



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

Report of Second Meeting

14-16 April 2014

WHO Headquarters, Geneva

PANDEMIC AND
EPIDEMIC DISEASES



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Abbreviations

AMR	Antimicrobial resistance
EMA	European Medicines Agency
FAO	Food and Agriculture Organization of the United Nations
FDA	US Food and Drug Administration
HIV	Human immunodeficiency virus
ICD	International Classification of Diseases
IMI	Innovative Medicines Initiative
IPC	Infection prevention and control
JPIAMR	Joint Programming Initiative on Antimicrobial Resistance
MDR	Multidrug resistant
NGO	Nongovernmental organization
OIE	World Organisation for Animal Health
R&D	Research and development
STAG-AMR	WHO Strategic and Technical Advisory Group on Antimicrobial Resistance
STAG-TB	WHO Strategic and Technical Advisory Group on Tuberculosis
SSFFC	Substandard/spurious/falsely-labelled/falsified/counterfeit
TB	Tuberculosis
UHC	Universal Health Coverage
WHA	World Health Assembly
WHO	World Health Organization
XDR	Extensively drug resistant

Introduction

Background to meeting

In 2013, the Director-General convened the Strategic and Technical Advisory Group on Antimicrobial Resistance (STAG-AMR), which held its first meeting in Geneva on 19 and 20 September 2013.¹ Members of the STAG-AMR were unanimous in calling for urgent renewal and expansion of action to tackle the growing public health threat of AMR. They recommended WHO should lead the development and coordination of a global action plan on AMR. This approach was endorsed at the January 2014 meeting of the WHO Executive Board, which further recommended that the 67th World Health Assembly in May 2014 adopt a resolution on combatting AMR.

Subsequent to this meeting, resolution WHA67.25 was approved on 24 May 2014 at the 67th WHA. Through this resolution the World Health Assembly has requested that WHO develop a draft global action plan to combat AMR, including antibiotic resistance, and submit the draft to the 68th WHA in 2015.

Roles and responsibilities of STAG-AMR

The STAG-AMR was convened by the WHO Director-General to be the principal technical advisory group to WHO on AMR. It advises the Director-General on: WHO's strategic plan and priority activities to tackle AMR; the major challenges to be addressed by WHO to achieve the strategic goals for tackling AMR; and the engagement of partners and outreach efforts to tackle AMR. The WHO website provides details of the Terms of Reference and membership.² The 16 members³ have been selected by the Director-General for their technical expertise and scientific and public health experience. They serve in an individual capacity and not as representatives of their organizations or countries. The Director-General has taken into account the need to achieve an adequate distribution of expertise, geographical representation and gender balance.

Purpose and working methodology of the meeting

The STAG-AMR held its second meeting in Geneva from 14 to 16 April 2014. The purpose of the first two days was to discuss the core elements of a global action plan for AMR with a broad range of organizations and relevant bodies, to secure broad input to the development of a global plan. More than 30 additional participants attended including representatives from intergovernmental organizations, NGOs, public health and regulatory agencies, pharmaceutical industry associations, professional societies, and civil society and patient groups. Staff from WHO Headquarters and regional offices were present and contributed. The participants debated a range of concerns related to AMR, with break-out groups on the second day to discuss specific topics. On the third day, STAG-AMR members and the WHO Secretariat met to review the first

¹ Strategic and Technical Advisory Group on Antimicrobial Resistance (STAG-AMR) Report of the first meeting Geneva, 19-20 September 2013 http://www.who.int/drugresistance/stag/meeting_summary09013/en/

² Strategic and Technical Advisory Group (STAG) on antimicrobial resistance <http://www.who.int/drugresistance/stag/en/>

³ Current STAG-AMR members <http://www.who.int/drugresistance/stag/members/en/>

two days and prepare their report to the Director-General, including the proposed scope of a global action plan.

Declarations of interest

STAG-AMR members and meeting participants acting in an individual capacity completed the standard WHO form for declaration of interests and these were reviewed by the WHO Secretariat, against the purpose and agenda, in advance of the meeting. Participants attending as representatives of organizations were not asked to complete the form as they were representing the views and interests of that organization; nor were observers of the meeting.

In the interest of public disclosure and to ensure all members were aware of each other's relevant interests before the start of the meeting, a summary of relevant interests was presented to the members and meeting participants. The following interests were reported. Dr Visanu Thamlikitkul, through his employer Mahidol University, had received research grants from public sources for work on AMR. In addition, Dr Visanu's employer, Mahidol University, had received research support for antimicrobial resistance in the period 2009 to 2013, from three pharmaceutical companies producing antibiotics. Furthermore, Dr Visanu has personally received speaker fees and travel support relating to antimicrobial resistance from pharmaceutical companies over the same period. Dr Line Matthiessen declared having presented the views of the European Commission at several antimicrobial resistance meetings as part of her official duties. All other participants of the meeting declared no relevant interests.

There were no comments from meeting participants. It was concluded that none of the members' declared interests presented any conflict in relation to the objectives of the meeting and their role on the STAG-AMR and as such did not warrant the exclusion of any members from any part of the meeting, including those sessions leading to formulation of recommendations or advice.

Chair and apologies

The meeting was chaired by Professor Dame Sally Davies. Two STAG-AMR members sent their apologies: Dr Hiiti B. Sillo and Professor Jae-Hoon Song.

Opening comments

Professor Dame Sally Davies, UK Chief Medical Officer and STAG-AMR Chair, said the long history of trying to effect change in the area of AMR had brought us to a 'tipping point' where a real difference could be made. Nationally, we need to coordinate activities and ensure appropriate surveillance. However, international collaboration is the only way to tackle AMR effectively and save people's lives. This global approach requires medicines stewardship and the development of new antibiotics, while also ensuring people have access to the drugs they need. Too often the poor do not receive medicines, are given counterfeit or poor quality drugs, or have no access to the more expensive options needed to treat resistant infections.

Globally there are different perspectives on how to tackle AMR. But the example of the resurgence in tuberculosis across the world, including the emergence of pan-resistant strains, illustrates what a return to a pre-antibiotic, pre-therapy era would mean for everyone. Current treatments for infectious organisms – bacteria, viruses, fungi and parasites – are all potentially at risk.

A global action plan can only succeed through collaboration across all sectors and organizations connected with AMR, including human and animal health, agriculture, food, pharmaceuticals, research and development (R&D) and, more generally, the public and private sectors. The second STAG-AMR meeting is part of a process of wide engagement and consultation that will lead to the global action plan. The global action plan will only succeed if it is based in reality and draws in everyone to work together.

