EVALUATING EXISTING PROCESSES FOR UPTAKE OF SCIENTIFIC EVIDENCE ON AMR

Draft

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Background, Methodology, and Purpose

The Center for Global Development (CGD) is conducting a research project aimed at supporting the establishment of an independent panel for evidence for action (IPEA) against antimicrobial resistance (AMR). The proposed IPEA would mark a significant advancement in global governance for AMR, but is neither the first independent science panel to support evidence review for development goals (i.e., Intergovernmental Panel on Climate Change or Independent Monitoring Board for the Polio Global Eradication Initiative polio) nor the first initiative to translate evidence into policy for AMR. Accordingly, there is important historical context to draw from that can inform strategy and operations for the IPEA.

The purpose of this research and report is to extract best practices and lessons learned from prior efforts to translate scientific evidence into AMR policy. Due to time and resource constraints, this research is not exhaustive nor a true systematic review. It does, however, attempt to glean insights from a broad range of knowledge translation initiatives across One Health and geographic settings, both through desk research and key informant interviews (KII) with 15 subject matter experts in AMR policy. Experts were selected to represent multiple geographies, disciplines, and One Health sectors. KII were structured with a uniform set of questions to prompt reflection on the cross-cutting challenges and opportunities around AMR policy, and to elicit input on experts' specific experience working on AMR policy initiatives. Desk research sought to examine past examples of AMR evidence to policy interfaces, along with general challenges and opportunities in AMR policymaking processes.

The report below first describes a brief history of AMR policy and governance processes. It then employs a generic framework for translating evidence into policy to comprehensively outline the high-level challenges in translating evidence into policy for AMR. The report then lists relevant examples of past and current AMR evidence to policy initiatives, before delving into two case studies that provide important lessons learned for the IPEA. Finally, the report concludes with high-level recommendations for the IPEA, based on the findings of this research.

By delving into the unique context and challenges facing AMR policy initiatives and triangulating these insights with comparable learnings from independent panels in other development contexts, the IPEA leaders can ensure the panel's structure and activities incorporate lessons learned from other contexts while mitigating risks that have undermined past progress in AMR.

Introduction

Scientists have warned of the potential threat of antimicrobial resistance (AMR) for nearly as long as they have observed and extolled the virtues of antibiotics. Dr. Alexander Fleming first discovered penicillin in 1928 and only 17 years later he noted in his famous Nobel Lecture, "The time may come when penicillin can be bought by anyone in the shops. There is the danger that the ignorant man may

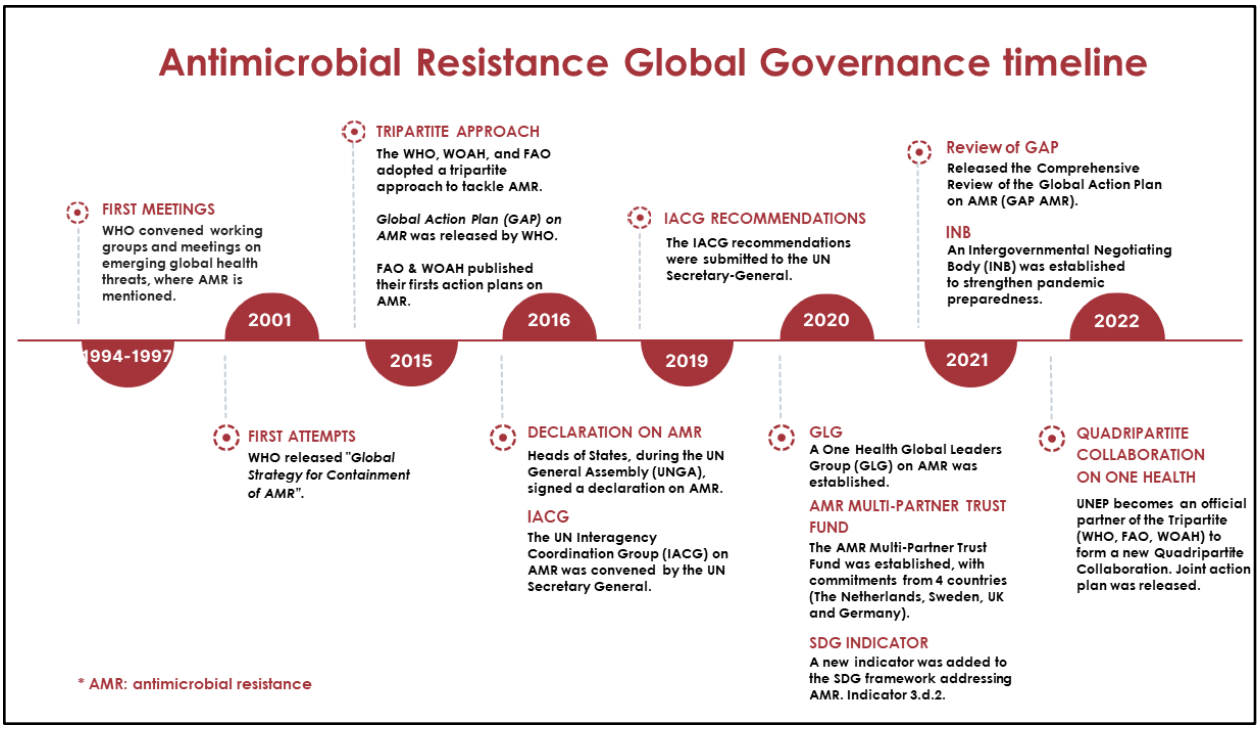
easily underdose himself and by exposing his microbes to non lethal quantities of the drug make them resistant."[1]

