# Global Health Strategy Group: Antimicrobial Resistance

# Summary of Recent Activities – Interim Report

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# Acronyms

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|---|---|
| ACORN 2 | A Clinically Oriented Antimicrobial Resistance Surveillance Network |
| AMR | Antimicrobial Resistance |
| CDC | Centres for Disease Control and Prevention |
| CIN | Clinical Information Network |
| CINAMR | Clinical Information Network-Antimicrobial Resistance |
| COVID-19 | Coronavirus disease 2019 |
| ECDC | European Centre for Disease Control and Prevention |
| FAO | Food and Agricultural Organization of the United Nations |
| GAP | Global Action Plan |
| GARDP | Global Antibiotic Research & Development Partnership |
| GLASS | WHO's Global Antimicrobial Resistance and Use Surveillance System |
| GRAM | Global Burden of Disease-Antimicrobial Resistance |
| IDDO | Infectious Disease Data Observatory |
| IHME | Washington's Institute for Health Metrics and Evaluation |
| IRIS | Invasive Respiratory Infections Surveillance |
| KPA | Kenya Paediatrics Association |
| LIMS | Laboratory Information Management System |
| LMICS | Low- and Middle-income Countries |
| LSHTM | London School of Hygiene and Tropical Medicine |
| MEVacP | Molecular Epidemiology for Vaccination Policy |
| MoH | Ministry of Health |
| NAPs | National Action Plans |
| OiB | Oxford in Berlin |
| OIE | World Organisation for Animal Health |
| PubMLST | Public Databases for Molecular Typing and Microbial Genome Diversity |
| R&D | Research and Development |
| SDG | Sustainable Development Goal |
| SF | Substandard and Falsified Medicines |
| UHC | Universal Health Coverage |
| UK | United Kingdom |
| WASH | Water, Sanitation and Hygiene |
| WHO | World Health Organisation |

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# Presenters Across the First Two Meetings

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# 1.0 Introduction

Antimicrobial resistance (AMR) is a major global health threat and tackling it an extremely high priority. According to available estimates, AMR infections, including drug-resistant tuberculosis, may be responsible for approximately 700,000 deaths per year around the world. The economic burden of AMR is enormous. Furthermore, AMR places a significant strain on individuals and healthcare systems alike; prolonging hospital stays, the need for more expensive drugs, and financial hardships for those affected are all consequences of extended sickness.
Improper use of antimicrobial in humans and animals is the leading cause of drug-resistant microbes. In countries with no regulation over antibiotics and weak health systems, health workers give antibiotics arbitrarily. In like manner, there is overuse of antibiotics by farmers and the general public, making the situation even more problematic.

Efforts to eradicate infectious diseases on a global scale will only be viable if we have effective medications to treat them. In 2014, the World Health Organization (WHO) released its Global Action Plan (GAP) as a blueprint for tackling the increasing threat of AMR. Despite the fact that over 190 nations have developed National Action Plans (NAPs) to combat AMR, progress and policy implementation remain slow. Without prompt action, we are on the verge of entering a post-antibiotic era, in which common infections would be impossible to treat.

This interim report presents the outcomes of the first two meetings of the Global Health Strategy Group for Antimicrobial Resistance (AMR) in April and September 2021. The aims of the meetings were to:

- Initiate a discussion on how the Strategy Group can contribute to have an impact on a public health problem of global importance, i.e., what is being done, what are the unique strengths and global opportunities of the Group, where are the gaps and limitations?
- Explore how those present can work together to create a safe, friendly, space for collaboration and learning, for continued dialogue—with activities such as blogs and webinars—and for building strong consortia drawing off multiple institutes to respond to current priorities.
- Provide training opportunities, improve the policy environment, and create attractive projects for funders.

This will feed into a larger report in the spring of 2022 summarising the work by then of the first four meetings of the Group and related workshops and outcomes.