Dr Keiji Fukuda, WHO Assistant Director-General for Health Security and Environment, explained that the Director-General could not attend due to a work trip. He said few public health issues had escalated in importance to the same extent as AMR had over the past year. The level of attention on AMR is now higher than at any point in recent decades and it is important to use this opportunity to make AMR a global political and social priority. Dr Fukuda thanked the Chair and participants, acknowledging that many had spent a large part of their careers on AMR.

Session I: Global Action Plan for AMR – what is envisaged

Presentation: Dr Keiji Fukuda, Assistant Director-General for Health Security and Environment, WHO Geneva

The context

Past decades have seen considerable efforts to tackle AMR, with progress in many areas. Yet AMR is a worsening global phenomenon. While some battles have been won, the war is being lost:

- There is a history of published documents and guidance but too little effective action. Now we need to move beyond discussions and declarations of intent.
- Where there has been action it has been fragmented. Many organizations have tried to move in the right direction but there has been no unifying international strategy to create a coherent, coordinated approach.
- AMR has been addressed primarily at a technical level without full political and social engagement.

Information is lacking on the overall economic costs of AMR, specifically the large indirect costs caused by lower productivity and other societal impacts. The costs of inaction make AMR a

developmental issue for lower income countries. There are also gaps in our epidemiological knowledge, including of the impact of antibiotic use in one sector on resistance in others.

We need to understand why there are no new antibiotics. This is a question of how to sustain R&D and distribute the risk of developing new products. And if new agents become available should we treat them as typical commodities, or are they public global goods for everyone's benefit? If the latter, how do we handle their distribution in a commercial world?

Development of a global action plan for AMR

For the global action plan to be presented to the 68th WHA in May 2015, an agreed draft will be needed by the end of 2014.

We need to develop:

- **A mission statement and a narrative** to answer why action is needed.
 - The focus of the mission statement should be AMR's impact on human health, while at the same time recognizing that solutions will also come from a wide range of partners beyond the health sector.
 - The narrative must engage politicians and public opinion. Previous attempts have been too complex and theoretical to capture attention.
- **A global action plan for AMR** that provides a **blueprint** to answer what needs to be done.
 - The global action plan should be the definitive vehicle for developing global coordination and synergy. It needs to cover issues that are relevant across sectors and for all countries.
 - Consensus is needed on defining the core 'areas of concern' so that they engage and bring together stakeholders (including politicians), and avoid creating divisions. Identifying these areas will also define the scope of the global action plan. Too wide, and the global action plan will fail; too narrow, and it will have no impact.
 - Each core area of concern needs a list of concrete, measurable objectives with defined milestones e.g. 5 and 10 years. These should be prioritized in terms of a) greatest long-term value; b) confidence-building short-term actions.
 - The plan should be as concrete as possible but use a stepwise approach to make it accessible to countries at different stages of development and action.
 - The global action plan should build on the large body of work already done on AMR. Participants at the meeting were asked to help bring together this material. A knowledge base ('library') of existing initiatives and evidence will provide information for countries to use.

In discussion, many participants agreed that a flexible 'ladder' approach to objectives in the global action plan would be appropriate for developing countries. They stressed the large shared interests between the animal and human aspects of AMR and the importance of the blueprint reflecting where sectors are working together. The tripartite agreement between WHO, OIE and FAO will promote understanding of how international collaboration should develop. One

participant suggested an analysis of barriers to implementation in different contexts, in order to understand why the 2001 Strategy was not taken up. International organizations are good at guidance documents but the ‘translation gap’ means these do not always lead to political commitment or action. The support of WHO Collaborating Centres, advisors and technical assistance can help translate guidance into implementation at country level. To win political support, the global action plan should move away from technical language and focus on the health impacts of AMR. So far the reality of dying children and untreatable patients has been missing from the message.

One participant asked if antibiotic resistance was still the priority. Dr Fukuda said the issue is AMR, but with particular attention on antibiotics and the direct impact in hospital and clinical settings. At the same time, strong AMR work in other areas (including disease-specific programmes such as those for control of HIV, TB and malaria) must continue.

Where are we starting from?

Presentation: Dr Charles Penn, Coordinator AMR, WHO Geneva

WHO recognizes that a great deal of activity and investment has already taken place on combating AMR, involving many organizations and stakeholders. Dr Penn said it was important to ensure that the work on a global action plan for AMR builds on existing knowledge and initiatives and does not reinvent or repeat what has already been achieved. His presentation provided examples of current AMR actions, plans and initiatives nationally, regionally and globally. Dr Penn posed two questions for participants:

- What are the other significant activities, initiatives and resources that can contribute to development and implementation of the global action plan for AMR? WHO would like to gather this information to create a reference directory on AMR activities, which will facilitate collaboration and the sharing of expertise.
- Who else needs to be brought into the discussion? WHO would like suggestions of what organizations or sectors are currently missing from the AMR debate so that they can be included in development of the global action plan.

Session II: Establishing the perspectives - areas of concern and major objectives

Overview: Dr Keiji Fukuda, Assistant Director-General for Health Security and Environment, WHO Geneva

Dr Fukuda raised two issues for further consideration:

- There needs to be consensus and clarity that human health should sit at the centre of the narrative for the global action plan. AMR will be raised, for instance, as a leadership,

development, economic or inter-sectoral issue, depending on the audience and context. These perspectives are correct but at the heart of the narrative must be a substantive and unambiguous message.

- Why has there not been more progress on AMR, given earlier efforts and activity? The key is to create political will at ministerial level and above. To do so it has to be clear that success is possible, and the costs of both inaction and action must be spelt out. As well as making a coherent case for tackling AMR, we need to have clear, substantive answers about what action needs to be taken. The areas of concern must encapsulate areas of activity in a way that makes sense to different people.

Innovation and best practices for infection control, use of medicines and technology development

Presentation: Dr Marie-Paule Kieny, Assistant Director-General, Health Systems and Innovation, WHO Geneva

Infection Prevention and Control (IPC)

Strong global and national programmes are in place in health care settings in some countries, with evidence-based best practice (such as hand hygiene) contributing to reduced AMR transmission. However, many countries are still struggling to establish IPC programmes and more complex interventions are needed for some microorganisms. North/South and South/South partnerships at all levels can support IPC programme development, such as the African Partnership for Patient Safety that twins hospitals between North and South. Other cost-effective approaches include changing the behaviour of front line staff and greater patient participation in IPC. Research is needed on transmission mechanisms and to evaluate the impact and cost-effectiveness of IPC in resource-poor settings. New technologies are important, including rapid diagnostics and vaccines to reduce the transmission of multi-drug resistance.