While some sage scientists may have recognized and predicted the risks of emerging AMR in the second half of the 20th century, it took at least another 50 years for AMR to gain traction in political circles.[2] In 1998, the World Health Assembly (WHA) first urged member states to recognize the threat of AMR, and the World Health Organization (WHO) released the first "Global Strategy for Containment of AMR" in 2001.[3]

Yet, despite additional WHA resolutions and increased frequency of drug resistant outbreaks in hospital settings throughout the 2000s, concerted political action on AMR did not begin in earnest until after 2014.[4] In 2015, the WHO released the Global Action Plan (GAP) on AMR at the WHA, the WHO, WOAH, and FAO established the tripartite approach to tackling AMR, ultimately becoming the quadripartite with United Nations Environment Program, and countries began mobilizing efforts to develop National Action Plans (NAP). Since 2015, numerous additional convenings, political declarations, and cross-sector alliances have signalled renewed political commitment to developing and implementing global, regional, and national policies that combat AMR (Figure 1).

Figure 1: AMR Global Governance Timeline (1994-2022)

[1] Fleming, Alexander. "Penicillin. Nobel Lecture", 11 Dec. 1945, NobelPrize.org, https://www.nobelprize.org/prizes/medicine/1945/fleming/lecture/.
[2] Inoue, Hajime. "Strategic approach for combating antimicrobial resistance (AMR)." Global health & medicine vol. 1,2 (2019): 61-64. doi:10.35772/ghm.2019.01026
[3]WHO, "WHO Global Strategy for Containment of Antimicrobial Resistance", 1 Jan 2001. https://www.who.int/publications/i/item/who-global-strategy-for-containment-of-antimicrobial-resistance
[4] Inoue, Hajime. "Strategic approach for combating antimicrobial resistance (AMR)." Global health & medicine vol. 1,2 (2019): 61-64. doi:10.35772/ghm.2019.01026



Source: ReAct

Progress in developing and implementing AMR policy

Although there has been demonstrably accelerated advancement in developing AMR policies over the past decade, experts note that progress has been challenging and policy implementation has been gradual and uneven across settings. No peer-reviewed literature was identified that elucidates the rate of progress in developing and implementing AMR-related processes. As a proxy for understanding the maturation of AMR policy processes, the Global Database for Tracking Antimicrobial Resistance Country Self-Assessment Survey (TrACSS) data depicts several key indicators across One Health and economic dimensions.[5] TrACSS initially began surveying the 194 WHO member states in 2016 to assess progress in implementing national action plans on AMR, and revised its indicators in the past few years to provide more detailed and comprehensive measurements. Unfortunately, this revision precludes longitudinal assessment back to 2016 for several indicators that could demonstrate progress in AMR policymaking processes.[6]

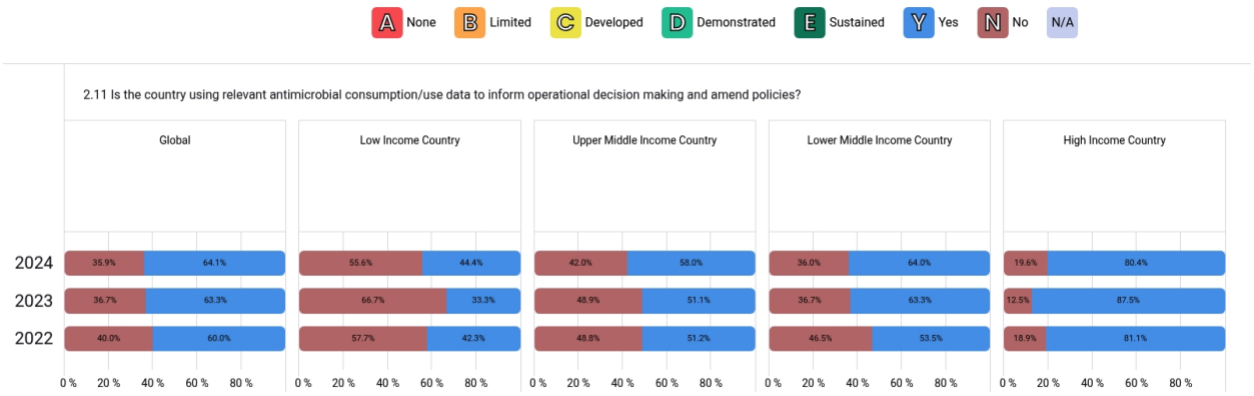
For indicator 2.3, TrACSS data shows that, globally, the percentage of countries that have a "National AMR action plan approved by government and is being implemented" has only progressed from 37% to 38% from 2022-2024, while the percentage that has a "NAP costed and budgeted operational plan and