# 2. Key Themes and Emerging Issues

## 2.1 Basic Hygiene and Infection Prevention & Control

Basic hygiene is a pressing global priority. Water, Sanitation and Hygiene (WASH) is key, but we underestimate how difficult it is to achieve in many parts of the world. Failing to hit the SDGs on WASH will have a knock-on effect for disease spread and every dimension of social and economic development. There is a big opportunity in many countries to capitalise on the higher appreciation many people have of the importance of washing hands regularly and hygiene for preventing COVID-19. It may be very valuable to highlight the message that some of the new habits acquired

since COVID-19, and investments made, should be maintained to protect from other diseases. We need to continue to raise awareness and scope best practices in low-resource settings.*

The international community needs to double-down on its efforts to satisfy the rights of every child to have access to clean water, basic toilets, and good hygiene practices. Every child has the right to an environment that is clean and safe. Access to safe drinking water, basic toilets, and good hygiene practices are indispensable for children's development and a healthy start in life.

### Key facts about WASH

- Worldwide, 2.2 billion people still lack access to safe drinking water.
- More than half of the global population does not have access to safe sanitation.
- Three billion people do not have access to handwashing facilities with soap.
- Still, 673 million people practice open defecation.

Source: link

* https://www.who.int/campaigns/world-hand-hygiene-day/2021.

**Excerpt from UNICEF on COVID-19 and WASH**

Despite the fact that COVID-19 has focused attention on the critical nature of hand hygiene in preventing disease transmission, three billion people worldwide, including hundreds of millions of school-aged children, lack access to handwashing facilities with soap. Rural residents, urban slum dwellers, disaster-prone areas, and low-income countries are the most vulnerable and affected.

Unsafe WASH practices can be catastrophic, especially for children. Each day, over 700 children under the age of five die of diarrhoeal diseases as a result of a lack of adequate WASH services. Children are nearly 20 times more likely to die from diarrhoea than from the conflict itself in areas of conflict.

Source: link

## 2.2 Health Systems and Capacity Strengthening

At the health-system level, the majority of antibiotics used in hospitals, particularly in low- and middle-income countries (LMICs), are defined by structures that are typically outside of the scope of AMR projects. Doctors inquire, 'What alternative antibiotics are available?', 'When will I see this patient again?', and 'How much can the patient afford?' In LMICs countries, these pragmatic choices are critical. Effective microbiology is a non-starter – once you have the result, you cannot locate the patient, and even if you could, you would not have the drug they require, and even if it were available, they could not afford it.

The quality of health systems is critical, including universal health coverage (UHC). The Group discussed a range of areas:

- Need for prescription guidelines and treatment guidelines, more holistic approach, better supply chains;
- Antibiotic stewardship/resources & diagnostics;
- Improving outcomes in patients with sepsis;
- Lack of blood cultures and in general, lack of microbiology laboratories;
- Overlap with substandard and falsified (SF) medicine (see the work of the Infectious Disease Data Observatory (IDDO), link, on substandard medicines).

The Clinical Information Network-Antimicrobial Resistance (CINAMR) and ACORN-2 projects in Kenya – are examples of building local laboratory capacities and intersectoral collaborations for strengthening AMR surveillance.

## 2.3 One Health

Adequately addressing AMR requires an integrated One Health approach spanning the human, animal, and environmental health nexus. Subsequently, addressing AMR is a critical component of the Sustainable Development Agenda and will be pivotal to achieving the Sustainable Development Goals (SDGs).

The COVID-19 pandemic has demonstrated the critical interconnections between humans and animals and the significance of strengthening health systems and surveillance for humans,

animals, and the environment. COVID-19 also emphasised the importance of examining the emergence of zoonotic diseases, such as infections caused by resistant pathogens, and thus the importance of preventing infectious diseases, protecting biodiversity, and encouraging agricultural practices that rely on prudent antimicrobial use. More here: link

To address AMR from a One Health perspective, it is crucial to create awareness and understanding about the various facets of antimicrobial use in agriculture and their effect on the environment.

