussed the different challenges facing the implementation of the identified area of actions such as the limited number of methods of detection of different fungal infections and antifungal susceptibility methods.

Questions to the STAG-AMR:

1. What additional actions, interventions and/or strategies would the STAG-AMR suggest for accelerating and optimize the implementation of WHO FPPL?

2. What is STAG-AMR’s advice on how to best tailor WHO FPPL to regional, local, and special populations contexts? (e.g. endemic mycosis and regionally distributed pathogens)?

The discussion was then opened among the STAG-AMR members and the participants.

STAG-AMR Observations:

- Recognizes that fungal pathogens are increasingly becoming of public concern worldwide, lurking in shadows of the greater global AMR threat, which is the silent antibiotic resistance pandemic.

- Recognizes the added value of the FPPL global prioritization exercise in bringing the issue to light, given the vulnerable and key populations at risk (newborns, the elderly, HIV and other immunocompromised patients).

- Acknowledges the findings from the global prioritization exercise including the gap in data/evidence on burden of disease for invasive fungal infections and antifungal resistance.
Recognizes that critical pathogens of WHO FPPL are of concern globally, but also recognizes that regional endemic mycoses are a priority only in their respective context,

- Raises concerns about competing priorities, countries capacities for diagnostics and the programmatic capacity for surveillance.

- FPPL has a potential beneficial impact as a tool to raise awareness, especially at the bedside for promoting appropriate use of antimicrobials.

**STAG-AMR Recommendations:**

1. STAG-AMR recommends following a stepwise approach in implementing the FPPL starting with top priority pathogens, working on data and evidence generation, and tailoring FPPL to regional, national, and local contexts and needs.

2. STAG-AMR recommends building mycology diagnostic capacity to perform surveillance, starting at the reference microbiology laboratories for identification, and susceptibility testing of fungi.

3. STAG-AMR recommends building capacity in antifungal stewardship to limit the inappropriate use of antifungals and antibiotics.

4. STAG-AMR recommends developing standard operating procedures and algorithms for laboratories to optimize the diagnosis of fungal infections.

5. STAG-AMR recommends that WHO, in collaboration with Quadripartite organizations and other partners, address the impact of antifungal use on resistance across the One Health spectrum.

**Session 4: WHO Global AMR Research Agenda in the human health sector**

Dr Silvia Bertagnolio (Unit Head, Control and Response Strategy, WHO/AMR) introduced the session by outlining the rationale, scope, objectives, methods and governance of the Global Research Agenda for AMR in human health, as well as the preliminary results of the scoping review and questions for the STAG-AMR. The scope of the research agenda is global, it covers human health and focuses on the WHO global priority list of antibiotic resistant pathogens, TB and fungi. The objectives are to identify and prioritize research questions across all AMR areas, to catalyze investment and scientific interest, and to leverage research into informing evidence-based policy and practice. The research agenda is complementary to the WHO One Health research agenda, which focuses on human, animal, environment and agriculture interfaces. The Child Health and Nutrition Research Initiative (CHNRI) methodology was
chosen for the prioritization exercise based on a comprehensive, repeatable, and flexible protocol allowing for a ranking of the research questions, with the support of an expert group that will score research questions based on predetermined criteria. The first step of the methodology was a scoping review (protocol published in the BMJ), to identify available and published research questions from the scientific and grey literature. The research questions are categorized in a “knowledge matrix” by theme (prevention, diagnosis, care and treatment) and by domain (descriptive, delivery, development, discovery).

Questions to the STAG-AMR:

1. Given the scope and context of the research agenda;
   i. Are the proposed criteria appropriate to prioritize research questions that are able to inform policy development to support evidence-base NAP implementation?
   ii. Are the criteria easy to understand and to apply when scoring the research questions?
   iii. How can the language for each criterion be improved for clarity?

   Note: ideally no more than 5 criteria should be selected

2. Maximizing the impact of the WHO AMR research agenda and ensuring the implementation of priority research questions;
   i. What strategies can be considered to catalyze the interest of funders to support the implementation WHO global research agenda and the interest of researchers to focus on the priority research questions?
   ii. Can you provide concrete and practical suggestions?

3. How should WHO track, monitor and evaluate the Research Agenda implementation? Can you suggest methods and approaches?

The session was supplemented with two presentations from discussants.

Professor Timothy Walsh (STAG-AMR member discussant) discussed the question of what makes research impactful, drawing on his own experience. The growth in the number of publications in recent years can make it difficult to discern truly important research from research with a narrower focus that could be feasibly pursued within the limited time-horizons dictated by the nature of the research context. Impact does not always align with the quality of research. To achieve impact, research should identify a need or intellectual gap, identify the data needed to address the gap, and consider accessibility, affordability and adaptation to the local context. For maximum impact, AMR research should be viewed through economic
lenses to consider health economics, including socio-economic national and subnational variations.