[5] WHO, TrACCS data (2024). https://new.amrcountryprogress.org/

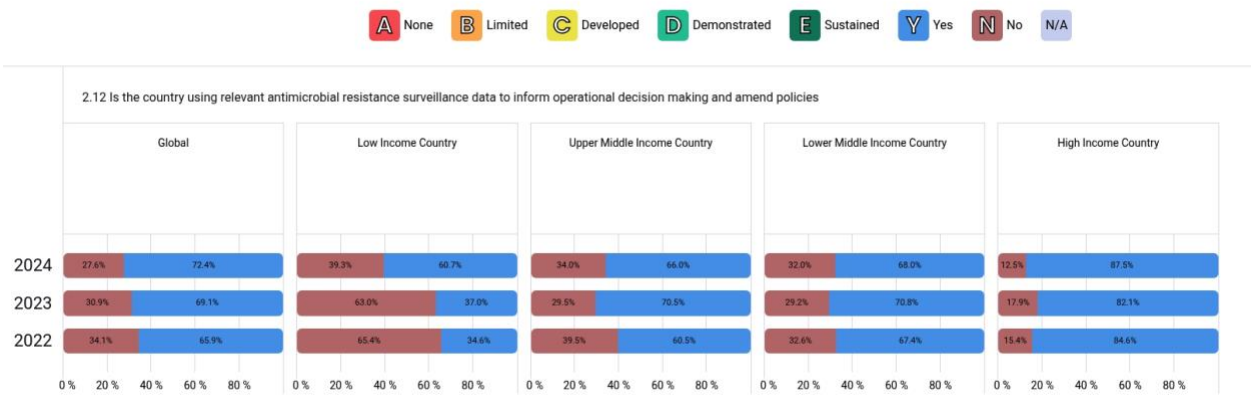
[6] WHO, UNEP, "Results from the 2024 Tracking Antimicrobial Resistance Country Self-Assessment Survey (TrACSS): Quadripartite webinar."

has a monitoring mechanism in place" has increased from 18% to 19% from 2022-2024, with higher income countries generally progressing faster than lower income countries.

Per, TrACSS indicator 2.11, "Is the country using relevant antimicrobial consumption/use data to inform operational decision making and amend policies", the proportion of countries responding "Yes" increased from 60% in 2022 to 64% in 2024, with the greatest increases occurring in LMICs.



Per Traccs indicator 2.12, "Is the country using relevant antimicrobial resistance surveillance data to inform operational decision making and amend policies", the proportion of countries responding "Yes" increased from 66% in 2022 to 72% in 2024, with significant progress among LICs, but relatively little progress among LMICs.



TrACSS data is perhaps the most comprehensive publicly available data on AMR policy development and uptake. TrACSS data is only one method of approximating the pace of AMR policy development and has its limitations in terms of self-assessment and relatively-narrow years of data collection. Nevertheless, it consistently demonstrates that higher income countries are farther along in developing and implementing AMR policies, and that global progress has been slow, if not stagnant, over the past few years, despite increased political attention. Most saliently, the majority of countries globally have yet to implement their national action plans on AMR, underscoring the importance of optimizing processes for the systematic review and translation of AMR evidence into policy.

FRAMEWORKS FOR TRANSLATING SCIENTIFIC EVIDENCE INTO POLICY

Across geographies and disciplines, policy is only likely to be effective if it is rooted in a robust evidence base, responds to the unique needs of the setting, and delivers its message in a way that resonates with its target audience. The literature cites several terms that are interchangeably used to describe the process of closing the gap between research knowledge and policy, such as knowledge translation, evidence to action, evidence-based policy. Likewise, many frameworks have been developed to facilitate translation of scientific evidence into health policy.[7] Leveraging these frameworks may provide insight into the individual components of effective science to policy interfaces and enable identification of the discrete, nuanced mechanisms required to optimally configure a new evidence to policy platform for AMR.