Use of medicines

Dr Kieny illustrated the variability in medicines use in different countries. To achieve optimal antibiotic use we need political commitment, reliable data and cross-sectoral involvement from national to health facility level. Concrete actions should target prescribers and dispensers, policy makers in hospitals, and government and health systems. These should include education programmes for professionals, patients and the public; greater awareness of treatment guidelines; implementation of antibiotic stewardship programs in hospitals; systematic monitoring of hospital usage; regulation and control of pharmaceutical company activities with prescribers and hospitals; and access to appropriate laboratory facilities for testing. Actions to contain AMR should be a national priority, with a national inter-sectoral strategy, indicators to monitor impact, essential medicines lists, and country sharing of surveillance data and antimicrobial usage. One issue at the centre of AMR is substandard and counterfeit products – in both high cost medicines and low cost antimicrobials – which lead to excessive mortality and morbidity while also promoting development of drug-resistant strains. Public health responses include: strengthening regulatory bodies; greater enforcement of regulations relating to registration, production and distribution; and enhanced national laboratory capacity for quality control and monitoring. We

should eliminate irrational antibiotic combinations and inappropriate pack sizes (antibiotics should not be sold as individual pills) and restrict pharmacists/drug sellers to prescription only sales.

Development of health technologies

In recent decades only two new classes of antibiotics have come to market and there is a dearth of novel antibiotics in the pipeline. This makes it necessary both to stimulate the development of new agents and to preserve these molecules' lifespans. Various current initiatives are relevant:

- Member States have requested that R&D related to new antibiotics and tools to fight AMR should be integrated into the planned global health R&D Observatory. This would pool information e.g. from clinical trials registers and patents.
- Debate is underway on innovative business models for the development and subsequent preservation of new antibiotics. At the moment there is nothing to constrain irrational use of products reaching the market. A new model could create a governmental consortium to finance the discovery of new antimicrobials and their development and production chain. This could be done through 'prizes' and grants for promising ideas. Intellectual property rights would remain with the consortium, which would control distribution and manage the market to preserve the lifespan of the agent.
- Thirdly, there is a need for new rapid methods for antimicrobial susceptibility testing (AST) at the point of care in low and middle income countries. An expert consultation on this subject was held in Geneva in April 2014, with academia, industry, NGOs and WHO, which started to develop a road map to stimulate AST tools for low and middle income countries.

Discussion points from participants are included under the five areas of concern.

Global tuberculosis control: Where we came from and where we are going

Presentation: Dr Karin Weyer, Global TB Programme, WHO Geneva

Dr Weyer presented an overview of WHO's experience on tuberculosis control since the declaration of an emergency in 1993, highlighting parallels with the AMR challenge. The first strategy in 1994 focused on five key principles for trying to prevent and control TB but was subsequently criticized as being too medically driven. Over the following decade, drug resistance and other epidemics (e.g. HIV) became an issue for TB and in 2006 the more comprehensive global Stop TB strategy was adopted. This touched on emerging new challenges, health system issues, the private sector, harnessing community advocacy, and the role of R&D. Stop TB served as a blueprint for the actual global plan (The Global Plan to Stop TB 2011-15), which was a costed investment plan to address the strategy's six components. The 2009 resolution WHA62.15 on drug resistant TB touched on many of the issues raised at the STAG-AMR meeting: health information, surveillance, detection and monitoring, and protection and control. The post-2015 Global TB Strategy is based on three 'pillars', constituting the evolution to a more comprehensive and cross-sectoral approach. As with AMR, this is a global strategy that has to be adapted according to local regional and country circumstances.

For TB, the vision and the goal were relatively easy to define, as was reaching an international consensus. More challenging was how to measure progress; it took 24 months and several technical and strategic consultations to agree on milestone targets up to 2035. Dr Weyer's advice on AMR was to 'consult, consult, consult' to ensure the 'buy in' of countries and donors. Dr Weyer summarized the Strategy's consultation process.

Global TB drug resistance surveillance started in 1994. Two regular publications have been produced and updated since then: guidelines on drug resistance surveys and an overview of drug resistant TB. In 1994 the TB unit recognized the need for a strong laboratory structure, which led to the TB Supranational Reference Laboratory Network of around 30 laboratories that provide oversight and external quality proficiency testing for national reference laboratories. Between 2009 and 2012 the Strategy built more than 100 national reference laboratories to expand developing country capacity for drug susceptibility testing, surveillance and diagnostics. Dr Weyer said there was scope for collaboration over AMR, including access to the 100 laboratories.

Participants were variously inspired, daunted and optimistic after the presentation. AMR is more complicated as there are more stakeholders, many pathogens and a much shorter timescale to reach a consensus on a global action plan, they pointed out. One speaker stressed that the regular WHO TB reports had been important tools for advocacy campaigns. Dr Weyer said costed plan with targets (albeit debated vigorously) had also helped with advocacy, as had collaboration with the pharmaceutical industry. Pharmacists welcomed the joint working on TB between WHO and the International Pharmaceutical Federation, and hoped to see something similar for AMR. Another speaker welcomed the TB Strategy's explicit recognition of research; Dr Weyer said TB's aspirational goals had stimulated R&D.

Session III: Short and long term objectives

Discussion and agreement from STAG-AMR members and meeting participants was sought on the following elements for a global action plan:

- An overall mission statement.
- The five core areas of concern that global, regional and national plans need to address, incorporating comments from participants during the meeting.
- Objectives under each of the five areas for 5 and 10 year timeframes, including:
 - 'process' targets/indicators and 'outcome/impact' targets/indicators that can be applied in a stepwise approach i) globally (such as % of countries to achieve target); ii) within countries
 - the highest priorities
 - 'low hanging fruit' that can be achieved quickly to demonstrate progress and build confidence.

In the morning, meeting participants broke into five groups to discuss each of the five proposed core areas. In the afternoon, the groups reported back to the full meeting for a wider discussion of the suggested points. The suggested objectives and related discussion points are included in the summary of the proposed areas of concern and objectives.

Who else needs to join the AMR discussions?

STAG-AMR members and meeting participants suggested the following should also be involved:

- The broader medical community still needs to be convinced of the urgency for action on AMR; we need to link with the wider medical professions e.g. surgeons and GPs. WHO can use the World Health Assembly to bring these groups together.
- The device and diagnostics industries.
- On the private side, animal health protection at farm level: a) private vets; b) networks of farmers who have organizations for animal health protection.
- Environment and waste disposal sectors.
- Communicators (brand ambassadors; media professionals).
- Social scientists, as behaviour change is needed across all professions and sectors of society including patients and the public.