Professor Sabiha Essack (STAG-AMR member discussant) presented health systems, operational and implementation research for translating evidence from research into policies, programmes and practices. The intervention-implementation research continuum was highlighted and aligned with the CHNRI methodology. Regarding the scoring criteria for the research agenda, it is important to be as specific as possible about the meaning of each criterion since different experts may have different understanding of some criteria (i.e. equity). Funding is biased towards observational research, and funders need to answer the “so what” question about the impact of research. Projects should be funded from proof-of-concept, to proof-of-implementation, and ultimately scale-up in order to tangibly mitigate AMR.

STAG-AMR Observations:

■ Acknowledged the benefits of a WHO research agenda on AMR in the human health sector to direct the interest by researchers, beneficiaries and funders on priority research areas, to reduce fragmentation of research and funding efforts and maximize impact.

■ Called for inclusivity: research domains and disciplines, including regulation, health financing, and behavioral science.

■ Commended the thorough and systematic approach planned by WHO to develop the research agenda and the rigorous scoping review already undertaken.

■ Endorsed the prioritization framework and criteria to prioritize research ideas with the highest potential to inform evidence-based policies to mitigate AMR.

■ Recognized the importance of clarifying the socio-economic context for research prioritization.

■ Recognized the benefit of engaging with established research networks and other research agenda projects, particularly with the WHO AMR One Health research agenda.

■ Acknowledged the challenges in determining and monitoring causal relationship of the prioritized research agenda in the development of effective interventions.

■ Acknowledged the importance of emphasizing and promoting ethical principles in health research.

STAG-AMR Recommendations:

1. The STAG-AMR encourages the development of a WHO AMR Research Agenda for human health, in line with WHO’s mandate and GAP objective 2.
2. STAG-AMR recommends WHO consult a global expert group to prioritize research questions to address AMR. In doing so, WHO should guide the global expert group to propose research ideas spanning across all research domains (observational, operational, intervention, implementation and health systems research); and using a framework for systematic listing of research ideas in health research (i.e., descriptive, discovery, delivery, development; as well as efficacy, effectiveness, efficiency.

3. STAG-AMR recommends that WHO ensure that both the global expert group, as well as the research questions subject to prioritization, reflect the multidisciplinary nature of AMR.

4. STAG-AMR recommends that WHO incorporates the concept of ‘public health impact’ as part of the prioritization criteria.

5. STAG-AMR recommends that WHO disseminate research priorities to relevant AMR stakeholders to enable its implementation and its public health impact.

Session 5: Updates from the Secretariat (continued)

WHO Regional Office for the Americas

Dr Pilar Ramon-Pardo, AMR Advisor in the WHO Regional Office for the Americas, delivered a presentation on governance and multisectoral coordination at country level from the perspective of Latin America and the Caribbean. In this region, there is a significant COVID-19 burden and economic impact, political changes including high turnover in ministries of health, migration and social unrest, and a lack of access to safe water.

Most countries have established multisectoral working groups or coordination committees on AMR with government leadership. The Ministry of Health often leads the coordination but there is scarce participation of civil society organizations or the private sector. To understand how these groups work in practice, WHO developed a landscape analysis tool to identify gaps and activities to address them.

The analysis showed that most AMR activities are sector-specific, coordination across sectors is limited, the environmental sector is often not included, resources are often inadequate and legal norms may not exist to support One Health decisions. Activities identified to address these gaps include training key stakeholders in the One Health concept, promoting collaboration between ministries of health and academic institutions with experience in AMR, establishing working groups to identify the most salient AMR problems for prioritization, and developing work plans and AMR-specific laws or regulations.
Moving forward, ensuring sufficient time to build AMR multisectoral committees will be important. The initial stages of the process must include awareness-raising within all ministries and involved institutions so that expectations are clear. Furthermore, coordination between actors at country, regional and global levels should be open and fluid. Seed funding for AMR activities can also promote country ownership.

WHO Regional Office for the Western Pacific

Dr Takeshi Nishijima, Technical Officer for AMR in the WHO Regional Office for the Western Pacific, presented country examples of opportunities to accelerate implementation of national action plans on AMR. Fiji, the first country showcased, has made significant progress in leadership and governance, advocacy and communication, stewardship and IPC. Fiji established a National AMR Committee under the Fiji Medicinal Products Board which was already established by the Act in 2015 with members from five ministries. This facilitated multisectoral coordination and the AMR committee meets monthly. Lao People’s Democratic Republic has made progress on awareness, AMR surveillance, consumption monitoring and stewardship. Lao People’s Democratic Republic has included AMR national action plan into the 9th Health Sector Development Plan 2021-2025 to secure a dedicated budget. Challenges faced include the prioritization of COVID-19, decreased external funding, capacity-building in sentinel hospitals and the ability to purchase antibiotics from private pharmacies without a prescription. Mongolia has shown a significant reduction in antimicrobial consumption by rolling out national "antibiotics only by prescription" campaigns, antimicrobial stewardship programmes in hospitals and e-prescription system introduced by the health insurance general agency, among others. Challenges faced in antimicrobial consumption surveillance include insufficient understanding and leadership among decision-makers, frequent changes in government and small private pharmacies in rural areas continuing to dispense antibiotics without prescription.

