Transatlantic Taskforce on Antimicrobial Resistance (TATFAR)
In-person Meeting, 14 – 15 November 2023, Luxembourg
Meeting Summary

Transatlantic Taskforce on Antimicrobial Resistance (TATFAR)
In-person Meeting, 14 – 15 November 2023, Luxembourg
Meeting Summary

The Transatlantic Taskforce on Antimicrobial Resistance (TATFAR) met for its first in-person meeting since before the start of the COVID-19 pandemic from 14-15 November 2023 in Luxembourg. The meeting included competent authorities and government agency representatives from Canada, the European Union, Norway, the United Kingdom (U.K.), and the United States (U.S.), along with other leading experts on antimicrobial resistance (AMR). TATFAR members and AMR experts shared experiences, discussed how to strengthen collaboration to address shared challenges in combating AMR, and discussed how to work together to develop tactics to help reduce this urgent global public health threat. The meeting was hosted by the European Union and co-chaired by the European Union and the U.S. The objectives of the meeting were to:

- Provide and create specific opportunities for TATFAR members to strengthen transatlantic cooperation to combat AMR, including informal exchanges and networking among TATFAR collaborators.
- Improve awareness of TATFAR member activities related to shared AMR priorities, including sales and use of antimicrobials in veterinary medicine; incentives and other mechanisms for stabilizing the antimicrobials market; and effectively communicating about AMR and TATFAR.
- Discuss how TATFAR (both collectively and as individual members) can most effectively contribute to and participate in global antimicrobial resistance efforts, including the 2024 United Nations General Assembly (UNGA) High-level Meeting (HLM) on AMR.
- Advance TATFAR technical collaboration across multiple key area working groups (WGs), including WGs for modeling AMR surveillance; approaches to AMR and healthcare-associated infection prevalence surveys; advancing alternatives to antimicrobials (e.g., phage therapy); and sharing best practices on national AMR policies.
- Inform the development of the next TATFAR five-year workplan by highlighting progress made across all current key areas and identifying new and emerging ideas for technical collaboration.

Day 1 - 14 November 2023

Welcome from TATFAR Co-Chairs

Sandra Gallina, Director General, Health and Food Safety, European Commission (EU); Loyce Pace, Assistant Secretary for Global Affairs, Department of Health and Human Services (HHS) (U.S.)

Sandra Gallina welcomed all TATFAR members and observers to the 2023 TATFAR in-person meeting and summarized the meeting objectives listed above. Loyce Pace reiterated that the focus of the meeting is to have intentional conversations around AMR and welcomed feedback from member states on the upcoming five-year TATFAR workplan. Sandra and Loyce both acknowledged and thanked former TATFAR Co-Chair, John Ryan, for his contribution to TATFAR and efforts to combat AMR.

Opening Remarks

Stella Kyriakides, European Commissioner for Health and Food Safety (EU) (via video)

Stella Kyriakides welcomed all TATFAR members and observers to the 2023 TATFAR in-person meeting. She highlighted that the meeting was a great opportunity to discuss TATFAR progress and upcoming developments such as the 2024 UNGA HLM on AMR. Domestically, she stressed the new EU targets on AMR, the EU investment of more than 50 million euros towards fighting AMR and the proposed measures to stimulate appropriate antimicrobial use and the development of diagnostic tests and new antimicrobials. She discussed the need for more global commitment at the UNGA HLM on AMR, the Group of Seven (G7) summit, and the Group of Twenty (G20) summit in 2024. The opening remarks were concluded with congratulations to TATFAR as a unique forum

for technical cooperations, congratulating TATFAR members on work accomplished thus far and support for their future work on AMR.

Keynote Address

Christopher Fearne, Deputy Prime Minister and Minister for Health of Malta; Vice-chair, Global Leaders Group on AMR

Christopher Fearne opened his statement by highlighting several concerning statistics, including a report published by the Organisation for Economic Co-operation and Development (OECD) forecasting that by 2035, 90% of bacterial healthcare-associated infections (HAIs) will be antimicrobial-resistant, and therefore it may be safer to receive treatment at home than in a hospital. He noted that AMR should also be an economic priority, since for every dollar invested in AMR, five are obtained in savings in healthcare costs and productivity loss.

He outlined five courses of action to address AMR including: 1) make people aware (especially decision makers), 2) start and implement locally, 3) expand globally, 4) address the antimicrobial pipeline comprehensively, and 5) produce a rallying cry as we work toward the UNGA HLM on AMR. Making people aware includes frequent communication and efforts to combat disinformation around AMR; it also includes having clinicians, farmers, and other health professionals maintain a One Health outlook. Addressing AMR locally entails working with communities to see what is happening on the ground, in alignment with a global framework for combating AMR. On global action, he stressed the need for global shared targets and regulations to protect antibiotics as a public good. Addressing the antimicrobial pipeline includes creating a variety of incentives, voucher systems, and fair pricing and price transfers. He stressed the importance of access to antibiotics worldwide, including generics, especially in low- and middle-income countries. He closed his statements by sharing that we are the first generation to live in the antibiotic era, and we must make sure we aren't the last.

In response to a question around how to best increase involvement from the public and recommendations around celebrity endorsements or spokespeople, Chris Fearne highlighted COVID-19 as an example, and how we were able to address the issue through rigorous and timely science, influence of the public's opinion, and pressuring government officials – aiming for similar levels of public awareness and pressure without creating panic, can be beneficial.

Panel Discussion 1: Challenges and Opportunities for Transatlantic Cooperation on AMR

Moderator - Sandra Gallina (EU)

Sandra Gallina provided opening remarks for panel one and welcomed panelists. All panelists were presented with the first (two-part) question for discussion: 1) From your perspective, can you share one example of an AMR-related effort that has made an impact over the past few years? 2) Is AMR getting enough financing in your country or region to achieve the goals of your action plan?

Sandra Gallina discussed the EU's target of reducing antimicrobial sales for farm animals and aquaculture by 50% by 2030 and pointed to the EU regulations in veterinary medicine as robust achievements in reducing antimicrobial use. While there is currently a total ban on the use of antibiotics as growth promoters and for preventative use for certain groups of animals in the EU, it has been more difficult to create a list of antimicrobials reserved for human use only. Christopher Fearne (Malta) opened with examples of successful regulations on AMR in Malta including patient screening and expansion of the National Antimicrobial Coordinating Unit. In Malta, one initiative that proved to be successful included students reporting physicians

and nurses who did not wash their hands after seeing a patient, although this was not popular among physicians.

Line Vold (Norway) discussed Norway's cross-sectoral collaboration after an outbreak of methicillin-resistant *Staphylococcus aureus* (MRSA) in livestock led to more regulations on the surveillance of livestock and animals and cleaning and disinfection efforts. Norway has started to examine antifungal consumption and resistance levels.

Dame Sally Davies (U.K.) noted that AMR should not be called a silent pandemic anymore, but a "grand pandemic" as it is an acute health crisis that needs to be prioritized. She explained that AMR remains a top priority in the U.K. She continued with an example of England's successful antibiotic subscription incentive model pilot.