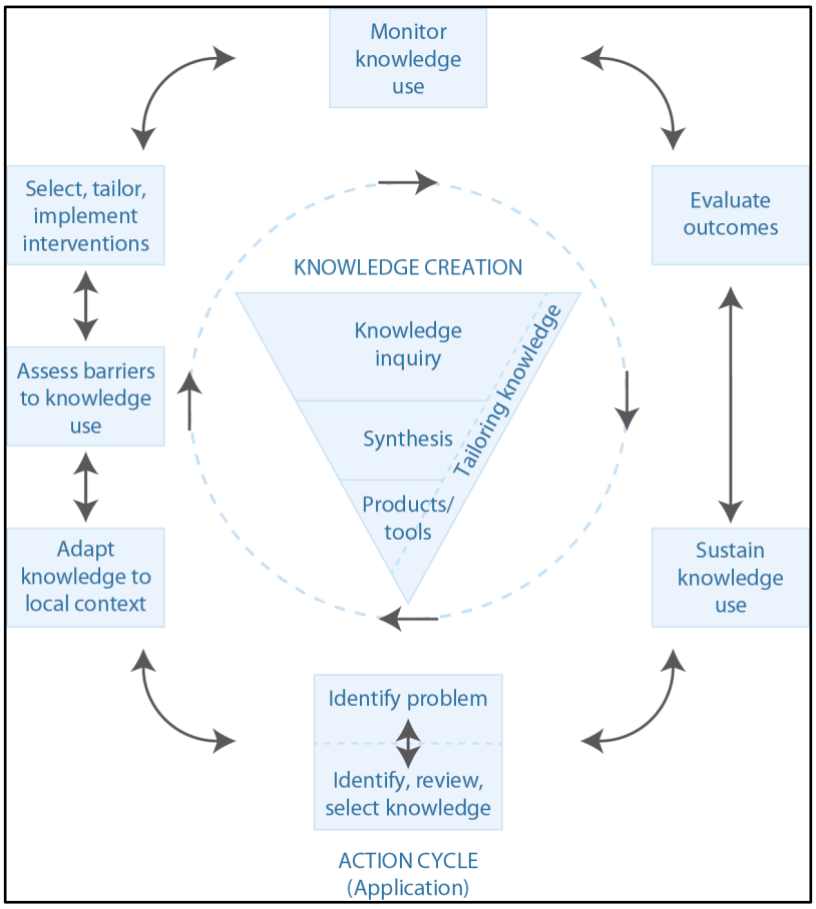
One relevant framework, the Knowledge to Action (KTA) framework, was developed by Graham and colleagues in 2006.[8] While initially intended to support effective translation of evidence into clinical practice, it offers a useful framework for translating knowledge into “action” for practitioners,

[7]Milat AJ, Li B. Narrative review of frameworks for translating research evidence into policy and practice. Public Health Res Pract. 2017;27(1):e2711704

[8] Graham, Ian D et al. “Lost in knowledge translation: time for a map?.” The Journal of continuing education in the health professions vol. 26,1 (2006): 13-24. doi:10.1002/chp.47

policymakers, patients, and the public. After reviewing 29 unique terms that have been used across health literature to describe various aspects of translating knowledge into action (i.e., knowledge translation, knowledge transfer, knowledge exchange etc.), Graham and colleagues propose the KTA framework that includes an interlinked "knowledge creation" and "action" (application) cycle, with distinct components rolling up into each cycle (Figure 2, below). The KTA process is intended to be dynamic and fluid, not necessarily sequential, such that various actors can independently drive progress on distinct components of the cycle(s).

Figure 2: Graham et al's Knowledge to Action framework



At a high level, the "knowledge creation" and "action" (application) cycles entail the following:

- *Knowledge Creation*: the knowledge funnel includes three components of evidence generation or research in healthcare. Knowledge creation is conceptualized as a funnel, such that information becomes more refined and useful to stakeholders as it is increasingly processed and distilled.
    - "Knowledge inquiry" may refer to uncoordinated, varying quality of research and evidence on a certain health topic – a vast collection of relevant and irrelevant data that may or may not be easily accessed.

    - "Synthesis" refers to the systematic aggregation and organization of existing knowledge, filtering the broad collection of data into relevant answers to specific questions (i.e., meta-analyses or systematic reviews on specific topics).
    - "Products/tools" distill these reviews even further into practical and user-friendly materials that audiences can leverage to facilitate the uptake of relevant knowledge.
- *Action (Application):* The action cycle refers to activities that promote implementation and uptake of insights generated in the Knowledge Creation funnel. The action cycle can be dynamic, enabling actors to work on different components of the cycle simultaneously or return to steps that require additional attention. Graham et al summarizes the action cycle with the following prompts, adapted to specify the policy focus of this report:
    - Identify a problem that needs addressing through policy
    - Identify, review, and select the knowledge of research relevant to the problem
    - Adapt the identified knowledge or research to the local context
    - Assess barriers to using the knowledge in policy
    - Select, tailor, and implement policy to promote the use of knowledge
    - Monitor knowledge use and policy implementation
    - Evaluate the outcomes of the policies
    - Sustain ongoing knowledge use

CHALLENGES IN TRANSLATING EVIDENCE INTO POLICY FOR AMR

For the IPEA to be successful, leaders will need to be cognizant of the challenges that have undermined previous efforts to translate evidence into policy for AMR so that they can be proactively mitigated. Utilizing Graham et al's KTA framework as a high-level outline of the indispensable steps in knowledge translation illuminates many of the unique challenges in translating evidence into policy for AMR (*note: some steps have been combined due to overlaps in relevant challenges)*:

Knowledge creation: Evidence is the foundation of effective policy. Because AMR is a phenomenon with direct ties to human, animal, and environmental domains, knowledge creation for AMR is uniquely challenging due to the sheer breadth and depth of data that could be plausibly relevant for developing AMR policies. Moreover, AMR is fundamentally an evolutionary phenomenon for the most abundant life forms on earth – the randomness and non-linearity of evolution makes it difficult to comprehensively monitor change over time across a global scale.[9] Nevertheless, policymakers do not need to be able to fully comprehend every aspect of AMR, the imperative is to understand which interventions are effective and apply, scale those accordingly.