WHO Regional Office for the Eastern Mediterranean

Dr Maha Talaat, Regional Advisor for AMR in the WHO Regional Office of the Eastern Mediterranean, presented common challenges to implement national action plans on AMR at country level globally. While most countries have developed a national action plan on AMR, they are at different stages of implementation, and significantly slower in LMICs. Political engagement and leadership are the most important drivers for implementation, and extensive collaboration and coordination are required. Key challenges faced by LMICs include complexity of understanding AMR as a concept, competing priorities, sub-optimal legislation and regulation, limited data on AMR burden and economic impact to inform policies, limited funding and expertise, and unrealistic national action plans without M&E frameworks. Numerous challenges exist across all technical areas of the AMR response.
including governance, awareness, surveillance, microbiology laboratory capacities and diagnostics, tackling AMR in the food and livestock sector and in the community, infection prevention and control (IPC) and antimicrobial stewardship.

Dr Mahat Talaat posed the following questions to AMR-STAG members: 1) Limited human capacities are reflected at all levels within a country and in all sectors and building capacities takes time. How can WHO meet this important challenge? 2) Should there be a dedicated team in the Ministry of Health to deal with AMR to ensure sustainability, routine programming, planning and budgeting by governments? 3) How do we further support stopping overuse and misuse of antimicrobials to decrease overall antimicrobial consumption?

The STAG-AMR members thanked WHO for the excellent presentations and made the following comments.

- WHO should establish a centre of excellence for countries to share success stories and lessons learned in implementing national action plans on AMR.

- Stronger advocacy is needed to educate government leadership and the general public on AMR to obtain buy-in. Simple success stories such as the decrease in antibiotic prescriptions in the UK should be shared. Simple and consistent messages will be key to supporting countries. We should also identify champions for AMR in regions.

- The STAG-AMR should be reoriented to focus its agenda on providing strategic advice to WHO. The STAG-AMR recommends convening a meeting dedicated to a brainstorming session on what the STAG-AMR would like to do in terms of their strategic role.

- There is a need to identify the six AMR interventions with KPIs that are going to result in the greatest good for public health to support countries. Resources should be concentrated to support these interventions.

- Building HR leadership capacity on AMR in countries could allow countries to sustain efforts when there is political change.

- AMR should be integrated into existing programs that the government is supporting, such as Universal Health Coverage (UHC) and Primary Health Care (PHC), to secure funding and to reach the lowest levels of the community.

- To ensure sustainability of donor’s investments, it would be useful to identify criteria that countries should meet before a donor invests in AMR.

WHO ADG Hanan Balkhy expressed sincere appreciation for the discussion and for the recommendations on supporting countries to implement national action plans on AMR. The STAG-AMR has a major role to play in providing strategic advice to WHO to move forward with AMR.
Session 6: National periodic AMR prevalence surveys for AMR burden, trend analysis and (multisectoral) research projects

Dr Sergey Eremin (Team Lead, Evidence and Emerging Resistance, WHO/AMR) began with a brief overview of the current GLASS surveillance modules. He justified the need for complementary approaches to AMR surveillance, indicating that surveillance based on “routine” clinical testing is significantly limited in its coverage, accuracy, and representativeness in most countries, especially LMICs. He introduced a newly adopted “two-pronged” approach for surveillance of AMR which involves both continuing data collection based on routine clinical sampling of patients and application of complementary strategies such as surveys. Dr Eremin then stated that the surveys will follow standardized methods that make it possible for the data to be comparable between and within settings over time, and principles and standards for ethical implementation of surveillance systems in public health. He provided a brief overview of the surveys methodology. This includes working with a sample of hospitals selected using statistically meaningful probability sampling methods, independent of whether microbiology diagnostic services are available on site; continuous active case finding of patients with suspected bloodstream infections in selected hospitals during an intake period with inclusion of all consecutive eligible patients; blood samples shipped to the nearest quality assured laboratory for microbiology and antimicrobial susceptibility testing (AST), carried out in line with international standards; and minimum set of demographics and clinical information obtained for each patient in the survey. He observed that the prevalence survey platform can be potentially utilized to conduct specialized studies to fill various knowledge gaps and noted that, while the benefits of the periodic national prevalence survey approach come with a cost, it also builds country capacity for better patient management and future surveys and research.

The session was supplemented with two presentations from discussants.

Dr Dawn Sievert (STAG-AMR member discussant) provided an overview of “why”, “when”, "what", "who", "where" and "how" of prevalence surveys, shared results from US national surveys, discussed limitations of prevalence surveys and shared some considerations to prevalence surveys including possibilities and opportunities.