Loyce Pace (U.S.) highlighted the current actions of the U.S. Presidential Advisory Council on Combatting Antibiotic Resistance and the efforts led by the CDC through the Global Antimicrobial Resistance Laboratory and Response Network which detects emerging threats globally in health care, the community, and the environment. One major challenge the U.S. faces is how to educate political leaders on the technical pieces of AMR to advocate for legislation and funding.

Sandra presented the second (two-part) question for discussion: 1) What are the major global challenges for making substantial advances to the spread of AMR? 2) How do we ensure commitments made as part of the 2024 UNGA HLM on AMR are sustainable?

Loyce Pace began the discussion by highlighting global challenges including public awareness, collaborative surveillance, data sharing, and capacity to implement National Action Plans (NAPs). She discussed the need for the UNGA HLM on AMR commitments to be inclusive of the world and acknowledge a One Health approach.

Dame Sally Davies continued the conversation on the UNGA commitments by highlighting the opportunity for global leaders on AMR to work together to ensure global action on AMR. She discussed that the commitments should be based on existing targets set by multilateral organizations and the need for an accountability framework to review the high-level commitments presented. The U.K. believes that the UNGA HLM on AMR provides a unique opportunity based on access, science, and innovation for AMR and diagnostics.

Line Vold emphasized the need for a whole government and society approach and the importance of investing resources to prepare for the UNGA HLM on AMR. Norway continues to experience challenges in investing diagnostics and integrated diagnostics.

One theme that emerged is that the UNGA HLM on AMR commitments need to include a One Health approach. Norway specifically stated that the commitments should use the WHO Quadripartite strategy – the WHO Quadripartite plays a central role in promoting and coordinating a global One Health approach to support policy action. Another theme that emerged was the need to be inclusive of partners – including government and industry – to ensure the commitments at the UNGA HLM on AMR are sustainable. All panelists agreed that we need to be inclusive of our partners around the world when looking forward to UNGA.

Sandra Gallina wrapped up the panel highlighting the importance of fostering research and stopping inappropriate use of antimicrobials. She highlighted the importance of concrete commitments at the UNGA HLM on AMR along with the discussion that would be needed on funding mechanisms.

Update on G7 AMR Priorities and Activities

Eiji Hinoshita, Assistant Minister for Global Health and Welfare, Ministry of Health, Labor, and Welfare, Japan (via video)

Eiji Hinoshita provided updates from the G7 Hiroshima 2023 Summit held from May 18-19, 2023. He emphasized that it is important to continue to build on lessons learned from the COVID-19 pandemic in preparation for future public health emergencies (PHEs). During the meeting, discussion centered around global health objectives and identified three pillars to a healthier future including strengthening global health architectures for PHEs, building more resilient and sustainable universal health coverage, and promoting innovations to address health challenges. The G7 is also committed to promoting health innovation and exploring and implementing pull and push incentives for antimicrobials. Addressing AMR should be achieved through equitable access to medical countermeasures (MCM). The G7 looks forward to enhancing collaboration within the G7, regulatory agencies, the G20, and TATFAR members.

Update on Global Developments on AMR

Haileyesus Getahun, Director for Global Coordination and the Quadripartite Joint Secretariat on AMR, World Health Organization

Haileyesus Getahun highlighted the purpose and functions of the Quadripartite Joint Secretariat on AMR. The Quadripartite work is guided by a strategic framework with two objectives, including optimizing the production and use of antimicrobials and decreasing the incidence of infection in humans, animals, and plants. Dr. Getahun described the RENOFARM initiative which includes 100 countries in a collaborative effort to reduce the need for antimicrobials in agrifood systems led by the Food and Agriculture Organization of the United Nations. He highlighted the opportunities to transform our AMR response when looking forward to the UNGA HLM on AMR and the need to draw on lessons from the 2016 UNGA HLM on AMR political declaration when developing our commitments on AMR. One of the major lessons learned from the 2016 political declaration was the lack of measurable targets and an accountable organization to guide the follow through of commitments. The commitments at the upcoming UNGA HLM on AMR need to be written with specific language addressing key areas including targets, financing, and accountability that engage more heads of state and government to galvanize political efforts and increase support. Loyce Pace closed the presentation with a question about industry and private organization involvement. Dr. Getahun responded by raising the importance of collaboration and partnerships that bring private and civil organizations and government together. The global AMR community must unify its voice and overcome geopolitical differences.

TATFAR Member Remarks

Moderator – Loyce Pace (U.S.)

Maureen Carew, Director, Infection Prevention and Surveillance, Public Health Agency of Canada provided member remarks on behalf of Canada. She acknowledged the considerable progress made through international forums and emphasized Canada's commitment to work with partners to monitor, prevent, and mitigate impacts of AMR, and preserve the effectiveness of antimicrobials. The Canadian government committed $28 million to AMR surveillance and stewardship efforts over five years starting in 2021, including efforts to address wastewater surveillance and promote appropriate use of antimicrobials. Furthermore, the Pan-Canadian Action Plan on Antimicrobial Resistance is a five-year action plan (2023 – 2027) introduced in June 2023 to address AMR through five pillars: innovation, surveillance, stewardship, infection prevention and control (IPC), and leadership.

Sandra Gallina provided remarks on behalf of the EU, highlighting that we should not reach a point where there are an excessive number of infections without treatment. She noted that there is currently a "permacrisis" situation happening, where there are simultaneous crises happening globally, including health. The EU has recently adopted Council Recommendations on AMR, including targets, which builds upon the EU AMR One Health Action Plan of 2017 by strengthening measures for EU Member States action against AMR. Stewardship, surveillance, IPC, and research and development are all key areas that the EU wants to stimulate. She also referred to the EU Global Health Strategy, the EU ambition to have provisions on AMR as part of the future pandemic agreement, and called for concrete commitments at the 2024 UNGA HLM on AMR.

Line Vold provided remarks on behalf of Norway. She mentioned that Norway is actively engaged in international portfolios, including negotiations for the pandemic agreement. Norway is currently revising its AMR strategy, initially set to end in 2020, but was extended to address ongoing AMR issues. Implementation of the strategy will use a multisectoral approach to focus on health and care services, trade, agriculture and food, science and environment, and foreign affairs. She mentioned that IPC measures, such as screening and isolation, are effective in reducing the burden of disease, including an uptick in carbapenemase-producing organisms (CPOs), which can be attributed to the war in Ukraine and increased numbers in Norwegians returning from travel. Norway has recently launched hand hygiene electronic monitoring systems in nursing homes which have seen success, alongside improved stewardship efforts in primary care settings.

Dame Sally Davies provided remarks on behalf of the U.K. by acknowledging the intersection of science and policy efforts around AMR have become stronger in the U.K. In addition to science and policy, there is an increased need for communication efforts. The U.K. is currently developing its next five-year NAP, drawing on work already achieved from COVID-19 and other ongoing efforts, and hopes to publish this plan in 2024. She also highlighted several innovations and findings on AMR from the U.K., including a pull incentive subscription model and a report on veterinary antimicrobial sales and surveillance that showed a 59% decrease in the use of antibiotics in food producing animals since 2014.