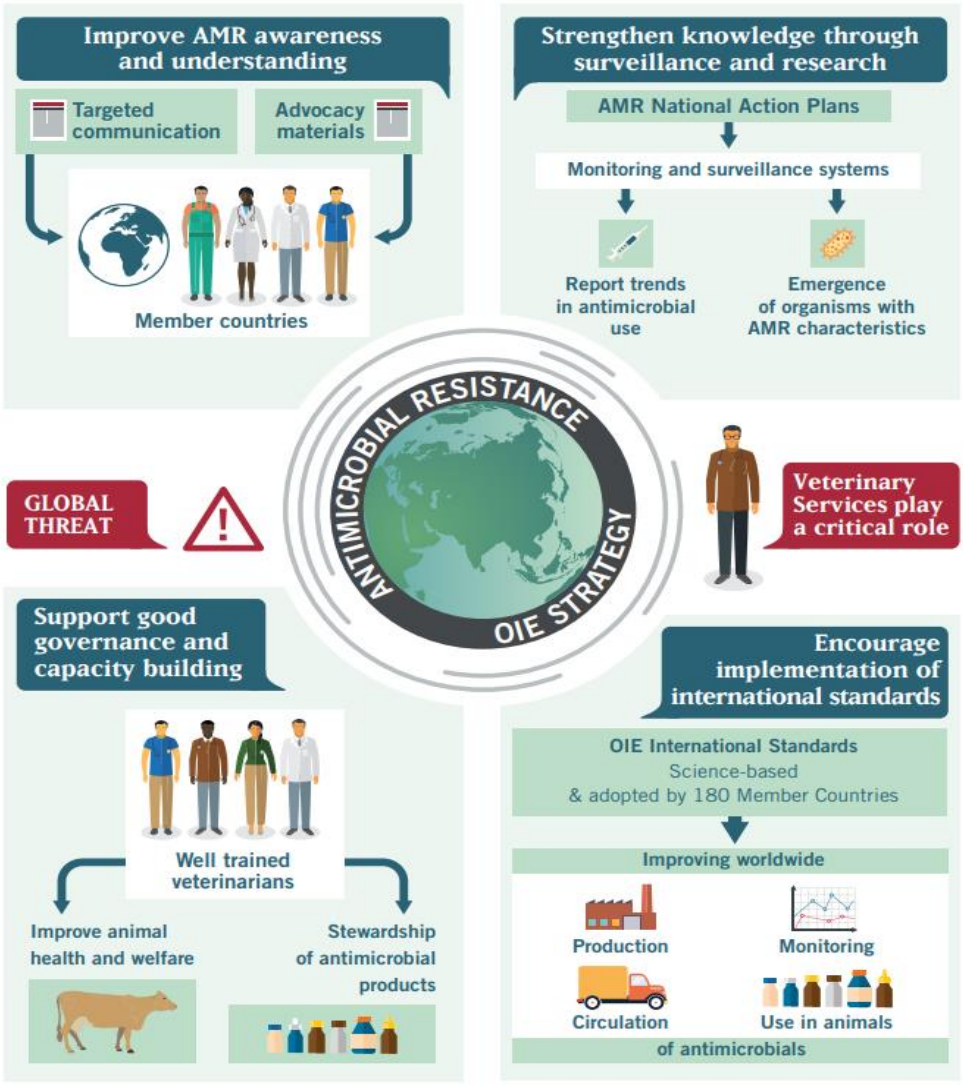


**Figure showing the One Health approach to AMR**

## 2.4 Climate Change

Climate changes have implications for AMR, and the relationship between planetary, livestock health, and human health (nutrition and disease, water quality/scarcity and health). Antibiotics and intensive rearing are used more frequently as demand for meat products increases – two by-products are climate-related pollution and AMR. Interventions that focus on farming systems and ensuring farmers have sustainable livelihoods that do not require such intensive practices can also help reduce disease risk.