Dr Laura Barcelona (STAG-AMR member discussant) shared results from application of different approaches to AMR surveillance in Argentina and gathered experiences. She provided some considerations on the prevalence survey needs including resource implications.

STAG-AMR Observations:

- STAG-AMR recognizes that nationally representative AMR data should be generated to provide strategic information for governments to assess and monitor the AMR situation
and to inform the AMR response.

- STAG-AMR recognizes that currently in most countries this strategic data cannot be generated by routine surveillance. Standardized periodic nationally representative surveys can fill the knowledge gap and inform national, regional and global advocacy and action, and allow comparison and target setting.

- STAG-AMR raises questions and concerns about feasibility, cost, sustainability, country capacity and country priorities, and notes that some countries may benefit more than others. At the same time, STAG-AMR recognizes that the surveys will also foster national capacities in terms of diagnostic stewardship, microbiology laboratory functions, clinical management, referral systems and data management.

- STAG-AMR considers political commitment a necessary prerequisite.

- STAG-AMR suggests that further development of this approach could consider additional infectious syndromes, including in the community, depending on country-specific needs.

- STAG-AMR expects WHO to continue to support routine diagnosis and management of patients, as this will contribute to both patient survival and better routine surveillance data.

**STAG-AMR Recommendations:**

1. STAG-AMR recommends WHO to continue efforts to set a global standard for national AMR prevalence surveys to collect representative and accurate strategic information on the magnitude and trend of AMR in humans to inform national policies, report on SDG indicators and allow country comparisons.

2. STAG-AMR recommends that defined criteria be used to prioritize countries for national AMR prevalence survey implementation, based on the added value to inform national policies, government commitment, local capacity building needs and priorities.

3. STAG-AMR recommends that WHO identify funding for the first phase of national prevalence survey implementation and offer a comprehensive technical assistance package to countries.

4. STAG-AMR recommends that the measurement of patient outcomes (e.g., length of stay, mortality, etc.) could also be collected while implementing national AMR prevalence surveys. STAG-AMR also recommends the potential of the survey network for special studies be considered.
William Wekwete (WHO consultant) presented the AMR Quadripartite plan for the Global Human and Veterinary Medicines Regulatory Authorities Summit and Forum to preserve antibiotics used in human and animal health sectors, the objectives and expected outcomes, and questions to the STAG-AMR concerning the proposed Summit.

The session was supplemented with two presentations from discussants.

Dr Kirsty Buising (discussant STAG-AMR member) raised the importance of adequate and updated information on labels; the development, maintenance and monitoring of AMR stewardship guidance; collaboration and coordination of the regulators in AMR risk assessments.

Prof Sam Kariuki (discussant STAG-AMR member) emphasized the need to optimize the use of antibiotics in the human and veterinary sectors; build sustainable collaborations among and within regulatory bodies; address gaps in legislation and regulation; and, resolve data and advocacy gaps.

Questions to the STAG-AMR:

1. How do the objectives and outcomes of the Global Human and Veterinary Regulatory Authorities Summit and Forum resonate with the STAG-AMR?

2. What are the STAG-AMR’s suggestions for the Global Human and Veterinary Regulatory Authorities Summit and Forum?

STAG-AMR Observations:

- Recognises the critical role of regulatory agencies for human and animal medicines to address the diverse challenges related to access to registered, quality-assured antimicrobials, vaccines and alternatives to antimicrobials for responsible and appropriate use in human and animal sectors as well as regulatory issues related to discharge into the environment.

- Welcomes the proposed regulators’ summit and forum to enhance sustainable coordination between human and animal medicines regulatory authorities, globally, regionally and nationally and to enable the development of a shared vision and common goals to address AMR across the One Health Spectrum.
Acknowledges the importance of establishing a regular forum of collaboration between human and animal regulatory agencies to address the multitude of challenges related to the regulation of antimicrobials, vaccines and alternatives to antimicrobials.

Emphasizes the need for the Summit and Forum to address regulations of over-the-counter and internet sales of antibiotics as well as sustainable strategies for enforcement.

STAG-AMR Recommendations:

STAG-AMR proposes the following considerations for the Regulators’ Summit and Forum.

1. Focus on how to optimize and enforce regulations to phase out the practice of selling unprescribed antibiotics over the counter or via the internet, using a broad range of strategies.

2. Reduce demand for antibiotics by targeted and effective regulatory measures focused on consumers. One example is to consider the labelling of antibiotic packaging, including warnings of potential hazards. These should be evidence-based and use appropriate and effective communication strategies to enhance consumer awareness and behavioral change.