Loyce Pace provided remarks on behalf of the U.S. The U.S. is currently at the mid-point of its *U.S. National Action Plan for Combating Antibiotic-Resistant Bacteria (CARB)*, 2020 – 2025, which takes a One Health approach to address IPC, stewardship, surveillance, diagnostic testing, antibiotic, antifungal, and other product development, and global leadership. She also highlighted several U.S. Government accomplishments, such as the White House bringing together several agencies to address the risk posed by use of some pesticides to the effectiveness of human and animal antibiotic and antifungal drugs; and the United States Department of Agriculture and the Food and Drug Administration work this year focused on agricultural and veterinary efforts, while other agencies such as the Centers for Disease Control and Prevention, National Institutes of Health, Biomedical Advanced Research and Development Authority, and the Office of Global Affairs focused on human health. The U.S. is committed to addressing AMR through a One Health lens.

Participant Poll – Day 1

Facilitated by TATFAR Secretariat, Stefanie McBride (U.S.)

What is one word that you would describe current collaboration among TATFAR members?

What is one thing that TATFAR is doing well?

What is one thing that TATFAR could improve on?

Panel Discussion 2: Sales and Use of Antimicrobials in Veterinary Medicine (TATFAR Key Area 1)

Moderator – Fraser Broadfoot, Head of AMU Surveillance and Stewardship, AMR Policy and Surveillance Team, Veterinary Medicines Directorate (U.K.)

Loyce Pace opened the panel and discussed the objectives of panel two and welcomed the panelists. Fraser Broadfoot began the panel with an overview of the TATFAR working group 1.1 review paper on antimicrobial sales and use. The purpose of the paper is to help stakeholders better interpret surveillance data and present various approaches on AMR surveillance taken by TATFAR member countries. He opened the discussion with an overview of how the EU defines antimicrobial consumption, specifically antimicrobial sales and antimicrobial use, and highlighted how to measure sales and use data. The purpose of monitoring antimicrobial sales and use is to monitor trends and evaluate the effectiveness of actions to improve prudent and responsible use, as well as evaluate the effectiveness of actions to improve prudent and responsible use.

Each member country provided information on the scope of their sales and population data for antimicrobial sales and antimicrobial use and defined what variables (e.g., average weight at time of treatment, average liveweight at time of slaughter, average weight at time of treatment) are used as numerators and denominators to quantify sales or use of antimicrobials during a specified period.

The U.S., the U.K., and Canada antimicrobial sales data includes all medically important antimicrobials, while non-medically important antimicrobial sales data is voluntarily provided in Canada. The U.S. and Canada sales data are both sourced from pharmaceutical manufacturers with Canada also sourcing sales data from importers and compounders. The U.K. sources its antimicrobial sales data from marketing authorization holders. The EU and Norway both utilize the European Surveillance of Veterinary Antimicrobial Consumption (ESVAC) database sourced from wholesalers and feed mill farmers. All countries include food producing animals for population data on antimicrobial sales sourced from national/ country statistics. The U.S. also uses sector specific reports and international trade reports, in addition to national statistics, for population data on antimicrobial sales.

The U.S. and the U.K. antimicrobial use data includes all medically and non-medically important antimicrobials supplied voluntarily. Norway's antimicrobial use data includes veterinary and human medicinal products used for animals sourced from veterinarians, pharmacies, and feed mills. Canada's use data includes all medically and non-medically important antimicrobials from major food animal species sourced from species-specific questionnaires administered on sentinel terrestrial farms and regulatory authorities for all aquaculture operations. In the EU, all member states are required to collect data on the volume of sales and on the use of antimicrobial medicinal products used in animals and send that information to the European Medicines Agency.

The panelists were all asked about data sharing with industry and consumers. The EU utilizes ESVAC data that is readily available online to the public. Canada releases their findings on antimicrobial use and sales annually. The U.K. relies on the stakeholders to report their antimicrobial use and sales data to the industry and consumers. The U.S. antimicrobial use information is voluntary, unlike the sales data which is mandated by legislation.

In summary, there were a lot of similarities and differences in what and how countries collected and analyzed their antimicrobial sales and use data. These systems for collecting antimicrobial sales and use data continue to evolve but must allow for integrated analysis of antimicrobial use and resistance to support stewardship activities. Encouraging appropriate antimicrobial use is a key strategy for reducing the threat of AMR around the world.

Panel Discussion 3: Incentives and Other Mechanisms for Stabilizing the Antimicrobials Market (TATFAR Key Area 3)

Moderator – Christine Årdal, Senior Researcher, Norwegian Institute of Public Health (Norway)

Christine Årdal opened the panel discussion by providing an overview of the antimicrobial pipeline. She discussed how there is limited innovation in the clinical pipeline, and although there have been incremental improvements that benefit patient health outcomes, these advances are not adequate for carbapenem-resistant strains, and therefore the need remains for a larger variety of alternatives to existing antibiotics. Additionally, sustained funding is critical to having a more robust antimicrobial development pipeline. It is important both to develop new therapies and to ensure that they are accessible. Christine mentioned that delinked incentives may improve access to new and old antibiotics and implementing a revenue guarantee for small, vulnerable markets can help address access to old antibiotics, helping to avoid shortages.

David Glover (U.K.) provided a presentation on a U.K. antimicrobial products subscription model, discussing eligibility and award criteria and how to send signals on valuing antibiotics. He discussed the U.K. NAP, 2019 – 2024, which aims to address the global failure to incentivize the development of new antimicrobials. The U.K. is testing a model that will de-link the payments made to companies from the volume of antimicrobials sold. The model is comprised of seven steps, and David emphasized the importance of step three (eligibility assessment – sending signals about the antibiotics to develop) and step five (product evaluation using award criteria – sending signals about what they are willing to pay for). There are award criteria in place that determine the contract payment, based on a weighted system, and how antimicrobials will be allocated. The program is set to launch in April 2024.

After the two presentations, Christine Årdal introduced the six panelists then proceeded to ask her first question around the different type of pull incentives each country is considering and implementing, and what are the challenges and lessons learned from this. Joël Denis (Canada) shared that Canada is launching a pull incentive pilot in 2024. Currently, Canada only has three of the twenty newest antibiotics available to the global market, therefore access is the focus of the pilot. He mentioned that Canada has collaborated with partners such as the U.K. and Sweden to better understand pull incentives and is working within funding parameters and regulatory and healthcare systems to address this topic. Some existing challenges are ensuring equity of access, early engagement with procurement experts, and prioritizing and defining priority areas. He mentioned there is a need to rely on data during the planning and evaluation phases, as well as shared learning from other experts.

Wolfgang Philipp (EU) mentioned that the EU pipeline is in a better state than it was years ago and shared that there is emphasis on making sure countermeasures are available for ongoing and emerging threats. To support research and development (R&D) in the most pressing cross-border health threats such as AMR, a new instrument called HERA Invest was launched in July 2023, with a €100 million budget geared towards small and mid-sized companies. It focuses on the development of medical countermeasures to help with pandemic preparedness.

Fabio D'Atri (EU) provided information about the ongoing revision of the EU pharmaceutical legislation, which includes proposals for AMR measures such a voucher system that gives companies protection to develop new antimicrobial products that have a novel mechanism of action and address priority pathogens. David Glover, who touched on this during his presentation, mentioned that the U.K. is committed to eligibility requirements around pull incentives.