The global action plan for AMR: summary of discussions

Framing the global action plan and cross-cutting themes

Over two and a half days, a number of issues were put forward by STAG-AMR members and meeting participants as framing the overall global action plan and as relevant across all areas for action:

- Strong **cross-sectoral collaboration** by the human and animal health, agriculture, and food sectors is essential and must be reflected in each of the global action plan's five areas of concern. WHO should continue to work at a global level in the tripartite collaboration with FAO, OIE and seek to facilitate cross-sectoral working at regional and national levels (cross ministry etc.), using the global action plan as the blueprint for such engagement.
- While the global action plan is focused on the global level, each of the five areas of concern will need in subsequent documents to be addressed at all levels by organisations and governments through detailed **global, regional and national action plans**. Standards already agreed at a global level need to be implemented at regional and national levels.

- Overall, there are standards/actions relevant at the global level; regulatory approaches at the national level; systems organization at the unit (e.g. hospital) level; and behaviour at the community/individual level. The global action plan will provide a way of **supporting national and regional organizations** in implementing and enforcing standards that already exist and in the development of regulations to avoid mis-use of new agents.
- National AMR programmes must be integrated into national health systems.
- The global action plan should take a stepwise approach to take account of countries' different starting points.
- The specific needs of developing countries should be addressed. These needs are extensive and to ensure 'buy in' should be at the centre of the global action plan. Wide-ranging capacity building is necessary on surveillance and to ensure countries can implement the actions outlined in a global action plan. Infrastructure investment and financial and technical assistance will be needed.
- Improvement in the quality of data across all five areas of concern is crucial for driving change and evaluating interventions and progress.
- AMR needs to be positioned for the post-Millennium Development Goal (MDG) era and explicitly linked with the One Health agenda and UCH. Separately, AMR is currently not in the WHO Global Burden of Disease project which has a high profile among politicians.
- The perception of new anti-microbial agents as global public goods is relevant across many of the areas of concern.
- The global action plan must recognize and build on what has already been done.
- Progress depends on sharing good practice, standards, technical knowledge and capabilities.
- The costs of action versus inaction need to be assessed across the global action plan.
- Inter-sectoral WHO Collaborating Centres would be a cost efficient resource for supporting implementation of the global action plan.
- Clear and consistent use of terms such as 'agriculture', 'animal health', and 'veterinary medicine' is important across all global action plan documents.

Five core areas of concern

STAG-AMR members and meeting participants agreed on the following five core areas of concern for the global action plan on AMR.

1. **Communications:** Awareness, understanding and education (including training, and engagement/commitment).
2. **Insight:** Knowledge, surveillance, research and development, innovation.
3. **Sustainability:** Economic impact, investment needs, and the needs of all countries.
4. **Optimizing the use of antimicrobials:** (medicines and other tools such as diagnostics, access, quality, regulation in all sectors).
5. **Prevention of infection:** Hygiene, infection prevention and control, use of vaccines.

Objectives under the areas of concern

1. Communications: awareness, understanding and education (including training, and engagement/commitment)

The main objective is behaviour change and altering social norms (e.g. the recognition of antibiotics as a ‘global public good’ and reducing patient expectations). Priorities are to raise awareness and the prudent use of antibiotics. Audiences range from heads of governments, through policy makers, professions, prescribers, and businesses, to public, patients and civil society, across all sectors (human and animal health, agriculture, veterinary etc.). In this context, it will be important for the global action plan to be translatable into products for a wider audience and that central messages are understood by both policy makers and broad sectors of society.

The public

Many people remain unaware of the dangers of AMR, especially in developing countries. Raising awareness among patients and civil society is a priority. Mass media campaigns (harnessing new technology) and ‘brand ambassadors’ e.g. football players, film stars etc. can help put across messages. We should use all health care professionals, including pharmacists, to deliver patient education and adherence to medication schedules. Communication messages should be simple, tailored to national culture and beliefs. Individuals, including children, need to understand that behaviour change is important to them personally, and to stop pressurizing doctors to prescribe antibiotics when unnecessary. There are potential parallels with campaigns on healthcare-associated infections, for example in some countries publication of hospital infection data has mobilized a popular consumer movement.

A World Antibiotic Awareness Week (an extension of the 18 November Antibiotic Awareness Day) would create momentum, provide a hook for national activities, and could be utilized in a stepwise fashion, with activities ranging from a press release/press conference to a full public awareness campaign. Such a week must embrace human and animal use, agriculture, the food chain and involve veterinarians, animal producers, and pet owners etc.

Prescribers

WHO should consider setting minimum standards for AMR education for all medical personnel, and there may be a case for governments to define the curriculum in this area. WHO could provide a training presentation for students in all medical specialities, particularly those who prescribe and whose patient outcomes depend on antibiotics. It is important to reach nurses as mis-dosage is a problem; they also drive requests for medication in long-term care facilities. The UK offered to share information developed on antimicrobial prescribing competencies.

Continuing education should be required of all professionals involved in prescribing and should be provided in an academic environment to balance information from pharmaceutical firms, which in some countries is the only form of continuing education for medical professionals. Evidence-based prescribing can be encouraged through WHO global treatment guidelines: while choice of drug might differ with locality, availability and local resistance, the prescribing

algorithms for treating infections would be the same. Guidelines must be accessible and available in both book and mobile app format, with annual updates. WHO Collaborating Centres could have a role to play. There also needs to be a global network of infectious disease specialists for patients who are difficult to treat. A relatively quick goal could be to secure voluntary commitments on prescribing by the medical associations of doctors and others who prescribe, dispense or administer medicines.

Pharmacists

Depending on the country, pharmacists are dispensers or prescribers. In some places a substantial part of a pharmacy's revenues comes from prescribing and this needs to be addressed by regulation. There is a need for training on AMR in pharmacy schools (through a standard presentation), mandatory training for pharmacy assistants, and continuing education.

Policy makers

Policy makers need to understand AMR and believe that action can be effective. Only then will they commit to a budget. Key messages are AMR's costs to the economy, the potential cost savings of investing in interventions, the benefits of regulatory action, and the benefits of public reporting of hospital indicators on AMR. They also need to understand that antibiotic stewardship and infection control contribute to patient safety and should be part of any accreditation process.