3. Prioritize the strict regulation of the WHO Watch and Reserve categories of antibiotics.

Session 8: Updates on infection, prevention and control (IPC) survey and IPC Global Strategy

Dr Benedetta Allegranzi (Technical Lead, Infection Prevention and Control, IPC Hub) described the structure of the cross-cutting work on IPC at WHO HQ and across the WHO Regions. She explained the central role of IPC Hub in coordinating the Organization’s work on IPC and in developing technical, capacity building and advocacy work in collaboration with other teams, in particular emergencies and outbreaks, Water, Sanitation and Hygiene (WASH), and AMR, with the strategic and technical support of the IPC Task Force. She highlighted the importance of IPC at point of care and patient safety.

Dr Allegranzi then highlighted the recently published First Global Report on IPC including the key messages that arise from the available data on country progress and the critical priorities for countries. Building on the core components published in 2015, WHO has now developed minimum components as a starting point towards a step-wise approach to implementation. This approach comprises national assessment tools, including a global IPC portal, to reflect on progress, build capacity and move ahead to the next stage. In response to the need to elevate awareness of IPC in the global and political agenda, a World Health Assembly
Resolution was passed in 2022 requesting WHO to develop a global strategy on IPC that will institutionalize IPC in legal frameworks and embed it in health programmes, accreditation and national curricula, including IPC leadership expertise.

Dr Allegranzi requested advice from STAG-AMR on WHO’s strategy and approach, gaps regarding IPC and AMR, strengthening at the country level, potential beneficial impact of COVID-19 response, products and support needed, lessons learned from the implementation of the GAP AMR and possible impact the new IPC global strategy could have on tackling AMR.

STAG-AMR congratulated Dr Allegranzi and her team on the recent achievements in driving forward the IPC agenda. They noted that the COVID-19 pandemic has highlighted the importance of IPC and the need to improve IPC measures. Questions were raised concerning the most significant barriers to effective IPC - financial, expertise, capacities, senior leadership, awareness, basic water and sanitation infrastructure. STAG-AMR concluded by noting the parallel and interconnected challenges and objectives shared by the IPC and AMR agenda and the value of each programme building on and integrating with the other.

Concluding remarks

Professor Kahlmeter closed the discussion sessions reflecting on the myriad and complexity of challenges that continue to be posed by AMR, while underlining the progress that has been possible thus far. He expressed his appreciation that STAG-AMR members had been able to meet in person for the first time and thanked all those who had travelled to Geneva under still challenging circumstances. He concluded by thanking STAG-AMR members, the WHO Secretariat, the interest of observers and input from Regional Offices.

Dr Hanan Balkhy closed the second meeting of the STAG-AMR by thanking members of the STAG-AMR for their expertise and guidance, the discussants, the Vice Chair, and the Chair for his work throughout the three days. She thanked the many observers who had followed the proceedings online. She also thanked WHO colleagues from WHO Regional and Country Offices for contributing their experiences addressing AMR in countries as well as staff across the WHO Secretariat at Headquarters who had participated in the preparations for this meeting.
# ANNEX 1

Meeting of the Strategic and Technical Advisory Group for Antimicrobial Resistance (STAG-AMR)

14-16 June 2022

Venue: Salle T, B Building, WHO Headquarters, Geneva, Switzerland

<table>
<thead>
<tr>
<th>TIME</th>
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<tbody>
<tr>
<td><strong>DAY ONE</strong></td>
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<tr>
<td>Session one. Opening (30 min)</td>
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<tr>
<td>09:00</td>
<td>Opening remarks:</td>
<td>Hanan Balkhy, ADG, AMR Division</td>
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<td>Tedros A Ghebreyesus, Director-General WHO</td>
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<td>Hanan Balkhy, ADG, AMR Division</td>
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<td>Gunnar Kahlmeter, Chair, STAG-AMR</td>
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<td>Meeting proceedings including declarations of interest</td>
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<tr>
<td>Session two. Updates from the Secretariat (Informative session)</td>
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<tr>
<td>09:30-12:00</td>
<td>Updates and Progress on STAG-AMR recommendations</td>
<td>Gunnar Kahlmeter, Chair, STAG-AMR</td>
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<td></td>
<td>Kitty van Weezenbeek, Director, Department Surveillance, Prevention and Control (20 min)</td>
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<td>Haile Getahun, Director, Department Global Coordination and Partnership (20 min)</td>
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<td>Q&amp;A (20 min)</td>
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<td>Coffee break (30 min)</td>
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<td></td>
<td>Update from the WHO Regions on AMR implementation</td>
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<td></td>
<td>Regional Office Focal points – Stephen Paul Jost and Benyamin Sihombing (WHO SEARO), Ali Ahmed Yahaya (WHO AFRO) and Danilo Lo Fo Wong (WHO EURO)</td>
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<td>Discussion (15 min)</td>
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### Session three. Discussion topic 1. Implementation/Next steps: Fungal priority pathogen list