Lynn Filpi (U.S.) mentioned that she is proud of the U.S. push incentives, which has taken a pipeline approach and continue to work on the country's manufacturing infrastructure. In the U.S. President's fiscal year (FY) 2023 budget, there is language around a novel payment mechanism for a 10-year period. The U.S. has 60% of patents for antimicrobials, however, it is widely recognized that pull incentives alone will not ensure access to drugs to everyone who needs them globally. Therefore, the U.S. remains committed to approaching this through a health equity lens and building on stewardship and access.

The next panel question was centered around different actions being taken to ensure each country's research and development efforts address the most pressing public health needs. Alessandra Martini (EU) mentioned continued European Commission (EC) support using different EU funding instruments for a diversified portfolio of research actions (from basic to clinical research) needed to implement priority activities. It is important to keep the development pipeline supported and continue collaboration across stakeholders and partnerships. She also mentioned that the EU is teaming with member states and other interested countries for preparation of a European partnership on One Health AMR research and innovation (https://www.jpiamr.eu/activities/one-health-amr/) with an expected co-fund from the EC up to 100 million euros. Finally, she mentioned the European Clinical Research Alliance on Infectious Diseases (ECRAID) network (https://www.ecraid.eu/) which connects laboratories and clinical sites across Europe, is building a pipeline of clinical work for testing antimicrobials. The development of vaccines is also ongoing. Wolfgang Philipp mentioned that medical countermeasures are in place to combat threats, particularly those that become pandemics, epidemics, and regional outbreaks; AMR remains a top three priority, and the European Heath Emergency Response Agency (HERA) is working on priority signaling in collaboration with the WHO, as well as developing new instruments to address ongoing and future public health threats.

Christine Årdal asked Joël Denis a question around how countries can ensure that newly developed drugs and other treatments are accessible to the patients who need them. Joël Denis responded that countries could increase accessibility with engagement plans, raising awareness, ensuring safety and timeliness in stewardship practices, and emphasizing data and tracking improvement in access to make sure all relevant information is gathered and properly disseminated to stakeholders.

Each panel member provided closing remarks, and there was agreement across panelists on the benefit of push and pull incentives. Panelists also emphasized the need for continued collaboration to help stabilize the antimicrobial market.

Day 1 Closing

Sandra Gallina (EU), Loyce Pace (U.S.)

Loyce Pace reiterated some of the key themes that emerged from the opening day discussions. Incentives, balancing incentives with impact, and access and equity were focus points. It is important to implement action to combat AMR broadly and beyond the 2024 UNGA HLM on AMR. Specific tailored solutions could be proposed at a global level, such as tackling untreated wastewater. Increasing awareness and messages around AMR, why people should care, and what TATFAR is doing to address this issue are critically important.

Sandra Gallina re-emphasized how branding and the need to better showcase the achievements of TATFAR are necessary. Sandra emphasized that TATFAR members and observers should continue to stand together in solidarity to make an impact at a global level. Funding is also important, and Sandra mentioned that member states should look to pandemic funding sources to help support AMR efforts.

Day 2 - 15 November 2023

Progress on TATFAR Implementation

Stefanie McBride, TATFAR Secretariat, U.S. Centers for Disease Control and Prevention (CDC) (U.S.)

Stefanie McBride highlighted internal TATFAR coordination, roles and responsibilities of the TATFAR Secretariat, and the implementation progress of each WG under each key area of the 2021-2026 work plan. Many of the WGs met regularly throughout the year and shared through presentations and interactive discussions about their work and experiences.

One achievement for the WGs under key area one included a recent paper "Reporting of Sales and Use of Antimicrobials per Animal Species by TATFAR Members" published on the TATFAR website. Under key area two, the WGs made significant progress on new guidelines for updated definitions and are using those guidelines to draft new human and veterinary tables for priority organisms and organism groups. Presentations from WGs under key area two include the Impact of the COVID-19 Pandemic on Antimicrobial Consumption and AMR in EU/EEA, The Current State of One Health AMR Surveillance and the Role of Genomics, and AMR Surveillance within the Veterinary Sector in Norway. Under key area three, the WGs regularly met to discuss scientific and regulatory challenges in drug development, U.K. eligibility criteria, the Southeast Asia Clinical Trials network ADVANCE-ID, and the Swedish and Norwegian access assessments. Under key area 4, meetings were held to discuss World AMR Awareness Week (WAAW) activities and multiple international initiatives around AMR communications.

Heather Ewing Ogle (U.S.) provided an update on current and planned activities for the WG 4.1 (communications). Heather provided an overview of planned TATFAR member activities during WAAW and encouraged all TATFAR members to share their planned WAAW activities through social media and other channels. TATFAR members will have the opportunity to provide feedback and discuss ways to communicate TATFAR updates more efficiently, while strengthening TATFAR branding and communicating successes. Stefanie McBride gave an update on the current and future planned activities for WG 2.7 on behalf of WG lead Amy Kirby (U.S.). This WG plans to meet to discuss priorities and objectives moving forward. Bernd Gawlik provided an overview of AMR and wastewater-based surveillance in the EU on behalf of the EC. He discussed the EU's commitment to explore options to support national authorities in efforts to implement non-invasive wastewater surveillance methods as outlined in the 2022 Berlin G7 Health Ministers Communique. He also discussed the importance of improving society's understanding of the blue mirror theory which can be used as a tool for communication and engagement on wastewater and AMR. Lastly, he emphasized that One Health and One Water are not independent approaches, it is important to mention One Water when discussing One Health.

Breakout Session 1: Improving Antimicrobial Resistant Organism Surveillance Systems Using Mathematical Modeling (TATFAR Key Action 2.2)

Moderator – Rachel Slayton, CDC (U.S.), Francesco Di Ruscio, Norwegian Institute of Public Health (Norway)

Representatives from CDC and the Norwegian Institute of Public Health (Rachel Slayton and Francesco di Ruscio, respectively) organized breakout session one, which provided an opportunity for participants to share experiences on improving antimicrobial-resistant organism surveillance systems using mathematical modeling.

Rachel Slayton and Francesco Di Ruscio discussed that the goals of public health surveillance systems could include estimating burden of disease, evaluating trends over time, detecting emerging infections (or resistance mechanisms), and rapid outbreak detection. The data collected from these efforts can be used to identify facilities for targeted interventions, evaluate changes in outcomes as policies change, and forecast future incidence. The organizers provided examples of innovative AR surveillance scenarios, including asking the group if wastewater surveillance could be used as sentinel surveillance, which led to a bigger discussion around using mathematical modeling to evaluate trade-offs. Resource constraints, such as absolute number of surveillance sites and location of these sites, were also discussed. The session organizers emphasized that the design of surveillance systems is complex and must consider factors such as: resource constraints, unit of analysis, community versus healthcare surveillance, connecting surveillance systems globally, and meaningful outcomes for the public.

Organizers of the session presented questions in an interactive tool for the participants to contribute to the discussion, including questions on priorities for national AMR surveillance systems, use of non-traditional data sources to be explored for AMR surveillance, and how health inequities in the population might be better captured in AMR surveillance systems. Participants provided examples of non-traditional sources including wastewater, administrative data, manure, food, shellfish, wildlife, pets, sentinel, electronic, veterinary medicine, and laboratory. There was a second interactive "word cloud" assessed on how health inequities in the population can be better captured in AMR surveillance systems. Some examples of responses related to the types of health equity data that it would be useful included testing, social determinants of health, data resolution, anonymity, ethnic, metadata, setting-specific, outreach integrating, marginalized, engagement, and information.