Research in India (Jennifer Cole) and Uganda (Clare Chandler) highlights the problems caused by climate change. Antibiotics are often used to compensate for people's inexperience in farming and the pressures they face from outside, including those caused by climate change. There is demand for protein as an apparent development win-win, and nutritional need/demand and economic development through farming poultry/pigs even though this relies heavily on the use of antibiotics.

## 2.5 Molecular Epidemiology

We now have open-access molecular epidemiology web-based resources for clinical and public health microbiology (Martin Maiden), that have the capacity for incorporating private data pre-publication or pre-data release. This makes rapid global data sharing and analysis very easy through a web interface. The databases are principally funded by the Wellcome Trust and anyone is welcome to use them – so that novel resources can be developed as necessary.

The Public databases for molecular typing and microbial genome diversity (PubMLST) is a public repository that has been operating for more than two decades and currently contains over 850,000 curated isolate records and more than 650,000 genomes.† There are organism-specific databases for most bacterial pathogens. For instance, a group of researchers at the University of Oxford recently used this technology to establish a massive international peer-to-peer surveillance network for encapsulated bacteria in the COVID-19 era, the Invasive Respiratory Infections Surveillance (IRIS) project – this was established in a matter of weeks, collecting data from thousands of disease isolates. Despite its excellence, the IRIS study restricts the sharing of data for ethical reasons. Moreover, the majority of participating countries are high-income countries, with the exception of South Africa, the only country from the global south.

Nonetheless, peer-to-peer networks are essential especially working with LMICs, as they offer opportunity for capacity strengthening – especially but not exclusively in Africa.

The recently established Molecular Epidemiology for Vaccination Policy (MEVacP) seeks to leverage molecular epidemiology for improved vaccine use.

All of this provides useful resources – AMR phenotypes and genotypes for many organisms, and there is scope to expand this.

## 2.6 Surveillance

Surveillance is critical in guiding policy development and infection prevention and control responses. Notably, it serves as the bedrock for evaluating the spread of AMR and informing and monitoring the impact of subnational, national, and global actions.

There is lack of real-time data such as has been produced for COVID-19 infections. However, a variety of surveillance activities are conducted. For instance, the WHO's Global Antimicrobial Resistance and Use Surveillance System (GLASS) serves as a blueprint for collecting and monitoring global AMR data.

† Source: https://pubmlst.org

GLASS is not perfect and often relies on self-reported data from member states. With regards to self-reported data, concerns about data heterogeneity and lack of comparability between countries exist because of the varied methods used to curate the data.

To address the limitations of self-reported data, a new hospital network-based surveillance system‡ for antimicrobial resistance has been proposed as a more robust alternative to self-reporting. In many LMICs, however, major or tertiary hospitals are utilised as proxies for reporting and monitoring AMR, which is usually not generalisable. The situation beyond hospital walls, in the community, is even less well captured in current approaches and was identified as an important priority are for this strategy Group.

### 2.6.1 Hospital Network-Based Surveillance System

**Presentation by Dr Sam Akech**, KEMRI-Wellcome Trust, Nairobi, Kenya: "AMR Surveillance in Kenya Hospitals using a Clinical Information Network".

The case study describes a range of interconnected activities linking local research on AMR to global calculations of the burden of AMR. It also demonstrates how global collaborations can be used to strengthen local laboratory capacities and AMR surveillance:

- The Clinical Information Network (CIN) was established in 2013 as a collaboration between MoH, KPA, KEMRI-Wellcome Trust Research Programme, and participating hospitals;
- CIN aims to support improvement in collection and analysis of paediatric and neonatal inpatient information to support audit, service evaluation, quality improvement, and research;
- The CINAMR (Clinical Information Network-Antimicrobial Resistance) Project: A pilot microbial surveillance using hospitals linked to regional laboratories in Kenya;
- In two hospitals with existing, but inconsistent, microbiology services they will support active surveillance in both paediatric and medical wards to detect both community and hospital-acquired infections in a multinational surveillance project referred to as **ACORN 2 – A Clinically Oriented Antimicrobial Resistance Surveillance Network**. The pilot phase was done in Asia. The second phase seeks to estimate the burden of AMR, advancing the development of Laboratory Information Management System (LIMS), and to explore questions around diagnostic stewardship;
- Two hospitals are being supported to perform local microbiology for 24 months, with support from KEMRI-Wellcome in Kilifi;
- This feeds into collaboration and data sharing with the **GRAM study** – a collaborative study between the University of Oxford and the University of Washington's Institute for Health Metrics and Evaluation (IHME). See: (link)

## 2.7 AMR Accountability and Governance

Governments worldwide have made significant progress in developing National Action Plans (NAPs) to demonstrate their commitment to combating AMR. Moreover, since the Global Action Plan (GAP) on AMR was endorsed in 2015, over 190 WHO member states have committed to incorporating the GAP's objectives and actions into their NAPs. Yet many countries continue to lag behind in terms of implementation, a term Munkholm and Rubin

‡ Donker, T., Smieszek, T., Henderson, K. L., Walker, T. M., Hope, R., Johnson, A. P., Woodford, N., Crook, D. W., Peto, T. E. A., Walker, A. S., & Robotham, J. V. (2019). Using hospital network-based surveillance for antimicrobial resistance as a more robust alternative to self-reporting. *PLOS ONE*, *14*(7), e0219994. https://doi.org/10.1371/JOURNAL.PONE.0219994.

(2020) have dubbed 'isomorphic mimicry,' as evidenced by strong alignment in terms of defined policies but much lower levels of synchronisation in terms of enacted policies[§].

There is need for an overview/mapping of previous and current research on AMR, as well as funding for such work. To our knowledge, this does not exist at the moment. The Global AMR R&D Hub focuses exclusively on antimicrobial product research and development, not on research or funding in general. The Global Leaders Group on AMR recently released the following two-page information note on **AMR financing and gaps**, which may be of interest to the Group.

The Global Leaders Group also published an information note on **current surveillance of antimicrobial resistance and use and gaps.** The United Kingdom (UK) Government's priorities for addressing the 'silent pandemic of antimicrobial resistance' as presented to the United Nations (UN), include: improving antibiotic use, developing new antibiotics, and supply-chain safety – including through global standards. At their recent meeting for the G7 Summit, G7 health ministers identified antimicrobial resistance as a critical area for strategic action.

However, the conundrum with this agenda is threefold. To begin, these issues are not new for the most part, and the UK Government's five-year action plan and 2040 vision have been lodged in the memory of many in the Group for some years with unclear evidence of where it went. Second, while the UK is a major influence and player in the antimicrobial resistance space, such as holding a conference on "Tackling antimicrobial resistance in the UK and the UK's role on the global stage", it tends on the whole to be more about supporting and reinforcing the status quo than it is about new thinking, challenging, or identifying policy/action gaps. Thirdly, the AMR agenda passed through the G7 mill two or three years ago for national and international governmental policy/action agreement. This resulted in the formation of numerous global partnerships, bodies, and three-tier governance.

Besides the effectiveness or performance agendas of the aforementioned global oversight bodies, another assessment agenda that is missing on the global stage is that of accumulating specific patient/clinical experience (in order to make the AMR 'crisis' real and solvable).

Furthermore, a much stronger emphasis should be placed on what else is happening in the healthcare sector (or lack thereof) that makes antibiotics the easiest – or only – choice for many physicians and their patients. Reflecting on animal husbandry again, while people's knowledge of AMR is often reasonably adequate, they are still required to keep their livestock alive until such stock can be sold else they will not be paid. Even something as simple as a workers' union with compensation for lost birds in extreme circumstances would help – farmers cannot afford to ignore an animal for fear of infection spreading throughout the flock/herd.