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<tr>
<th>Time</th>
<th>Event</th>
<th>Presenter</th>
<th>Chair, STAG-AMR</th>
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<tr>
<td>12:00-15:00</td>
<td>Topic Introduction – Hatim Sati, WHO (30 min)</td>
<td>Gunnar Kahlmeter,</td>
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<td>Lunch (90 min)</td>
<td>Chair, STAG-AMR</td>
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<td>Presentations from AMR STAG members</td>
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<td>Discussant 1 – Tim Eckmanns, Germany (10 min)</td>
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<td>Discussant 2 – Jameela Alsalman, Bahrain (10 min)</td>
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<td>Discussion (40 min)</td>
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<td>Coffee break (30 min)</td>
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### Session four. Discussion topic 2. WHO Global AMR Research Agenda in the human health sector

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<th>Time</th>
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<tr>
<td>15:00-17:30</td>
<td>Topic Introduction – Silvia Bertagnolio, WHO (30 min)</td>
<td>Gunnar Kahlmeter,</td>
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<td></td>
<td>Presentations from AMR STAG members</td>
<td>Chair, STAG-AMR</td>
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<td></td>
<td>Discussant 1 – Sabiha Essack, South Africa (10 min)</td>
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<td>Discussant 2 – Timothy Walsh, United Kingdom (10 min)</td>
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<td>Discussion (40 min)</td>
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<td>Wrap up of the meeting</td>
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<td>Reception at the Red Ribbon cafeteria (D building)</td>
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### DAY TWO

### Session five. Updates from the Secretariat continued

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<th>Event</th>
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<tr>
<td>Opening and proceedings of the day by Chair</td>
<td>Gunnar Kahlmeter,</td>
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<tr>
<td>Update from the Regions on AMR implementation</td>
<td>Chair, STAG-AMR</td>
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<tr>
<td>Regional Office Focal points – Pilar Ramon-Pardo (WHO AMRO), Maha Talaat (WHO EMRO) and Takeshi Nishijima (WHO WPRO)</td>
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<tr>
<td>Discussion (30 min)</td>
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<td>Coffee break (30 min)</td>
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### Session six. Discussion topic 3. National periodic AMR prevalence surveys for AMR burden, trend analysis and (multisectoral) research projects.

<table>
<thead>
<tr>
<th>Topic Introduction – Sergey Eremin, WHO (30 min)</th>
<th>Gunnar Kahlmeter, Chair, STAG-AMR</th>
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<tbody>
<tr>
<td>Presentations from AMR STAG members Discussants</td>
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<tr>
<td>Discussant 1 – Laura Barcelona, Argentina (10 min)</td>
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<td>Discussant 2 – Dawn Sievert, United States of America (10 min)</td>
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<td>Discussion (40 min)</td>
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<td>Lunch (90 min)</td>
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### Session seven. Discussion topic 42. Considerations from STAG for the Global Regulators’ Summit on Antibiotic Use in Humans and Animals

<table>
<thead>
<tr>
<th>Topic introduction – William Wekwete, WHO (30 min)</th>
<th>Gunnar Kahlmeter, Chair, STAG-AMR</th>
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<tbody>
<tr>
<td>Presentations from AMR STAG members Discussants</td>
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<tr>
<td>Discussant 1 – Kirsty Buising, Australia (10 min)</td>
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<td>Discussant 2 – Samuel Kariuki, Kenya (10 min)</td>
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<td>Discussion (40 min)</td>
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<td>Coffee Break (30 min)</td>
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### Session eight. Updates on IPC Global Strategy and Additional cross-cutting topic

<table>
<thead>
<tr>
<th>Update on IPC Survey and Global Strategy</th>
<th>Gunnar Kahlmeter, Chair, STAG-AMR</th>
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<tbody>
<tr>
<td>Benedetta Allegranzi, Technical lead, Infection Prevention Control, UHC/Life course (20 min)</td>
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<td>Discussion (40 min)</td>
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<td>Wrap up of the day</td>
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### DAY THREE

#### Session nine. Discussion topics: Agreement on observations and recommendations

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<th>Topic</th>
<th>Speaker</th>
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<tr>
<td>Opening and proceedings of the day by Chair</td>
<td>Gunnar Kahlmeter, Chair, STAG-AMR</td>
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<tr>
<td>Discussion topic 1 – Hatim Sati, WHO (10 min)</td>
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<tr>
<td>Agreement on observations and recommendations (20 min)</td>
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<tr>
<td>Discussion topic 2 – Silvia Bertagnolio, WHO (10 min)</td>
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<td>Agreement on observations and recommendations (20 min)</td>
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<td>Coffee break (30 min)</td>
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<tr>
<td>Discussion topic 3 – Sergey Eremin, WHO (10 min)</td>
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<tr>
<td>Agreement on observations and recommendations (20 min)</td>
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<tr>
<td>Discussion topic 4 – William Wekwete, WHO (10 min)</td>
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<td>Agreement on observations and recommendations (20 min)</td>
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#### Session 10. Final STAG-AMR Recommendations and Meeting closure (30 min)