Politicians

Elected politicians are sensitive to public and professional opinion, and superbug outbreaks. So communication should focus on patient outcomes and the positive impact of reduced antibiotic use. Politicians may themselves have a role in the communication process, as they did for hand hygiene and vaccination. A session on AMR at the G20 would reach politicians from countries where antibiotic use is not optimal. If too late to put AMR on the next meeting's agenda, it could be raised at an ancillary meeting and followed up with the next G20 presidency.

Pharmaceutical industry

Communication needs to reach both the research-based and generic sides of the industry so that they understand the need for prudent use of antibiotics, while also recognizing the industry's role in educating prescribers. If an innovative business model is devised for new antimicrobial agents (de-linking volumes and revenues) then industry can champion optimal use and become part of the solution. An immediate action would be to seek a 'compact' between key interested parties and the pharmaceutical industry (including distributors). Such a 'compact' or 'code of conduct' across sectors (industry, health professions, prescribers, civil society) would reinforce and capitalise on the way disparate voices already speak 'the same language' on AMR.

2. Insight: knowledge, surveillance, research and development, innovation.

Knowledge

Knowledge (information and data) should guide all actions on AMR. However, gaps in the AMR evidence base include: the current and future health burden of antimicrobial resistance, the consequences of not tackling AMR; information on mechanisms of resistance; and a deeper understanding of the drivers (risk factors) of emergence and the spread of resistance (e.g. antibiotic usage and antibiotic consumption). In addition, evidence will be needed to show that the global action plan's proposed recommendations on AMR are effective.

Actions to redress these knowledge gaps would include point prevalence studies on the clinical burden of resistance, in specific locations or across different areas. Currently the samples that are cultured are taken from highly-selected patients who do not represent the population at large; they have usually taken many antibiotics and undergone treatment for some time. We need population data from the real world, which would also indicate if drugs on essential medicines lists are still effective. Moving forward, any intervention under the global action plan for AMR must include the monitoring and evaluation of impact, including effectiveness in different countries.

Surveillance

The meeting's working group for this area described surveillance as the key tool for addressing knowledge gaps, identifying future research areas and providing data to underpin awareness campaigns. Surveillance covers several types of data, for instance on antimicrobial use, pathogens, specific antibiotic classes, and health impact – with correspondingly different audiences.

The meeting identified many gaps in the available surveillance data including on the epidemiology of AMR, use of antibiotics, clinical data, and AMR outcomes. These gaps are at national, regional and global levels. The priority should be to establish a global surveillance system with global standards, linking epidemiological, clinical and microbiological information. This will require standardized methods; (good quality) data collection; standardized reporting systems across different areas; and a shared minimum data set for local, regional and global use. Population-based data are needed to link information on AMR with mortality, morbidity and costs. Establishing such a system and making use of the data is complex, requiring a stepwise approach. Among issues to be resolved is a definition of AMR-related death in the International Classification of Diseases (ICD), either in ICD10 or the ICD11 revisions. Horizontal links need to be established between human, animal, agricultural and food surveillance systems. OIA and FAO are involved in technical consultations aimed at implementing systems, guidelines and protocols for integrated surveillance across the sectors.

Capacity building and support will be needed as many Member States do not have laboratory and epidemiological capacity to measure burden of disease and resistance. Even in the European region, only half the countries have good surveillance programmes. Worldwide, where laboratory networks do exist, quality of analysis is variable, posing a challenge for collating and analyzing global data.

A large body of work already exists on surveillance, including the WHO publication, *Antimicrobial resistance: global report on surveillance 2014*⁴, which provides the most accurate picture at present of the magnitude of AMR and the state of surveillance globally. Earlier this year WHO held the second technical consultation on surveillance, which scoped steps to develop global standards. WHO aims to have draft surveillance protocols in six months.

Research and development

The meeting's working group said R&D programmes should build on existing data and research networks. One priority is to develop a target profile of products for different areas (antimicrobial agents, diagnostics, prevention). The 19 Member States of the Joint Programming Initiative on Antimicrobial Resistance (JPIAMR) have joined forces to coordinate AMR research to achieve greater impact and avoid duplication. JPIAMR maps out research that is underway on AMR. Its Strategic Research Agenda was launched in April 2014.

No new classes of antibiotics have been developed since the late 1980s. Even with the few agents that are moving forward there will be gaps. For instance, new drugs for NDM1 will be extremely scarce. Generally, pharmaceutical companies prefer to invest in cancer drugs and medicines for chronic diseases. They need to be drawn back to antibiotic development as the world will need new antibiotics, even if we reduce AMR. Some of the most promising research is taking place in academia and small and medium sized enterprises, rather than large companies. Participants suggested that there is scope to look at traditional medicine, and at historic “forgotten” agents that were never developed or are no longer manufactured.

On vaccines, it appears that the spread of AMR has not yet influenced development and use.

Innovative diagnostics are needed, in particular, rapid, affordable, ‘point of care’ tests to identify whether an infection is bacterial or viral and to detect resistance. Improved diagnostics would help drive surveillance and optimize antimicrobial use. R&D especially needs to address the technical barriers to creating point of care tools for use in developing countries.

Several participants said that developing countries should be brought into international research through networking and funding. Cross-sectoral cooperation is also needed on R&D; one participant mentioned a number of R&D initiatives in animal health and the potential to bring animal and human approaches together in some areas.

Innovation and new business models

Participants said a new business model for antimicrobial R&D would need adequately to reward investment while limiting a new product's use and ensuring equality of access for the developing world. Recent policy work has looked at de-linking antibiotic use from the rewards to innovators, as outlined in Dr Kieny's presentation. The challenge is to devise a business model that provides strong incentives for R&D while avoiding incentives for high sales volumes. The Innovative Medicines Initiative (IMI) is working in this area. Participants discussed how de-linkage could be implemented, querying what would govern prices and how to restrict and monitor procurement

⁴ Antimicrobial resistance: global report on surveillance 2014 <http://www.who.int/drugresistance/documents/surveillance/en/>

and post-authorization use. All countries must commit to ‘super enforcement’ of the use of new antimicrobials if they are to be treated as global public goods. In exchange, all countries must have affordable access. One participant suggested small-scale piloting of new business models, focussing on some key agents rather than trying to change the model for antimicrobials overall. New global and national regulatory regimes will be needed to ensure a controlled entry and highly managed use over the drug’s lifetime. Pilot initiatives could test how to regulate pathways.

Since outcomes cannot be predicted, the key to success will be diversity in research through incentivizing a large number of small projects, while allowing failure to be a realistic possibility.