Quote on accountability:

***"Careful consideration of 'accountability' as a framework - It implies the existence of a supranational issue about which countries should report. Countries that may perform less well on tracking could be those with the fewest resources - should these resources be directed on compiling and submitting metrics or toward tackling health (including AMR) locally?" ****

§ Munkholm, L. and Rubin, O. (2020) 'The global governance of antimicrobial resistance: a cross-country study of alignment between the global action plan and national action plans', *Globalization and Health 2020 16:1*, 16(1), pp. 1–11. doi: 10.1186/S12992-020-00639-3.

# 2.8 Exploring the Idea of an 'AMR Accountability Tracker' to Benchmark Global Progress Against AMR

- The goal of a tracker would be to design a visual interface of a selection of key indicators (less likely aggregated into a single indicator) in a single format on a single website. This exercise needs to keep in mind that numerous other organisations have already worked on tracking the progress of various components of AMR, and the value-add will come from incorporating the best of what is available in a highly visible tracker that keeps pace with latest developments.
- How broad or narrow do we want the indicators to look?
- AMR is an extremely broad and we need to reflect this in the tracker, because actions need to be just as broad.
- The tracker is not, nevertheless, a complete solution on its own.
- Such a tracker would be contingent upon implementation capability and health systems, as well as political and socioeconomic contexts.

## 2.8.1 The Audience?

- Who are we trying to make accountable? Obviously, some stakeholders more than others? Do we also want to hold consumers accountable? In some LMICs there is a huge informal market in antibiotics.
- Do we want to help the public change its behaviour? If so, do consumers have the agency to decide how they access antibiotics? Do consumers of animal products have much genuine agency once large agribusiness is involved, or when more informal systems rely so heavily on antibiotics?
- What is the science communication part of the whole package? how do we go beyond talk and gathering more evidence to leveraging societal change?

## 2.8.2 Topics that the Tracker Should Include?

Seven categories kick the discussion off: See Global Coalition on Aging "2021 AMR Preparedness Index" report:[**]

i. **National Strategy:** evaluates the high-level policies, commitments, and investments that national governments have undertaken to combat AMR
ii. **Awareness & Prevention:** Assesses the level of commitment within countries to fund and facilitate efforts to increase awareness among stakeholder groups and improve mechanisms that can prevent and monitor AMR.
iii. **Innovation:** Quantifies government commitments to foster and support AMR innovation, especially in areas of greatest opportunity, including novel valuation and pull mechanisms.
iv. **Access:** Measures patient access to both older and novel antimicrobials.
v. **Appropriate & Responsible Use:** Assesses governments' efforts to reduce misuse and overuse of antimicrobials and promote rational diagnosis.

[**] https://globalcoalitiononaging.com/wp-content/uploads/2021/06/GCOA-AMR-Preparedness-Index_FINAL.pdf

vi. **AMR & the Environment:** Examines how national governments are attempting to manage antimicrobials throughout their life cycle: production, procurement, usage across sectors (including non-human applications), and disposal.
vii. **Collaborative Engagement:** Captures how effectively national governments are facilitating collaborative engagement to address AMR.

The question is whether an upgraded version should include additional or fewer categories, and where the data comes from. There is some existing evidence – for instance, data on antibiotic prescriptions and sales. And then, of course, in terms of a One Health approach, we need to increase data on the AMR-environment-animal health nexus; it was rather difficult to find data on this, at least standardised data, and particularly for the environment, where there is a severe dearth of information. There is a really important potential overlap with the work of the Global Health Strategy Group for Planetary Health, and opportunity for the growing planetary health movement to overlap its activities with those of groups seeking to tackle AMR.

## 2.9 Data on AMR in the Environment

The global coalition on aging's 2021 AMR preparedness index report reaffirmed the caveats with data on AMR and the environment. The report examines how national governments manage antimicrobials throughout their life-cycle: manufacture, procurement, use in a variety of sectors (including non-human applications), and their disposal.