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<thead>
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<th>Topic</th>
<th>Speaker</th>
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<tr>
<td>Final STAG-AMR Recommendations -</td>
<td>Gunnar Kahlmeter, Chair, STAG-AMR</td>
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<tr>
<td>Gunnar Kahlmeter, Chair, STAG-AMR</td>
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<tr>
<td>Closing remarks – Zsuzsanna Jakab, Deputy Director-General, WHO</td>
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<tr>
<td>Closure of meeting and Lunch</td>
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ANNEX 2

List of participants

STAG-AMR Members

Prof Gunnar Kahlmeter (CHAIR), MD, PhD, Professor of Bacteriology, Clinical Microbiology, Central Hospital Växjö, Sweden, Chair

Prof Sabiha Essack (VICE-CHAIR), Professor in Pharmaceutical Sciences and Director, Antimicrobial Research Unit, University of KwaZulu-Natal, South Africa

Dr Jameela Al Salman, Infectious Disease Consultant, Salamiya Medical Complex, Kingdom of Bahrain

Dr Laura Barcelona, Coordinator for Appropriate Use of Antimicrobials, Ministry of Health and Professor of Infectious Diseases, Bernardo Houssay Hospital, Vicente López, Argentina

Prof Hanene Tiouiri Benaissa, Head of the Infectious Diseases Department, University Hospital Rabta of Tunis, Tunisia

Prof Kirsty Buising, Infectious Diseases Physician, Deputy Director of National Center of Antimicrobial Stewardship, Royal Melbourne Hospital and Doherty Institute for Infection and Immunity, Australia

Ms Vanessa Carter, Patient Advocate, Healthcare Communications and Social Media, South Africa

Dr Sujith J Chandy, Professor, Department of Pharmacology and Clinical Pharmacology, Christian Medical College, Vellore, India

Dr Tim Eckmanns, AMR Lead, Robert Koch Institute, Germany

Prof Mukesh Kapila, Professor of Global Health and Humanitarian Affairs, University of Manchester, United Kingdom

Prof Samuel Kariuki, Director of Research and Development, Kenya Medical Research Institute, Kenya

Prof Constance Schultsz, Department of Global Health-AIGHD, Amsterdam University Medical Centers, Netherlands

Dr Nandini Shetty, Consultant Microbiologist, Clinical and Scientific Advisor, The Fleming Fund, United Kingdom (virtual)
Dr Dawn Sievert, Senior Science Advisor on AMR, National Center for Emerging and Zoonotic Infectious Diseases, Centers for Disease Control and Prevention, United States of America

Prof Timothy Walsh, Professor of Medical Microbiology and Antibiotic Resistance, Department of Zoology, University of Oxford, United Kingdom (virtual)

Dr Yu Zhang, Vice Director of State Key Laboratory of Environmental Aquatic Chemistry, Research Center for Eco-environmental Sciences, Chinese Academy of Sciences, China (virtual)

Observers

Julia Bishop, Global Strategy Lab

Sarah Bolongaita, World Bank Group

Su Chiang, CARB-X

Denise Rabold, German Federal Ministry of Health (BMG)

Alex Costa, United Nations International Children’s Emergency Fund (UNICEF)

Damiano de Felice, CARB-X

David Denning, Global Action For Fungal Infections

Alejandro Dorado Garcia, Food and Agriculture Organization of the United Nations (FAO)

Aitziber Echeverria, UN Environment Programme (UNEP)


Corinne Heaume, Médecins Sans Frontières


Geetanjali Kapoor, One Health Trust

Mohan Joshi, USAID Medicines, Technologies, and Pharmaceutical Services (MTaPS) Program

Rupa Kanapathipillai, Médecins Sans Frontières
Pimrata Leethongdee, Department of Medical Sciences, Miscellaneous Bacteriology Section, Ministry of Public Health, National Institute of Health, WHO Collaborating Centre for AMR Surveillance and Training, Thailand

Alexis Leonard, United States Agency for International Development (USAID)

Sonja Löfmark, Department of Communicable Disease Control and Health Protection, Public Health Agency of Sweden, WHO Collaborating Centre for AMR Containment, Sweden

Javier Y. Marcos, World Organisation for Animal Health (WOAH, formerly OIE)

Laura Marin, Joint Programming Initiative on Antimicrobial Resistance

Ana Luisa Pereira Mateus, World Organisation for Animal Health (WOAH, formerly OIE)

Dominique Monnet, European Centre for Disease Prevention and Control (ECDC)

Julien Morin, Ministry of Health of France

Tonny Brian Muthee, World Bank Group

Emmanuel Nfor, USAID Medicines, Technologies, and Pharmaceutical Services (MTaPS) Program

Seamus O’Brien, Global Antibiotic R&D Partnership (GARDP)

Zoe O’Donoghue, United States Agency for International Development (USAID)