The group agreed that there is an increased need for multiple sources of information to effectively communicate models and emphasized the importance of interaction between different groups (mathematicians, modelers, epidemiologists, clinicians, decision makers, etc.). Additionally, the group agreed that ongoing interaction between WGs in TATFAR could be useful.

A series of presentations from mathematical modelers who have worked on AMR surveillance questions was included in the session. Tjibbe Donker (Germany) presented on the impact healthcare patient sharing networks have on AMR spread. He emphasized how patient treatment and related-admission data can be reconstructed and leveraged to design strategies that aim to decrease the spread of AMR. He also explained that patients often need additional treatment after leaving hospitals, which increases the risk and potential spread of AMR from hospital-to-hospital. In an example from the Netherlands, regional network structures were created to respond to these challenges and to facilitate collective responsibility for AMR outbreaks, including information sharing and educational courses for healthcare workers.

Julie Robotham (U.K.) discussed modeling to inform AMR surveillance and control strategies. She opened her presentation by sharing how carbapenemase-producing Enterobacteriaceae (CPE) is a growing problem in U.K. hospitals describing the interconnectedness of hospitals and implications for control and resource allocation decisions. Modeling work from Dr. Robotham's group has evaluated admission screening and implementation of the UK's 2016 CPE Toolkit as an AMR prevention strategy. The modeling work is currently being extended as Public Health England began a surveillance of *Clostridiodes difficile*, in particular to aid in selection of sentinel surveillance sites.

Sen Pei (U.S.) presented on improving AMR surveillance in hospital settings. He explained how existing surveillance missed most people colonized with antimicrobial-resistant pathogens, making it difficult to

accurately measure transmission in hospitals. He highlighted an article he published in 2021, A simulation exposes the secret spread of hospital infections (nature.com), that showed how modeling can help address many practical problems in surveillance and the importance of designing better surveillance methods before running clinical trials.

Matthew Samore (U.S.) shared data from the U.S. Department of Veterans Affairs (VA) from Feb. 2007 – March 2022, when different isolates were collected for community-onset infections, hospital-onset infections, and post-discharge infections. He described resistance to third generation cephalosporins in *Pseudomonas aeruginosa* (*P. aeruginosa)* and *Acinetobacter. S*upporting surveillance of antimicrobial-resistant bacteria by measuring and modeling susceptible bacteria is useful for predicting the consequences of antimicrobial stewardship interventions.

In summary, modeling strengthens the design of AMR surveillance systems and interpretation of surveillance data using traditional and novel data sources. There was a call to action for a more pragmatic way of modeling. The group agreed that collaboration across TAFTAR WGs is essential for exchanging information.

As the next step, the leaders of this session will draft a white paper summarizing the meeting's findings for public dissemination, focusing on three key modeling priorities to improve AMR surveillance system design and interpretation.

Breakout Session 2: New Approaches for AMR/HAI Prevalence Survey/Surveillance and Burden Estimation (TATFAR Key Action 2.4)
Moderator – Nora Chea, CDC (U.S.)

Nora Chea welcomed session attendees and introduced himself as leading CDC's efforts on point prevalence surveys (PPS) for HAIs and antimicrobial use in acute care settings in the U.S. and contextualized that these surveys are critical for helping to understand the national burden of HAIs. He shared that the session objectives were 1) to discuss approaches for estimating national or regional burden of HAIs 2) share information about automated systems for HAI and AMR surveillance and 3) agree on an approach that attendees could take back to their countries to explore feasibility, based on data each country or institution has available.

Following the introduction, a representative from the U.S. CDC (Jonathan Edwards) presented work on prevalence-to-incidence methods for HAI/AMR burden estimation. He spoke about work that CDC has done on the 2015 PPS survey data to building on the methods used. He also briefly reviewed approaches for HAI prevalence to incidence conversion, including Rhame and Sudderth's formula, published in 1981, and then described a pre-print article coming out of Germany with an update to the formula from Rhame. He described Grenander estimator, a method that can be used in the absence of length of stay (LOS) data, and instead uses a probabilistic approach. For specific information about these formulas, please see the slides. He compared the different approaches for burden estimation described above. In summary, his presentation demonstrated how HAI burden estimates are impacted by stratification by LOS and patient age, and that performance of each method varies depending on prevalence, LOS, infection, and sample size.

The European Centre for Disease Prevention and Control (ECDC) (Carl Suetens) presented work on prevalence-to-incidence methods for HAI/AMR burden estimation. He shared some results from the PPS completed in 2011-2012 and in 2016-2017, with the use of Rhame and Sudderth parameters. He also highlighted that the PPS collects data on HAIs on one day (the date of survey), and that discharge date is not available in these surveys. He shared that the hospital questionnaire used included number of admissions and discharges in previous year,

number of patient days in previous year, which was used in the numerator. Infection data included date of onset, date of admission, and ECDC was able to calculate time to infection and time from infection to survey date. In the 2011-2012 survey, Carl Suetens' team found median length of stay until survey date correlated best for LOS from hospital denominator/LOS until PPS. In 2016-2017, ECDC used the same method, but also applied the method based on the Grenander estimator to calculate HAI incidence for hospitals and long-term care facilities (LTCF). He concluded that it is important to consider differences in PPS methods when comparing burden between TATFAR members and partners.

Nora Chea led a discussion about plans for national burden estimation among attendees. Representatives from the U.K. shared that they participated in previous rounds of ECDC's PPS, but the U.K. did not participate in the most recent PPS. He subsequently asked if all TATFAR members were planning to use Grenander method for the burden estimation. He mentioned it would allow for a more meaningful comparison, and participants indicated they would need to review the details to understand feasibility.

The U.S. CDC (Andrea Benin) presented on CDC's automated HAI and AMR surveillance. She shared about the National Healthcare Safety Network (NHSN) and described that it works in support of CDC's mission to protect patients, protect healthcare workers, and promote value in national and international healthcare systems. NHSN is a surveillance system that tracks and supports response for emerging and enduring threats across U.S. healthcare settings. She shared that NHSN provides data for action, and that the system is related to the Center for Medicare and Medicaid Services, providing quality metrics that are used to pay for performance in hospitals. The coverage of NHSN includes more than 38,000 facilities and there are more than 150,000 users. About 4,000 of the facilities are acute care hospitals; NHSN also includes 1,368 critical access hospitals. She shared that by the end of 2024, NHSN should have more robust data on antimicrobial use and antimicrobial resistance, as hospital reporting to a new module will be required. There was significant interest from attendees to learn more about NHSN and Nora Chea said he would invite Andrea Benin to a future WG 2.4 meeting.