The major limitations are a lack of data in a number of countries, the self-reported nature of the limited accessible data, and the fact that in certain countries, environmental data is not tied to antimicrobials. Mezzelani and colleagues,[††] for example, discovered evidence of human pharmaceuticals in sea mussels. The ubiquitous presence of pharmaceuticals in coastal mussels provides insight into the possible ecotoxicological risk posed by these substances in marine animals. Despite the fact that these compounds were not explicitly antimicrobials, the study establishes a relationship between pharmaceuticals and the environment. Moreover, the study demonstrates that seasonality had a negligible effect on bioaccumulation.

In November 2018, the UN Food and Agricultural Organisation (FAO) launched a scoping exercise to get a good sense of the risks of antimicrobial resistance in aquaculture and the availability of data in that area, drawing on a broad range of international expertise.[‡‡]

- A risk-profiling exercise was done on two bacterial agents important to both animal and human health, namely: Streptococcus spp. and Vibrio parahaemolyticus. These bacterial agents affect tilapia and shrimp, respectively, top aquaculture species that contribute significantly to global food and nutrition security.
- The risk-profiling exercise for the two bacterial pathogens revealed that in both cases the AMR risks posed by these pathogens were likely to be low, and thus the conducting of a full risk assessment was not recommended.
- The Expert Group agreed to develop a project proposal to contribute to a multisectoral project "Towards reducing aquaculture-based AMR through a cross-sectoral approach".

[††] Mezzelani, M., Fattorini, D., Gorbi, S., Nigro, M., & Regoli, F. (2020). Human pharmaceuticals in marine mussels: Evidence of sneaky environmental hazard along Italian coasts. *Marine Environmental Research*, *162*, 105137. https://doi.org/10.1016/J.MARENVRES.2020.105137

[‡‡] Source: https://undocs.org/pdf?symbol=en/A/73/869 Point of contact Melba.Reantaso@fao.org, http://www.fao.org/fishery/nems/41098/ar.

- See link to Expert group report: LINK

# 2.10 Anthropology of AMR

**Presentation by Professor Clare Chandler**

- **Anthropology of antibiotic use.** See: **LINK**
- **Use of Ethnography** – Immersive observations. This involves not only conducting interviews and observing what happens in practice, but also tracing stories and histories, which requires a great deal of archival material; these days, looking at media is a significant part of the research, as also looking at policies and programmes, and attempting to truly understand them.
- **Approach**: Follows antibiotics, care and AMR science/policy across regions. Ethnography of discourses – making metaphors, imaginaries and histories apparent.
- For an accessible review of ethnographic research on AMR, see ***Tompson, Manderson & Chandler (2021) 'Understanding antibiotic use'*** in JAC-AMR I JAC-Antimicrobial Resistance.
- Threats of AMR stabilised as a political project.
- For current accounts of antimicrobial resistance: stabilisation, individualisation and antibiotics as infrastructure, see: LINK

- Anthropologists can explore why, for example, antibiotics are utilised differently in various parts of the world – **The 'Drug Bag' method: lessons from anthropological studies of antibiotic use in Africa and South-East Asia.**
- We are reminded again how solutions to a major global health challenge need a truly transdisciplinary and multidisciplinary approach, the tearing down of silos and the sharing of data and information across highly-varied sources, and the willingness for many to collaborate around the globe.