- *Knowledge inquiry*: Relative to narrow, vertical topics in human health (e.g., individual disease areas), the knowledge inquiry funnel for AMR is wide and diverse, but replete with data gaps.

[9]Wernli, Didier et al. "Antimicrobial resistance: The complex challenge of measurement to inform policy and the public." PLoS medicine vol. 14,8 e1002378. 17 Aug. 2017, doi:10.1371/journal.pmed.1002378

While still underfunded relative to other human health topics, knowledge inquiry has been an initial priority for the AMR field, as evidenced by relatively significant investments in AMR surveillance (compared to other components of the KTA framework), though these surveillance systems are just now being implemented and scaled. Moreover, other primary research across One Health topics may possess relevant data for AMR policy, even if the research was not initially conceptualized with AMR in mind.

Accordingly, data and evidence may be of varying quality and relevancy, with pockets of rich evidence in certain topics and geographies, but with uneven distribution and quality of evidence across One Health and geographic dimensions. All stakeholders interviewed for this report concurred that AMR evidence is disproportionately derived from high income country (HIC) and human health contexts, with significant knowledge gaps persisting in low- and middle-income country (LMIC) and animal, environmental contexts. Even less attention has been paid to the overlaps between One Health contexts, leading to limited understanding of how to coordinate actions across topics that implicate diverse stakeholders who traditionally have not worked in close collaboration.

Several interviewees recognized that a lack of global governance in AMR has precluded coordinated, rigorous research agendas that adequately span One Health and geographic contexts. While WHO has a global AMR research agenda, other AMR research has often been driven at the discretion of independent researchers or institutions without a coordinated or centralized directive. Without consensus around the key research questions and priority data gaps, AMR evidence will continue to be fragmented and untethered from downstream components of the KTA process.

- *Synthesis & Products/tools*: Notably, the synthesis and tool production mechanism in the KTA process may be the ultimate role of the IPEA, helping to digest vast amounts of fragmented AMR information and translating those insights into coherent, setting-specific AMR policy recommendations. Relative to knowledge inquiry, multiple interviewees recognized that the AMR field has invested fewer resources in downstream synthesis of available evidence and translation of these syntheses into tools for policymakers (relative to funding for new therapeutics, for example), although the WHO does have a mandate to serve in this function.[10] This may be, in part, a function of the complexity and breadth of relevant AMR research questions (as described in "knowledge inquiry") and the relative-nascency of the field – data needs to be systematically generated before it can be organized, synthesized, and translated into user-friendly tools. The widely-acknowledged gap between generation and utilization of surveillance data exemplifies this point: there is an abundance of surveillance data routinely

[10] Kelly, Ruth et al. "Public funding for research on antibacterial resistance in the JPIAMR countries, the European Commission, and related European Union agencies: a systematic observational analysis." The Lancet. Infectious diseases vol. 16,4 (2016): 431-40. doi:10.1016/S1473-3099(15)00350-3

collected, but it has generally proven difficult to incorporate these data into routine policy and clinical decision making.

Action cycle: Upstream knowledge creation activities require coherent implementation or application vehicles in order to catalyze impact. While the IPEA may play a lesser role in executing components of the action cycle, it is critical to understand what infrastructure and mechanisms are needed to optimally convert the IPEA's insights into impact. In addition to and exacerbated by the aforementioned challenges in knowledge creation, policymakers face substantial challenges in optimally executing the action cycle of the KTA for AMR:

- *Identify the problem, review relevant evidence:* The first essential step in the action cycle entails identifying the problem or issue that warrants attention. For AMR, there is a dual challenge of raising awareness of the general threat of AMR (e.g., equipping policymakers to recognize AMR as a problem worth addressing) and disaggregating AMR into distinct, approachable problems that should be addressed through policy (i.e., increase in drug resistant hospital-acquired infections or unregulated use of antibiotics in agriculture). Some interviewees acknowledged a general dearth of AMR expertise across HIC and LMIC governments, rendering this initial step challenging in many settings. Some initiatives, such as EVIPNet-RADAAR (discussed later), have focused on capacity building for national policymakers to enable the appropriate identification of priority problems and relevant evidence. Even when policy-relevant problems are adequately identified, finding relevant research to inform possible solutions remains a challenge, for the reasons identified in the "knowledge creation" cycle.