Hanne-Merete Eiksen-Volle of Norway presented on the COVID-19 pandemic as an example of usefulness of automated surveillance of HAIs. Dr. Eiksen-Volle described that HAI surveillance has been mandatory in hospitals and LTCFs in Norway since 1995. In Norway, mandatory PPS are carried out twice a year and antibiotic consumption data were included in 2009. Norway uses semi-automated systems for uploading data and provides data feedback to facilities so that they can see patterns to inform action. There are challenges associated with this approach, including lack of timely incidence data, and surveillance is understood as too labor intensive to be expanded. Outside of emergencies, Norway has legislation that prevents merging of data from different surveillance systems, but during the pandemic, new legislation permitted this and allowed Norway to look at healthcare-associated SARS-CoV-2 infections, outbreaks and clusters, and infections in healthcare workers. Dr. Eiksen-Volle described use of merged data systems that supported making evidence-based decisions about healthcare safety, including allowing partners of women in hospitals during birth, because analyses showed that the presence of partners wasn't driving transmission. In closing, Dr. Eiksen-Volle shared that moving towards automation helps ensure Norway has the data needed to inform decision making, and that in Norway, new legislation was needed to allow for data usage.

The final presentation, from ECDC's Carl Suetens, was on ECDC's project on automated bloodstream infection (BSI)/AMR surveillance. Dr. Suetens shared that in 2022 legislation changed and a new mandate includes digitalized surveillance across EU borders. The aim of this effort is to support participating countries to create automated systems for collecting BSI data, including data on AMR. The effort includes collecting data on AMR profiles of organisms to better understand when pan-resistance may be occurring and generate alerts to inform action.

Breakout Session 3: Phage Therapy – Brainstorming on Key Challenges in Advancing Phage Therapy into Clinical Practices (TATFAR Key Action 3.4)

Moderators – Dennis Dixon, National Institute of Health (U.S.), Marco Cavaleri, European Medicines Agency (EU)

Representatives from the U.S. National Institute of Health (Dennis Dixon) and the European Medicines Agency (Marco Cavaleri) co-chaired breakout session three, which provided a forum for meeting participants to discuss key challenges in advancing phage therapy into clinical practice, including challenges regarding clinical trials, regulatory requirements, and to discuss how TATFAR can help address these challenges. The slides from all presentations are available as an attachment to the meeting report.

The first presentation was from the Belgium Ministry of Defense (Sarah Djebara) who provided an overview of the Belgian magistral phage concept, an approach to phage therapy focused on personalized phage preparations. Under the Belgian magistral phage medicine, industry or academic organizations produce phage active pharmaceutical ingredients, which are delivered to pharmacists, upon compliance check by a National Reference Laboratory for the control of medicines (i.e., Sciensano in Belgium). These phage ingredients can be incorporated, by – or under the responsibility of – a pharmacist into phage magistral preparations, upon prescription (for a named patient) by a physician. The adequate phage(s) can be selected using a test in a hospital laboratory or in a pharmacy in order to best incorporate the phage into an individual patient's treatment plan. This concept allows doctors to personalize patient treatments based on specific needs and make medications available that do not exist commercially. The presenter highlighted the logistical challenges represented by such an approach, and the lack of dedicated regulatory framework for this approach in Belgium and the EU.

The presenter closed with four points of advice: utilize phage in synergy with antibiotics, select adequate sustainable phages, train phages when necessary, and develop phage cocktails for first-line use. It is vital to avoid making the same mistakes as with the use of antimicrobials to avoid the development of phage-resistant bacteria. From the audience it was highlighted that this approach does not and cannot contribute to generating the evidence that bacteriophages are safe and effective, which is utterly needed. There is a need for phase three clinical trials to standardize phage therapy and continue research.

The second presentation was from the U.S. NIH (Dennis Dixon) who provided an overview of the ongoing Antibacterial Resistance Leadership Group (ARLG) multi-site phage trial. The NIH-supported randomized double-blind, placebo controlled, clinical trial included patients with cystic fibrosis (CF) colonized with *P. aeruginosa* who were given sequential doses of a bacteriophage cocktail to reduce colonization; the overarching goal of the study is to enhance the understanding of the safety and microbiologic activity of phase therapy as anti-infectives. The researchers will conduct two interim analyses – one analysis on trial safety and the second analysis to evaluate the maximum dosage of phages needed to complete the trial. The presenter highlighted key challenges faced thus far during the phage trial, including, but not limited to the selection of a target population, publishing of a phage guidance document, selection of a candidate phage or phage cocktail, and the identification of eligible, stable CF patients colonized with *P. aeruginosa.* Dennis also mentioned the lack of scientific evidence because there are very few phase three clinical trials or large-scale randomized studies.

The organizers invited the panelists to share their thoughts on the scientific and regulatory gaps and challenges for preclinical and clinical trials for phage therapy. One challenge identified was the lack of proof-of-concept data emerging from well-designed randomized clinical trials demonstrating safety and efficacy of phage therapies. Another challenge identified was the hesitance of investors and bigger pharmaceutical companies to invest in phage therapy, given their belief that the evidence is lacking on the benefits of phages as an alternative

to traditional antibiotics, and currently the limited profitability of such investment. There is a need to advance the science by promoting, establishing, and conducting large clinical trials for properly demonstrating the efficacy and safety of phage therapy in human and veterinary medicine, while taking into account the difficulties in designing an optimal-study protocol.

A theme that emerged from the discussion was the need for more global guidance and alignment in regards to requirements, notably for phage trials. Measurements and regulatory expectations regarding safety, quality, and efficacy in view of a potential approval.

Belgium informed of their work with other countries to improve collaboration and standardize measurements through a global phage registry.

Finally, all panelists emphasized the importance of having evidence on the benefits and risks of phage therapy to spur regulatory action and help inform prescribers on whether and when they could use phages for treatment. All participants acknowledged the need to continue working under the TATFAR framework in order to create the conditions in infrastructure and resources, funding, and legislation to support appropriate clinical trials and advancing phage therapy into clinical practice.

Breakout Session 4: Sharing Experiences with Domestic AMR Policy Instruments (TATFAR Key Action 4.2)
Moderator – Julia Langer, Directorate-General SANTE, European Commission (EU)

Representatives from the European Union organized breakout session 4, which provided an opportunity for meeting participants to share experiences with domestic AMR policy instruments.

The first presentation was from the European Union (Julia Langer and Velina Pendolovska) and highlighted key policy actions in the EU related to AMR. This includes the 2017 European One Health Action Plan on AMR and the recent policy initiative - the 2023 Council Recommendation on AMR that builds on areas of the action plan, outlines key areas for action, and sets specific targets on AMR and consumption of antibiotics. The presenters noted that development of the targets involved experts from both the EU Directorate General for Health (DG Sante) and the ECDC who looked at past performance and considered the feasibility of meeting the targets by 2030. The EU recognizes individual considerations and starting points across EU member states and a one-size fits all approach is not suitable. Targets are therefore tailored to the national situation to ensure they are achievable. The EU will monitor progress on a country-by-country basis at regular intervals. To support achieving the targets, the EU has committed €50 million financial support for member states and plans to develop guidelines that strengthen IPC and antimicrobial stewardship.

The second presentation was from Spain (Cristina Muñoz Madero), Spain's AMR NAP coordinator. The presentation highlighted Spain's One Health approach to combating AMR and how this approach has helped bring together leaders and experts across sectors through effective coordination mechanisms to achieve targets and goals. Spain's first NAP focused on bringing together the right stakeholders and improving understanding of the current state of AMR in the country. The second NAP focused on development of projects and concrete actions across human health, animal health, and the environment. The third NAP focused on continuation of successful programs and launching new efforts that had been identified through evaluation and quality assessment. The presenter noted that Spain has had a 65% decrease in sales of antibiotics for use in animals and a 17% decrease in antibiotic use in humans. The presentation highlighted numerous activities across the human health, animal, health, and environmental health sectors, including annual communications and community-led activities to raise AMR awareness.