## 2.10.1 Antibiotics in Practices, Structures and Networks

- **STRUCTURES**: The use of antibiotics is determined by economic and political priorities – such as productivity – reflected in quick fixes to physical and social structures. Humans have crafted a system in such a way that fever, case management, with medicines at the end, leads people to think of antibiotics as the endpoint of a consultation, when really the endpoint should be care; we may wish to consider how else we can define care. We need to explore also the ways in which antibiotics are used to enable productivity, such as when people use antibiotics because they are in day-wage labour and need to return to work, because they cannot afford to take sick leave. The way we would use antibiotics to address issues such as inequality also need to be addressed. Sometimes, giving antibiotics to children, to reduce the number of diseases they might contract or lift them out of poverty, compensates for lack of attention to improving their housing conditions and sanitation or dealing with a range of social factors.
- **PRACTICES:** Antibiotic use enacted by individuals whose decisions are shaped by biological, social, political and economic contexts.
- **NETWORKS:** Antibiotic use is written into the flows of materials, information, algorithms and imperatives that make up global health and development.

Quote on ethnography of AMR:

***"…One of the things I really wanted at the start of the project was to believe that if I'm a farmer, I don't wake up in the morning knowing exactly what I'm going to do that day…I'm going to waste some antibiotics. As a result, it was critical for me to understand why farmers use antibiotics in the manner in which they do." ****

Quote on fear, empowerment, and information:

***"while fear of antimicrobial resistance can increase expectations for antibiotics, it has the potential to backfire unless people are also given empowering information about how to successfully self-manage their symptoms without antibiotics." ****

**See more: (link)**

## 2.11 AMR in the Community

There is a dearth of published data from community practice settings that adequately reflect local AMR trends, particularly in low- and middle-income countries (LMICs) with widespread unregulated antibiotic access and misuse and weak systems for routine AMR surveillance. Thus, there is a looming threat of AMR in the community.

As a result, it is critical to develop standardised, reproducible, and viable surveillance methods for measuring AMR and antimicrobial use in the community in order to inform policy and intervention development.

# 3.0 Action Points from the Meetings

Next practical steps, possibly including:

- Communications/knowledge-sharing platform for the Group (with public- and private-access areas);
- Countries and areas of expertise in the Group relatively overlooked this time (global links, links to industry and policy) to place more emphasis on next time;
- Any proposed sub-groups to explore specific themes (building on the potential success of the AMR-in-the-community sub-group);
- Proposed webinar topics (including joint with other groups and organisations), as subsidiary activates of the Group;
- Planning and logistics of activities, resource and funding needs and possibilities;
- Workshop on AMR in the community – early next year. This is an attempt to bring together experts in this field in order to spark discussion and possibly develop a project

*** *Quote made by member of Oxford in Berlin Global Health Strategy Group for AMR during the meeting, according Chatham House rules applied in this meeting.**

for action. It is hoped that this will be the Global Health Strategy Group working in partnership with colleagues and their organizations in Sierra Leone, Nigeria, and Kenya, and also possibly in Uganda, Malawi, Zambia, Zimbabwe, Burkina Faso, Pakistan, and Bangladesh.

# 4.0 Resources (to which Group members are invited to add):

- AMR Centre at the LSHTM
- Centers for Disease Control and Prevention (CDC)
- European Center for Disease Control and Prevention (ECDC)
- Food and Agricultural Organization of the United Nations (FAO)
- FAO/OIE/WHO Tripartite
- Global Antibiotic Research & Development Partnership (GARDP)
- World Organisation for Animal Health (OIE)
- Global AMR R&D HUB

## Members and Observers of the Group (for confirmation)

Members and observers of the Global Health Strategy Group for AMR and their host organisations arranged in alphabetical order:

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| 5. Angelina Taylor | Robert Koch Institute |
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| 8. Benn Sartorius | University of Oxford |
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| 49. Suzanne Edwards | Global AMR R&D hub, Berlin |
| 50. Tim Eckmanns | Robert Koch Institute |
| 51. Tim Walker | Oxford University Clinical Research Unit (OUCRU) Vietnam |
| 52. Tim Walsh | University of Oxford |
| 53. Tochi Okwor | Nigeria CDC |

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  Source: UNICEF/UN0225353/Brown
- Image page 4: https://www.oie.int/app/uploads/2021/03/en-oie-amrstrategy.pdf