The question was raised of whether regulation is holding back the development of new agents. Participants from the pharmaceutical industry and regulatory bodies said regulatory changes in the past five years meant this was not a problem. The European Medicines Agency (EMA) and the US Food and Drug Administration (FDA) had provided new pathways for early approval of antibiotics to address AMR, allowing early development based on a small data set and early access for patients in need. The U.S. and European regulatory bodies have also made progress on harmonizing their systems. The next phase will look more closely at post-authorisation use and surveillance of new drugs that register based on small data sets of perhaps 300-500 subjects as small trials may not identify adverse consequences and toxicities, especially if conducted with very sick patients taking a variety of agents. Many countries do not have adequate pharmacovigilance systems for monitoring side effects, toxicity and efficacy. So there will be important considerations around access to and global use of these new agents that are given accelerated or conditional market authorizations.

3. Sustainability: economic impact, investment needs, and the needs of all countries.

Costs of inaction

It is important to be able to demonstrate the overall economic cost of inaction compared with the cost and benefit of action. While we understand many of the direct costs of AMR (e.g. higher treatment expenditure), less information is available on its indirect economic impacts, for instance through the negative effect on productivity (including animal husbandry), life expectancy and food security. Data are available for some countries, but there is no overall robust tally of the estimated current and future direct and indirect economic costs of inaction on AMR. We should try to quantify these sums, particularly for developing countries.

Investment needs and costs

On the other side of the equation, we need to quantify the national and global investment required to implement a global action plan for AMR, allowing for activities already in budgets. This information will be demanded by policy makers facing competing health and development priorities. It is probably too ambitious at present to put a figure on the total investment needs, but the global action plan must capture the magnitude of the issue, that investment is needed, and why.

While WHO needs an AMR infrastructure to coordinate activities, with sufficient capacity to support Member States, countries themselves will also have to invest in laboratories, health systems, education and capacity development etc. as they develop and implement AMR action plans. One barrier to the implementation of previous AMR action plans was lack of financial resources in many countries.

There can be a stepwise approach. Some activities can be achieved using existing resources e.g. continuing medical education of health professionals. Many elements of an AMR strategy may already be included in budgets because they are integrated with other activities, such as health system strengthening and infection prevention. Other AMR strategy elements, such as improving laboratory skills and sample collection, will require some additional resources and training. Finally, there will be expensive items, such as surveillance networks. There is also an 'investing to save' argument to be made for AMR.

Types of activities where investment requirements need costing include:

- Surveillance, monitoring and diagnosis, including laboratory capacity and data collection (with quality control)
- Development of new treatment/interventions, diagnostics and vaccines (R&D for new agents may require \$400m - \$1bn per drug)
- Provision of existing diagnostics
- Regulations and enforcement (the capacity to monitor compliance across human and animal health)
- Infrastructure development (including upgrading hospitals in developing countries to tackle AMR)
- Prevention (including infection control in hospitals)
- Training and continuing medical education
- The provision of guidelines on appropriate use of antibiotics.

Among specific suggestions, one was that WHO could provide a template for countries to estimate the direct and indirect costs caused by AMR and another for estimating the costs of investment needed to combat AMR. Where national estimates are already available, WHO could start collating the data. An analysis of European countries that have phased out antibiotics for growth promotion in livestock without any impact on productivity (e.g. Netherlands) would help persuade other countries that their agricultural industry will not suffer economically if they take the same action. Work on the cost of inaction could include a literature review for studies in this area and scenarios to illustrate the financial impact of individual antibiotics becoming resistant.

4. Optimizing the use of antimicrobials: (medicines and other tools such as diagnostics, access, quality, regulation in all sectors)

Measuring and reporting usage

Reliable data are needed on the quantities of antimicrobials used, with systems to measure and track global antibiotic use. Every country should collect and report data. Usage can be quantified through sales data (e.g. IMS Institute for Healthcare Informatics, although developing countries often do not have registers); prescribing data; insurance data; existing databases for human use (e.g. at WHO); point surveys and sentinel surveys. The OIE is responsible for the database for antibiotic use in animals. The process of aggregating data by region should start now, even if some data are of poor quality, as there can be a stepwise improvement in the quality and harmonization. It is helpful to minimise the number of measures.

Optimizing human use

Stewardship requires the use of medicines across all sectors (through prescription, dispensing and administration) to be guided by evidence, diagnostics, rational protocols, and essential medicines lists. Overall guidelines could require every use of an antimicrobial to be governed in this way. System rules should force the prescriber to reconsider the original treatment decision if/when the results of a diagnostic test come in. Total compliance is unrealistic so the goal should be higher percentage compliance. Developing countries could focus on addressing self-medication and the easy access to antibiotics sold without prescription by non-qualified pharmacists in community pharmacies. Progress in India, which recently restricted the use of 24 categories of antibiotics, could provide a useful example.

One challenge is that in many private hospitals antibiotic sales contribute to total profit, so there are disincentives to reducing usage. Similarly, the commissions that many prescribers receive represent a large proportion of their income. A global survey of antimicrobial stewardship in hospitals has been conducted by the European Society of Clinical Microbiology and Infectious Disease and the International Society of Chemotherapy. It found that less than one-third of 66 responding countries have antimicrobial stewardship standards for hospitals. Apart from money and lack of data, major barriers to stewardship are prescribers' opposition and hospital administrators' lack of knowledge. The survey shows that stewardship reduces inappropriate prescribing, decreases use of broad spectrum agents, decreases direct expenditure, decreases hospital acquired infections, decreases length of stay, and even reduces AMR. Stewardship programmes will need their own infrastructure, with sentinel surveys as a starting point for measurement.

Optimizing use in veterinary medicine and agriculture

OIE has already adopted standards for responsible antibiotic use for animals (including aquaculture and fisheries), created in collaboration with WHO, FAO and others. The tripartite has agreed an antibiotic class concept in order to protect critical medicines. OIE has an essential medicines list for veterinary antimicrobials and its recommendations on not using some molecules have been integrated with the human side. The global action plan should build on

these achievements. Limiting multi-sector use is important so that the same class of drug is not used across all sectors. Yet while the veterinary side has excelled with overarching standards, there are big gaps in implementation on antimicrobial use at national level. Building on OIE/Codex Alimentarius standards, the EU is now producing guidance that provides best practice examples and flexibility; it is also developing related legal tools (regulations). Measures targeting AMR that will impact on animal and agricultural sectors, including monitoring, need to be considered from developing countries' points of view.