A discussion theme was how TATFAR members track and measure antibiotic use in human and animal sectors and on the challenges associated with measuring inappropriate antibiotic use versus overall antibiotic use. The EU shared that while their target related to antibiotic use focuses on overall use, they do not anticipate that working toward that target should impact appropriate antibiotic use. This is why a second target on consumption was chosen: that at least 65% of antimicrobials used should belong to the Access category of the WHO AWaRe classification. The EU also highlighted complementary efforts to increase the use of narrower spectrum antibiotics. Several session participants noted challenges with developing and implementing methods and policies to measure appropriate versus inappropriate antibiotic use.

Another theme of the discussion was the importance of improving public awareness and understanding of AMR, including through communications campaigns. Breakout session participants emphasized the importance of communications activities that are specific to the populations reached; evaluating communications efforts and sharing the results and lessons learned; and the need for additional funding for communications efforts. In addition to education efforts that reach the public, it is also important to ensure that healthcare professionals can communicate clearly and effectively about AMR. One suggestion was to have ongoing communications efforts that can be rapidly scaled up during emergencies or other challenging situations (e.g., a shortage of a type of antibiotic). Another suggestion was to find ways to make communication efforts personal and help audiences feel like they are involved and can take action.

A third theme that emerged was about pull incentives. There were two separate types of pull incentives discussed during the TATFAR meeting. The first, increasing access to existing antibiotics, is a good solution where needed but is not enough to stimulate the new antibiotic development pipeline. The second type of pull incentives discussed are those created to stimulate new product development. Breakout session participants noted that while we are making good progress on the effort to increase access to existing antibiotics, we are not solving the harder issues of pull incentives that result in new antibiotics. Participants also discussed challenges related to the financial costs associated with pull incentives and how TATFAR is an important venue to continue discussions of pull incentives and learn from TATFAR member experiences.

Finally, breakout session participants emphasized the importance of leveraging TATFAR as a mechanism to share information on successes, challenges, and lessons learned related to AMR policy instruments. This could help all TATFAR members improve their own AMR policy efforts and make progress toward national, regional, and global goals.

The breakout session recommended three TATFAR actions:

- Leverage the TATFAR policy WG 4.2 to facilitate discussions between policy and technical experts on themes that emerged during the meeting.
- Conduct a survey of ongoing TATFAR member AMR policy initiatives (e.g., targets, policies, and incentives) to inform future discussions.
- Measure effectiveness of TATFAR member communications campaigns.

Breakout Session Report-Out to Plenary

Facilitated by Loyce Pace (U.S.)

Rachel Slayton (U.S.) provided the report-out for breakout session one. The discussion focused on how to use mathematical modeling to address and improve surveillance systems. Rachel emphasized that healthcare system and AMR objectives unintentionally compete with each other, and applied modeling is essential to address this issue. Several key themes emerged from the discussion including interpreting surveillance data, the

effects of healthcare networks on AMR spread, HAIs, and infection control strategies, and how to best use modeling to improve AMR efforts in various healthcare settings. The breakout session organizers intend to draft a white paper summarizing the meetings findings highlighting key priority areas from this discussion and the WG.

Nora Chea (U.S.) provided the report-out for breakout session two. The discussion focused on new approaches for AMR/HAI prevalence surveys and burden estimations. Two objectives emerged from the breakout session: (1) harmonizing methods for converting HAI prevalence to estimated national burdens and (2) information sharing on automated systems for HAI and AMR surveillance. There were three presentations during this breakout session from the U.S., Norway, and the EU, which discussed topics such as online tracking systems, a pilot automated surveillance for HAIs and linking data to different sources, and automated surveillance for bloodstream infections. Several challenges emerged during the discussion, including legislative and access barriers and suppression of susceptibility results in facilities. There will be ongoing conversation in the WG meetings to discuss how PPS data can be used for action and figuring out a method to identify the impact of healthcare PPS data on AMR.

Marco Cavaleri (EU) provided the report-out for breakout session three. The discussion focused on key challenges in advancing phage therapy into clinical practice. There is increasing interest in the academic community around phage therapy, however, there do not seem to be similar levels of interest in industry, especially from large pharmaceutical companies. From a human perspective, microbiologists and clinicians are using these products with patients who have limited treatment options. There have not been many randomized clinical trials conducted on a global scale, therefore it is unknown if bacterial phages are safe for the public. More evidence and quality data are needed to move toward regulatory action and help prescribers understand the benefits of phage therapy. The group also discussed three different approaches for administering phage therapy which include: fixed combination of phages, specific phages customized to the patients' needs, and trained phages or phages that will kill bacteria causing infections. Phage therapy can also be used for veterinary medicine in addition to human medicine, therefore more research and promotion is needed around this topic.

Julia Langer (EU) provided the report-out for breakout session four. The discussion focused on sharing experiences of domestic AMR policy instruments. She shared success stories from participants in the breakout session including a colleague from Spain who shared a study showing a 70% reduction in veterinary antimicrobial sales, the development of an application for human and animal health on AMR guidance and awareness, and a hand hygiene program in collaboration with local schools. Julia also acknowledged the interest from countries to understand the EU's targets, as several countries are interested and reflecting over their national approaches. There was agreement across the breakout session for continued exchange in TATFAR, possibly in Working Group 4.2, conducting a survey to collect information on policy tools for TATFAR member use, and seeking volunteers to share their successes during the upcoming WGs were highlighted as desired outcomes from this meeting.

Panel Discussion 4: Effectively Communicating About AMR and TATFAR (TATFAR Key Area 4)

Moderator – Velina Pendolovska, Policy officer, Health Security Unit, Directorate-General SANTE, European Commission (EU)

Velina Pendolovska (EU) welcomed all panelists and shared an educational video on AMR developed by the U.S. CDC as an example of awareness-raising activities aimed at a wide audience. The video was intended to stimulate the discussion in this panel on key strategies for conveying messages on AMR to specific audiences such as policy makers, physicians, healthcare personnel, and the general population. Velina kicked off the

discussion with a three-part question: what are the main aims and/or key messages of your domestic communication on AMR, who is the main target audience, and what are the main channels for communication?

Camelia Enachioiu (EU) highlighted that the European Medicines Agency's (EMA) communication is focused on the importance of data collection on use of antibiotics in animals in the context of One Health and included certain challenges faced when developing communications on AMR such as making the content more digestible and easier to understand. Michael Craig (U.S.) discussed how messaging on AMR needs to be targeted to the audience, for example, targeting policy makers using modeling data to communicate impact to drive legislation. Data can guide more effective action and build awareness to drive action. Kimberley Meadows (Canada) expressed the importance of considering that not all audiences have equal access to certain resources, and the value in raising awareness on AMR and prevention in humans and animals. Regulatory scientists and policymakers in Canada face many challenges in conveying messages to the public on AMR. Hege Salvesen Blix (Norway) discussed several initiatives on AMR communications, including surveys, targeting messaging towards healthcare personnel and hospital physicians, annual reports on AMR in humans and veterinary, awareness campaigns, and partnerships with key stakeholders. The general population has knowledge about what AMR is thanks to the ongoing communication done for years in plain language. Nick Adkin (U.K.) discussed the success the U.K. has experienced with targeted AMR campaigns for audiences including teachers, antibiotic stewardship professionals, and the younger population. The panelists stressed the importance of not only the message, but the importance of the person conveying these key messages.