- *Adapt the identified knowledge or research to the local context:* After identifying the problem and relevant evidence or research, policymakers go through the process of assessing and tailoring the evidence to their context. The fragmented nature of AMR evidence paired with the heterogeneity of contexts can make this adaptation process challenging. For example, several interviewees acknowledged that the WHO's "Bacterial Priority Pathogens List" (BPPL) is a useful synthesis of global AMR evidence that categorizes bacterial pathogens depending on their threat to human health. While the BPPL has been successful in aligning research and development efforts towards the greatest global threats, policymakers at the national-level may see that the BPPL does not mirror the most prevalent or lethal pathogens in their geographies.

- *Assess barriers to knowledge uptake*: The adoption and uptake of policies is contingent on the quality of the policy, the receptiveness of policy adopters, and the context in which policy will be implemented. Assessing and mitigating potential barriers across these diverse stakeholder groups ensures that upstream knowledge creation and action components are not rendered futile. For AMR policy, interviewees recognized that AMR policy is often complex and that target implementers or audiences (i.e., healthcare providers, farmers) may have limited awareness of the threats of AMR. Moreover, implementation of AMR policy often requires coordination of actors across One Health sectors – these communication and collaboration pathways are usually not well-established and require intensive resources to stand up. Finally, all interviewees

acknowledged that, to date, AMR policy interventions have been undermined by a lack of national resources to implement, monitor, and refine policies over multiple years.

- *Select, tailor, and implement policy to promote the use of knowledge:* This phase entails actual planning and implementation of AMR policy. As described above, insufficient resources for implementation of AMR policy has been the predominant barrier to effective execution of this phase of the KTA cycle. Where policies have been implemented, interviewees noted that successful uptake of AMR policy has required in-depth planning, clear communication with target end-users (i.e., healthcare providers, farmers, patients/general public), and a staged approach to implementation. Because AMR is a cross-cutting phenomenon that implicates numerous potential stakeholder groups who often do not traditionally interact, targeted implementation with gradual scale up can result in more effective, widespread adoption in the long-term.

- *Monitor policy implementation & evaluate outcomes*: Once policy has been implemented, the next phase entails monitoring use and evaluating outcomes. While there are many evidence-based frameworks for monitoring and evaluating policy implementation, most interviewees recognized the inherent difficulties in doing so for AMR. Compounded by the dearth of resources for policy implementation, monitoring, and evaluation, AMR poses unique challenges in evaluation. Some AMR policies may have logical, direct indicators to measure success (e.g., a policy to improve surveillance may report on the frequency, accuracy, coverage of inbound surveillance data), while others may be more difficult to track for scientific and logistical reasons. For example, some interviewees in the agriculture sector noted that, depending on the setting, farmers may not be required to report on use of antibiotics on their properties, rendering it difficult to assess the impact of policies on appropriate use of antibiotics. Policymakers can use proxy data (e.g., data on sales of antibiotics to farmers) or voluntary, self-reported surveys to approximate the impact on antibiotic consumption, but these indicators may be of poor quality or misleading. Lastly, policymakers should, ultimately, want to assess if their AMR policies have reduced the emergence and spread of AMR, but this measurement likely requires significant time, resources, and surveillance networks to assess. Even if it is possible to measure the change in AMR rates over time, it is often difficult to directly attribute this trend to any specific policy initiative, as AMR is the result of innumerable variables interacting in an ecosystem.[9]

- *Sustain ongoing knowledge use*: Sustaining knowledge use to optimize policies over time requires dedicated resources, strong governance structures, and established feedback loops. Within AMR, scarce resources, competing priorities, fluctuating political will, and nascent infrastructure has precluded the establishment of robust feedback loops that enable evidence-based adjustments to AMR policies. Ideally, resources and efforts to promote this sustainment of knowledge use process can directly support upstream efforts in the “knowledge creation” process by generating evidence on what policies and implementation pathways are effective in achieving the desired outcomes.

INITIATIVES TO TRANSLATE EVIDENCE INTO POLICY FOR AMR

The following table outlines previous initiatives that have aimed to facilitate the translation of evidence into policy for AMR. This list is non-exhaustive, as there have been innumerable formal and informal efforts at the local-, regional-, national-, and global-levels, but represent a diversity of approaches, geographies, and One Health focuses.

Table 1: Initiatives striving to translate evidence into policy for AMR

Initiative	Orgs	Year(s)	Description	Region	One Health Focus
Interagency Coordination Group (IACG)	WHO, FAO, OIE	2016-2019	Established by the UN Secretary-General in 2016, the IACG brought together experts from across UN agencies to coordinate and promote efforts to combat AMR across One Health sectors. The group aimed to identify key, evidence-based actions that policymakers could take to prevent the spread of drug-resistant infections and ensure the continued effectiveness of antimicrobials.[11]	Global	All
Global Action Plan on AMR (GAP)	WHO	2015	The GAP was not solely an effort to translate evidence into policy, though that was a key component of the second objective: The GAP outlines five objectives on AMR: 1. to improve awareness and understanding of antimicrobial resistance through effective communication, education and training; 2. to strengthen the knowledge and evidence base through surveillance and research; 3. to reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures; 4. to optimize the use of antimicrobial medicines in human and animal health; and 5. to develop the economic case for sustainable investment that takes account of the needs of all countries and to increase investment in new medicines, diagnostic tools, vaccines and other interventions The GAP continues to serve as a framework for countries to develop national action plans, thus it has remained a key global tool to facilitate the development of evidence-based, national policies on AMR.	Global	All