The USA FDA has developed a voluntary cooperation agreement in the US whereby within 90 days, 26 of 27 manufacturers agreed to remove growth promotion as an indication on labels of antibiotics used in animal husbandry, and to require prescription from a veterinarian. This was much quicker than regulation, which could have taken years. It has yet to be seen how relabeling translates into more appropriate use of the antibiotics. In the Netherlands, where there was low AMR in humans but high antimicrobial use in animals, the Minister of Agriculture set a target of a 50% reduction in animals in five years, which many said was impossible. But in three years there was a 60% reduction, equivalent to 300,000 kg of antibiotics. Importantly, there has been no measurable negative affect on the production or welfare of animals.

Antimicrobial waste

Disposal of antimicrobial waste, including into water, is a big issue across the animal, agriculture and human sectors and improved disposal mechanisms are needed. Optimizing usage is thus also an ecological issue.

Role of diagnostics

Prescription of antimicrobials should be based on diagnostic tests (with treatment modified or stopped as appropriate) yet many of the enablers are missing. Affordable 'point of care' tests would help answer basic questions e.g. whether an infection is bacterial or viral and to identify pathogens. Countries also need to test for resistance to drugs in use. Such tests would both guide treatment and also collect data for surveillance. Diagnostics standards need to be harmonized.

Greater use of diagnostics will require capacity building, particularly in low and middle income countries, including the provision of basic tools at local level and reliable regional laboratories. In some low income countries there is no electricity 70% of the time, so innovative diagnostics must be relevant for these contexts. Building capacity for veterinary diagnostics should be a priority. Other issues include removing financial barriers to the use of diagnostics; prescribing medicines is often seen as cheaper than conducting a diagnostic test.

Access to medicines and diagnostics

Participants said all action on AMR needs to be guided by the principle of sustainable access to all antimicrobials (when appropriate); equitable access must be enshrined in the global action plan. Such access for those in need may require financial support. Where under-use is the issue, actions should ensure secure supply chains for key medicines and affordability. Regional

procurement mechanisms can help lower prices through economies of scale and thereby improve access.

However, market availability remains a problem as agents registered in one region are not necessarily available in others. Continued work is needed on harmonizing regulatory pathways, so that drugs are used, dosed and available in the same way worldwide.

Access to newly developed innovative drugs (e.g. for MDR TB) needs to be assured so that developing countries can afford second, third and fourth line drugs as they become available. This needs to be part of any new business model (as described above).

Pharmaceutical product quality

Greater focus should be put on the quality of antimicrobials (including generics) and on strengthening the relevant medicines regulations. Quality of medicines relates to animal as well as human medicines, and is a priority for veterinary medicine; indeed OIE said it was a bigger problem on the animal side. We therefore need strong pharmacovigilance, regulations and legislation across all sectors to identify and control the different types of substandard, spurious, falsely-labelled, falsified and counterfeit (SSFFC) medical products, without interfering in trade in generic drugs. There is a distinction between commercial issues arising from safe counterfeit products, and products that are not safe, including those containing low level sub-therapeutic amounts of a drug, which are often harder to identify than counterfeits; it is important to target the latter. To minimize the availability of substandard medicines, only authorized distribution channels should be used. Ideally a qualified pharmacist should be involved in the selection, distribution and procurement of antimicrobials. On SSFFC we need to take into account the capacities of developing countries as many do not have detection systems.

Product tracking can help defend against SSFFC medical products but the financial cost of tracking should not interfere with access. Some countries' action on counterfeit products can also result in legitimate generic medicines not being released by customs until after expiry dates.

Regulation

Most of the objectives under the five defined areas of concern require a strong policy and regulatory framework. Regulations need to be implementable in developing countries, some of which will need a stepwise approach as they lack a framework.

Regulation is required on antimicrobial use across all sectors including animal and food, with strengthened legislative and regulatory controls over authorisation to market, import, export prescribe, dispense and otherwise supply antimicrobial medicines. Effective regulation is also needed to cover monitoring, data collection, data management, data analysis, and knowledge through surveillance systems. All these controls must be enforceable.

WHO should convene a discussion on the unique regulatory aspects associated with the characterization of antibiotics as global public goods and how to regulate the post authorisation phase, surveillance and use of new agents consistently across countries.

5. Prevention of infection: hygiene, infection prevention and control, use of vaccines

Prevention offers ‘two for the price of one’:

- Prevention of infectious disease
- Reduced use of antibiotics (whether inappropriate or appropriate use), which should slow the development of AMR and help to preserve existing antibiotics.

Healthcare infection prevention

The most appropriate approach includes infection prevention and control (IPC) as a regular healthcare activity. Every healthcare facility (not just hospitals) should have a functional infection control programme. Such programmes are cost-effective; one participant mentioned the use of a simple cost analysis model to demonstrate at hospital level the cost of hospital acquired infections and the savings from reduced AMR.

Infection control programmes should be based on core competences, including: surveillance of hospital acquired infections; hand hygiene; standard precautions; isolation practices; safe injection practices. Some of these competencies vary between high, middle and low income countries, so healthcare infection prevention programmes need to be tailored to local conditions. The responsible bodies will also need to vary by location. In all healthcare facilities it is important that prevention initiatives are linked to staff training and education. One integrated approach is the Gulf Cooperation Council Center for Infection Control’s Infection Prevention & Control Manual, which has been published and updated since 2009.⁵ The document is available online with more than 65 different policies.

The hand hygiene campaign has demonstrated the importance of changing behaviours among front line staff. In countries such as Australia, publication of audited data on hand hygiene compliance has been a powerful motivator. We can learn from the hand hygiene model to focus on specific risky procedures through which patients and co-workers acquire infections and AMR. The introduction of alcohol rubs for hand hygiene had a huge effect; further simple, cheap solutions are needed, plus approaches that can be tailored to specific patient populations.

Since much is already known about how to reduce healthcare infection, it was suggested that the priority is to overcome implementation barriers and constraints, particularly in developing countries. The message that prevention can be achieved through simple measures is still not always understood. Enablers include countries sharing experiences, and training partnerships.

When establishing an infection control programme in developing countries, it is important to expand local human resources through permanent training resources. WHO can provide opportunities for governments and healthcare systems to exchange training activity programmes and IPC strategies for different levels of development.