One theme discussed throughout the panel was the need to strike the right balance between warning the public about AMR and providing them with the right resources for action, notably around IPC. The U.S. and Norway spoke about how fear-based campaigns have proven to not be as effective as patient stories, such as cancer patient stories, that can be more inspirational in highlighting the role of antibiotics.

The second key theme discussed among panelists was the idea that targeted messaging to policymakers, healthcare professionals (of which pediatricians, dentists, and emergency service personnel were explicitly mentioned), and the public needs to be improved. Tailored approaches will prove to be beneficial in conveying messages to these certain groups. For example, Norway saw a 13% reduction (2013-2023) in antibiotic use in children from a survey targeting parents with young children, specifically in doctors' offices.

In terms of communication channels, mass media was mentioned as very expensive, but engaging celebrities and other strategies that appeal to the general population, e.g., movies about cancer patients affected by AMR, can have a positive impact. A point was made about the need to simplify even the term "antimicrobial resistance," which may not be immediately or intuitively clear to all, with suggestions to use "killer bacteria/bugs" instead.

TATFAR WG 4.1 on AMR communications will meet to continue the discussion focused on the following: plain language of resources, strategies to target the public, measuring impact, and ways to diversify communication channels.

Panel Discussion 5: Connecting TATFAR and Other Global AMR Efforts

Moderator – Nick Adkin, Global Health Security, Department of Health and Social Care (U.K.)

Nick Adkin (U.K.) moderated panel five which focused on connecting TATFAR and other global AMR efforts. He emphasized the 2024 UNGA HLM on AMR and the pandemic instrument as important steps in the fight against

AMR and that we should approach the upcoming year with a "glass half-full" mindset. He also noted how the 2024 UNGA HLM on AMR is not the end, but a part of an ongoing conversation.

Nick kicked off the panel by asking each panelist what their key global milestones are over the next 24 months. Joël Denis (Canada) responded that member states can build on the 2023 UNGA HLM on pandemic preparedness and response and the importance of building on a horizontal aspect for pandemic preparedness and response and using the pandemic instrument across a One Health approach. The need for equitable access and sustainable financing was emphasized. Joël also mentioned that we can build vertically by keeping this discussion ongoing and having intentional conversations around the targets. Ingrid Keller (EU) agreed there is strong support for the pandemic instrument but would like to see strong provisions on AMR around NAPs, incentives, surveillance, IPC, and human and animal health. Ingrid mentioned that having a binding, global text could be advantageous, and member states should continue to bring previous efforts together. A further clear opportunity will be the 2024 UNGA HLM on AMR. Oliver Kacelnik (Norway) emphasized that the next 24 months are critical in the fight against AMR and shared how the WHO roadmap has been a useful tool for Norway. Oliver would like to see the implementation of IPC, water, sanitation, and hygiene (WASH), stewardship efforts, and One Health tied directly into milestones over the next 24 months. He also mentioned that climate change is a threat to AMR and should be addressed properly. Oliver believes that incremental steps are key to seeing long-term improvements. Michael Craig (U.S.) emphasized cross-country collaboration, especially in low-income countries. The U.S. is entering its next iteration of its NAP, that will be heavily influenced by the upcoming 2024 UNGA HLM on AMR and other events such as the 2024 U.S. presidential election.

Question two focused on the 2024 UNGA HLM on AMR. Michael built off his previous point by mentioning that although there is alignment and commonality across member states on many AMR targets, there is still room for discussion around targets and making sure they are appropriate when it comes to how we measure appropriate antibiotic and antifungal use. Michael mentioned that the goal should be to reduce inappropriate use of antibiotics, and therefore targets should be in place to measure appropriateness. IPC and sanitation measures must also be strengthened. Oliver acknowledged the openness and transparency of the discussion during the TATFAR meeting, and how this is important to continue going forward. Oliver also agreed with building the bridge around IPC, WASH, and diagnostics, and ensuring technical experts in TATFAR actively contribute to the 2024 UNGA HLM on AMR. Oliver mentioned that global targets are difficult, and that incentives can help justify commonality in targets for human and animal health. Ingrid mentioned that the EU is open to global targets, and how the new EU Council recommendation on AMR now entails a target to reduce total consumption in humans by 20% by 2030 and that 65% of consumption should be Access antibiotics (as defined by the WHO AWaRe framework). Joël noted the importance of a people centered approach, creating patient advocacy voices can ensure public understanding with a health equity focus. Joël challenged member states to continue to promote and understand One Health, and even suggested picking several proxy targets that we believe the global community is ready to achieve and think about what type of investments are required to attain certain outcomes.

The final question focused on what member states can do to support global efforts to establish common ground between the global north and the global south. Joël mentioned that TATFAR can help figure out what type of conversations need to be had, which conversations are best suited for which stakeholders, and create a unified voice that helps countries bring practices into action. Ingrid mentioned that we can lean into forums like the Quadripartite, G7, G20, and the Global Health Security Agenda (GHSA). Oliver emphasized continuing to be advocates for these efforts and having access to antibiotics as a target rather than focusing exclusively on appropriate use. He also mentioned using WHO's pandemic instrument as a foundation for a more coordinated approach forward. Michael thanked Oliver for bringing up access and reiterated some of the points made. There

was agreement across the panelists for the need to continue to build on each country's drug development pipeline, and to not taking existing drugs like penicillin for granted. Member states must remain committed to providing technical assistance and pushing NAPs forward.

Participant Poll – Day 2

Facilitated by TATFAR Secretariat, Stefanie McBride (U.S.)

Have you met and collected contact info from at least one new person during this meeting?

What would you like to collaborate on through TATFAR in the future/going forward (including things that you are already working on and/or new topics)?

Closing Remarks

Moderator – Phillipe Roux, Acting Director for Directorate B: Public Health, Cancer and Health Security of the European Commission's Directorate-General for Health and Food Safety (EU)

Philippe Roux thanked all the TATFAR members and observers for participating. Maureen Carew provided thanks on behalf of Canada to the European Commission and the TATFAR Secretariat for hosting. Oliver Kacelnik of Norway praised the great organization and hospitality from the European Commission. Colin Brown of the U.K. highlighted how the meeting provided the opportunity to share personal experiences and involve the public

to drive forward big change. Loyce Pace thanked Phillippe for hosting and acknowledged the TATFAR Secretariat team.

Phillippe Roux closed the meeting by sharing these key meeting takeaways:

- We as leaders on AMR need to work together to improve the way we communicate on AMR.
- TATFAR provides a space for open and transparent dialogue to share on successes and failures.
- TATFAR is instrumental in maintaining the dialogue on AMR and provides for greater cooperation a global scale.

To learn more about TATFAR, visit http://www.cdc.gov/tatfar/php/about/index.html.