Lesley Ogilvie, Global AMR R&D Hub

Norio Ohmagari, AMR Clinical Reference Center, National Center for Global Health and Medicine, WHO Collaborating Centre for Prevention, Preparedness and Response to Antimicrobial Resistance, Japan

Giridara Gopal Parameswaran, One Health Trust

Rosa M. Peran i Sala, Ministry of Health, Welfare and Sport of The Netherlands

Holly Rhyner-Jones, UK Department of Health and Social Care’s Fleming Fund

Robert Skov, International Centre for Antimicrobial Resistance Solutions (ICARS) and European Society of Clinical Microbiology and Infectious Diseases (ESCMID)

Mike Sharland, St George’s University Hospitals NHS Foundation Trust

Subasree Srinivasan, Global Antibiotic R&D Partnership (GARDP)

Ralf Sudbrak, Global AMR R&D Hub

Motoyuki Sugai, Antimicrobial Resistance Research Center, National Institute of Infectious Diseases, WHO Collaborating Centre for AMR Surveillance and Research, Japan
Nithima Sumpradit, Department of Medical Sciences, Miscellaneous Bacteriology Section, Ministry of Public Health, National Institute of Health, WHO Collaborating Centre for AMR Surveillance and Training, Thailand

Viviana Munoz Tellez, South Centre

Visanu Thamlikitkul, Faculty of Medicine Siriraj Hospital, Mahidol University, WHO Collaborating Centre for AMR Prevention and Containment, Thailand

Susan Rogers Van Katwyk, Global Strategy Lab

Sjoukje Woudt, Centre for Infectious Disease Control, Centre for Infectious Diseases Epidemiology and Surveillance, National Institute for Public Health and the Environment (RIVM), WHO Collaborating Centre for Antimicrobial Resistance Epidemiology and Surveillance

Ghada Zoubiane, International Centre for Antimicrobial Resistance Solutions (ICARS)

**WHO Regional and Country Office AMR Focal Points**

Dr Khadichamo Boymatova, Tajikistan Country Office

Dr Yara Khalaf, Egypt Country Office

Dr Stephan Jost, Regional Office for South-East Asia

Dr Vanchinsuren Lkhagvadorj, Regional Office for the Western Pacific (virtual)

Dr Takeshi Nishijima, Regional Office for the Western Pacific

Dr Pilar Ramon-Pardo, Regional Office for the Americas

Dr Anuj Sharma, India Country Office

Dr Mukta Sharma, Indonesia Country Office

Dr Benyamin Sihombing, Regional Office for South-East Asia

Ms Jiani Sun, Regional Office for the Western Pacific (virtual)

Dr Maha Talaat, Regional Office for the Eastern Mediterranean

Dr Liz Tayler, Egypt Country Office

Dr Danilo Lo Fo Wong, Regional Office for Europe

Dr Ali Ahmed Yahaya, Regional Office for Africa

Dr Bassim Zayed, Jordan Country Office
WHO Headquarters

Dr Tedros Adhanom Ghebreyesus, Director-General

Ms Zsuzsanna Jakab, Deputy Director-General

Dr Hanan Balkhy, Assistant Director-General for Antimicrobial Resistance (AMR), AMR Division

Dr Haileyesus Getahun, Director, Global Coordination and Partnership (GCP) Department, AMR Division

Dr Kitty van Weezenbeek, Director, Surveillance Prevention and Control (SPC) Department, AMR Division

Dr Benedetta Allegranzi, Coordinator, Quality of Care, Integrated Health Services

Ms Penelope Andrea, Technical Officer, Assistant Director-General’s Office, AMR Division

Ms Ellen Attafuah, Assistant to Team, Assistant Director-General’s Office, AMR Division

Mr Anand Balachandran, Unit Head, National Action Plans and Monitoring and Evaluation, SPC Department, AMR Division

Dr Silvia Bertagnolio, Unit Head of Control and Response Strategies (CRS), SPC Department

Dr Nienke Bruinsma, Executive Officer, Assistant Director-General’s Office, AMR Division

Dr Alessandro Cassini, Technical Officer, CRS Unit, SPC Department

Dr Rudi Eggers, Director, Integrated Health Services

Dr Sergey Eremin, Medical Officer, Evidence and Emerging AMR, Surveillance and Evidence and Laboratory Strengthening, SPC Department

Dr Stephen Nurse Findlay, Technical Officer, CRS Unit, SPC Department

Dr Valeria Gigante, Team Lead, Impact Initiatives and Research Coordination (IRC), GCP Department, AMR Division

Mr Thomas Joseph, Unit Head a.i., Antimicrobial Stewardship and Awareness, GCP Department, AMR Division

Dr Jean Pierre Nyemazi, Technical Officer, AMR Division

Dr Carmem Pessoa Da Silva, Unit Head, Surveillance and Evidence and Laboratory Strengthening, SPC Department, AMR Division