⁵ Infection Prevention and Control manual, 2nd edition (2013) <http://www.gdipc.org/ic-manual.html>

Agricultural settings

A package of measures to maximise infection prevention in agricultural settings, especially in farm animal production, would include: clean water; basic hygiene/sanitation/waste disposal; quality feed that is free of pathogens; improved farm biosecurity; vaccination; hygienic slaughter practices to guard against the introduction of pathogens into the food chain; and implementation of the existing codes of practice for aquaculture and fisheries. Surveillance for infection and awareness of pathogens is also crucial. Overall, the methods for controlling animal diseases are also the best ways of preventing antimicrobial misuse and AMR.

Vaccinations

Countries should promote the use of effective vaccines to reduce infections that require antimicrobial treatment, or where antibiotics are commonly used inappropriately. Priority existing vaccines are those for respiratory pathogens (e.g. pneumococcal vaccine and influenza vaccine) and for diarrheal agents (e.g. rotavirus). Important developmental vaccines are staphylococcal vaccines, vaccines for gram negative organisms (especially healthcare associated gram negative rods), and for gonorrhoea. Vaccination of healthcare workers and patients can also prevent healthcare infection.

Overall, it is important to demonstrate that infection prevention measures are cost effective in all countries – low, middle and high income. While such programmes initially require funding, it should be stressed to policy makers that infection control programmes are cost-saving over time.

Indicators under the global action plan

STAG-AMR members and meeting participants discussed possible indicators for inclusion in the global action plan. These covered both ‘process’ indicators for monitoring how the global action plan is being implemented and health impact (‘outcome’) indicators to assess its effectiveness. These two types of potential indicators were considered at various levels:

- **Top level global indicators:** such as the percentage of Member States with a national action plan on AMR that is cross-sectoral (process); the reduction in prevalence of antimicrobial resistant infections (outcome).
- **Indicators under each of the five areas of concern:**
 - Global: such as the percentage of Member States collecting and reporting human and animal antibiotic usage data (process); the percentage of Member States that show a declining trend in antimicrobial use (outcome).
 - National: such as the percentage of a country’s prescriptions based on a diagnostic test (or on guidelines in less developed health systems) (process); the percentage and trend of over the counter use for individual drugs (outcome).

A stepwise approach to national targets (linked to the stepwise implementation of national AMR action plans) was suggested to help retain confidence, investment and commitment. A big challenge will be to satisfy the requirement from governments for outcome indicators. Some activities, such as surveillance, would have both global and national indicators.

It was agreed that whenever possible indicators should be selected that will use data already being collected. Indicators should be common across all countries to allow comparison and benchmarking, which requires them to be meaningful and implementable in very different environments around the world. There may be scope to develop standardised composite indicators that combine a number of indicators across a sector.

The meeting was briefly informed of recent work on indicators within the WHO AMR Secretariat. This includes the Country Situational Analysis (CSA) tool to assess the baseline activities and capacities of Member States to tackle AMR. It uses 23 survey questions and process indicators aligned with the 2011 World Health Day policy package. One of them, the existence of a comprehensive national AMR plan, has been adopted as an outcome indicator for WHO's Programme Budget for 2014-2015.

Meeting outputs and next steps

On the final day STAG-AMR members and the WHO Secretariat met to review the discussions held during the first two days, meeting outputs, and to formulate their recommendations to the Director-General.

Professor Davies and Dr Penn outlined the expected outputs from the STAG-AMR meeting and future events:

- **A short report to the Director-General⁶**
- **A short paper for the World Health Assembly** in May 2014, based on the two-page Concept note on the development of a global action plan, provided to meeting participants.
- A full **meeting report** of the three-day STAG-AMR meeting (this report).
- Following a resolution at the WHA, a first **draft of a global action plan** for AMR, shaped by the output of the STAG-AMR meeting. The global action plan is envisioned as a 20-30 page document rather than a detailed technical report. Any content on implementation will be high level.
- The draft global action plan will be used for a web-based **open consultation** aimed at collecting feedback from organizations, institutions and networks (rather than individuals) with an interest or expertise in AMR. WHO will also use existing mechanisms for communication with Member States and WHO mailing lists. The consultation will also work with meeting participants who represent international federations of national organizations so that the global action plan process reaches their constituencies. The open consultation will:
 - Ensure everybody can express a view
 - Capture all the organizations, entities and interest groups that can contribute to the development and particularly the implementation of global action plan on AMR.

⁶ http://www.who.int/drugresistance/stag/STAG_AMR_report_to_DG_April_2014.pdf?ua=1

- Formal **consultation with Member States** on the global action plan outside the WHO Governing Body system. This may take the form of a combined meeting later in the year of STAG-AMR and Member State representatives.

Concept note

Dr Penn guided STAG-AMR members through the Concept note describing the planned global action plan for AMR and the steps proposed for its development and added:

- The proposed five main areas of concern need to be agreed and then kept consistent.
- The autumn 2014 WHO Regional Committee meetings will be particularly important for engagement on the global action plan, either alongside the RC meetings or as an agenda item.
- Three individual Member States have already asked to host and run cross-sector meetings on specific AMR topics.

Report to the Director-General

STAG-AMR members requested that the Report to the Director-General should include:

- Many programmes in WHO will contribute to the development and implementation of the global action plan for AMR, and these should formally be brought together (i.e. the WHO internal Global Task Force on AMR should be formalized).
- STAG-AMR would like to see AMR explicitly mentioned in the ‘post-MDG’ agenda and as part of UHC and the future delivery of global health.
- STAG-AMR members agree with WHO proposed steps (the ‘Concept note’) for the development of the draft global action plan.

Closing comments

STAG-AMR members contributed final comments at the end of closed session:

- When developing the draft global action plan for AMR, it is important to be consistent with definitions, areas of concern, and descriptions of different components. The vision must be ‘translatable’ into other languages. The challenge will be to organize elements in a logical way, given the linkages. WHO Secretariat should involve the STAG-AMR in the drafting process
- The AMR programme is horizontal, linking across programmes and initiatives, and must be integral to health systems. Otherwise it is not sustainable in the long term.
- WHO should keep communicating with stakeholders and provide feedback so they stay engaged and supporting. The role of stakeholders needs defining, including the expected cross-sectoral interaction at national and regional levels. WHO should use its convening power to work with the pharmaceutical industry on being responsible health partners. Public consultation should include a question on feasibility.
- The global action plan should identify priority AMR actions for countries, including for the short term. It is important that the business/strategic plans for each country follow WHO guidance and recommendations.

Professor Davies and Dr Fukuda said a key issue was how to position AMR in the context of larger global health movements, MDG, UHC, economic development, climate change etc. This relates to the need for a global action plan narrative that is not too complex. The global action plan for AMR needs to be feasible, realistic and sustainable – these are the necessary elements for it to succeed long-term.

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