[11] IACG, "No time to wait: securing the future from drug-resistant infections - report to the secretary general of the United Nations" WHO (2019)

AMR Policy Accelerator (AMRPA)	Global Strategy Lab	2022-present	The AMRPA uses research and evidence to advise governments and policymakers on policies to combat AMR. AMRPA provides support through advisory services, capacity building, and research services. This three-pronged model strives to comprehensively improve the way data and evidence are generated, synthesized, and translated into policy. Leveraging this model, the AMRPA delivers context-specific support for the development of national action plans and One Health policies, along with best practice guidance and technical support.	Global	All
Presidential Advisory Commission on Combating Antibiotic Resistant Bacteria (PACCARB)	US Health and Human Services (HHS), US Departments of Agriculture (USDA), US Department of Defense (DOD)	2015-present	PACCARB is a federal advisory council that works closely with the CARB Task Force and provides input and guidance into the US' National Action Plan for Combating Antibiotic Resistant Bacteria (CARB). PACCARB consists of non-federal subject matter experts across One Health sectors. PACCARB has been a mechanism through which to bring diverse perspectives together to review AMR evidence, in service of informing national action plans on AMR in the US. PACCARB recommendations can directly inform AMR policy through HHS, or be used to direct subsequent research efforts to fill priority knowledge gaps.	US	All
Evidence-informed Policy Network (EVIPNet) & Regional AMR Data Analysis for Advocacy, Response and Policy (RADAAR)	WHO, International Vaccine Institute	2022-present	The initiative aims to build countries' capacity to develop evidence-informed AMR policies through priority setting, baseline assessments, and country-specific Evidence Brief for Policy documents. Building off of RADAAR's experience developing policy and advocacy guidance for LMIC governments, the collaboration leverages EVIPNet's cutting-edge approaches to knowledge translation to improve evidence-based policymaking for AMR.	LMIC (Fleming Fund countries)	All
Strategic and Technical Advisory Group for Antimicrobial Resistance (STAG AMR)	WHO	Present	The Strategic and Technical Advisory Group for Antimicrobial resistance (STAG-AMR) is the principal advisory group to the World Health Organization (WHO) on antimicrobial resistance. The STAG-AMR has the mandate to provide advice to the WHO Director-General and the AMR Division on overall global policies and strategies to address AMR within the context of human health, while considering relevant World Health Assembly (WHA) resolutions and decisions. The mandate of the STAG-AMR is to provide strategic and technical advice. STAG-AMR members serve in their personal capacities to represent areas of technical expertise	Global	Human health
Strama - the Swedish strategic programme against	Public Health Agency of Sweden, Swedish	1995-present	The overall goal of Strama is to secure effective treatment of bacterial infections for the current and future generations. Strama is a platform for stakeholders across Sweden to exchange knowledge, identify knowledge gaps, and supporting the implementation of treatment guidelines and	Sweden	Human

antibiotic resistance	government		other AMR policies in human health. Strama was initially founded as a voluntary network of experts and agencies at the national level, but has since incorporated stakeholders from across all 21 counties. The broad representation enables robust data gathering and input from experts across fields in human health.		
Global AMR Legislators Initiative	G20 & G7 Health & Development Partnership	2024	Leveraging increased attention on AMR due to the UN General Assembly High Level Meeting on AMR, the Global AMR Legislators Initiative aimed to translate into simple, practical recommendations for policymakers. Emphasizing the need to translate complex AMR evidence into digestible formats for legislators who may not have AMR backgrounds, the initiative held a series of meetings to bridge the gaps between scientists and policymakers, culminating in a final report.	Global	One Health

CASE STUDY 1: EVIDENCE-INFORMED POLICY NETWORK (EVIPNET) & REGIONAL AMR DATA ANALYSIS FOR ADVOCACY, RESPONSE AND POLICY (RADAAR)

Background: EVIPNet-RADAAR collaboration leverages complementary strengths from WHO and IVI, respectively. EVIPNet has deep, cross-cutting expertise in strengthening capacity to translate evidence into effective policies across health areas and LMIC contexts, while RADAAR has years of experience building capacity and demand for policy-relevant AMR data and evidence in LMIC.

RADAAR Phase 1 began in 2019 as the only Fleming Fund project fully dedicated to AMR policy, planning, and advocacy. RADAAR Phase 1's objectives were to identify barriers and enablers to AMR data sharing and analysis, establish mechanisms to facilitate policy dialogues, and create a demand for policy-relevant AMR data and analysis. Despite significant workplan pivots incurred due to Covid-19 restrictions, RADAAR was successful in piloting in Bangladesh, Nepal, Malawi, and Uganda, culminating in the development of country-specific Evidence Briefs for Policy (EBP) for each of the pilot countries.

The collaboration between RADAAR and EVIPNet (RADAAR Phase 2) kicked off in 2022 and has the stated objectives of (1) enhance technical skills and capacities for AMR knowledge translation, (2) develop Evidence Briefs for Policy (EBP) to increase demand by policymakers for policy-relevant AMR data and evidence, (3) establish the foundations for country-level AMR knowledge synthesis and translation platforms, and (4) improve AMR data-sharing and analysis within countries. The collaborative model begins with priority setting on a critical AMR issue, followed by rigorous baseline assessments and systematic reviews, and culminates in the development of the EBP for each country.

The EVIPNet-RADAAR model takes a hands-on, context-specific approach that simplifies the process of making policy for AMR. Through workshops and webinars, the initiative supports policymakers to identify "policy-relevant data", prompting actors to consider (1) what is the current status quo/baseline

data, (2) what are the desired outcomes/target metrics, (3) what policies are needed to achieve those targets, (4) what policies are effective/what works, and (5) how much will it cost.

Results: Phase 1 of RADAAR culminated in four country-specific "formative" EBPs for each of the pilot countries. Focus groups and surveys from the four pilot countries suggested that the trainings significantly improved participants' knowledge and skills in translating AMR data and evidence into effective policies, and EBPs were deemed to generate greater demand from policymakers for policy-relevant AMR data, analyses, and evidence. 85% of participants evaluated the workshops as "excellent" and >70% stated that the workshops were "very helpful" in improving understanding of policy options for AMR containment.[12] Notably, due to the recent implementation of this project, there is a lack of information regarding the long-term impacts of the initiative on AMR rates.

Lessons learned: By prioritizing local capacity building as a critical component of the EVIPNet-RADAAR model, the collaboration between WHO and IVI has been unique in mitigating one of the primary barriers to effective evidence translation processes. By partnering with individual national governments, the initiative is able to take a tailored approach to building policy-relevant evidence bases while elucidating the country-specific barriers and enablers of policy implementation. The program proudly remains responsive to country demands and ensures all policy processes are co-developed. The program will be working in subsequent years to scale to additional countries and embed specific knowledge translation units into ministries of health in an effort to continue building institutional knowledge and capacity to develop salient AMR policies across LMIC.

There are at least two critical learnings for the IPEA to glean from EVIPNet and RADAAR's initiative. First, programs that strive to translate evidence into policy for AMR need to be cognizant of, and ideally supportive of, the target country capacity for adopting and implementing policy recommendations. Building demand for policy-relevant AMR data at the national- and sub-national levels, either through partnership with existing programs or IPEA-led capacity building workshops, will facilitate the rapid adoption of policy recommendations and ensure that upstream evidence synthesis efforts are not undermined by insufficient downstream infrastructure. Secondly, the IPEA can make incremental impact by simplifying its knowledge translation processes and focusing on the highest priority research questions, as defined by the countries themselves. While it may be tempting to grapple with an exhaustive list of all relevant AMR policy questions, downstream capacity to contextualize and implement a high volume of recommendations may preclude practical progress on the highest priority topics. By starting simple and focusing on incremental progress, the IPEA can ensure its activities reflect the unique and disparate needs of its target audiences, while honing the in-country mechanisms to adopt and incorporate its recommendations into national policy.

CASE STUDY 2: Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria (PACCARB)

[12] https://www.ivi.int/wp-content/uploads/2023/10/RADAAR-Project-Phase-1-Summative-Report.pdf

Background: The Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria (PACCARB) was established in 2015 to provide recommendations to the US government on AMR.[13] PACCARB brings together subject matter experts from across multiple federal agencies, academic institutions, private sector, and civil society to help shape and inform the US' national AMR policy. PACCARB complements the US government's National Action Plan for Combating Antibiotic-Resistant Bacteria (CARB) Task Force which draws its expertise strictly from the various US federal agencies. While its operations are currently in jeopardy due to sweeping changes in US government funding, it still represents one of the longest standing interfaces to translate scientific evidence into policy for AMR.

PACCARB operates through working groups that bring together diverse expertise from across the One Health sectors. The working groups review policy-relevant AMR data and develop recommendations that inform the national action plan. To date, PACCARB's focus has included strengthening surveillance systems, promoting antimicrobial stewardship programs, advancing research and development, and addressing environmental and agricultural factors in AMR. PACCARB monitors the implementation of its recommendations and evaluates progress, enabling the adjustment of policies and AMR strategies over time.

Results: PACCARB has hosted over 26 public meetings and supported the development of multiple national action plans in the US. PACCARB has provided the CARB Task Force, the US federal agencies, advocacy groups, and general public with dozens of evidence-based reports on the multisectoral impacts of AMR and supported the strategic development of grants to close primary data gaps. Comparable to other AMR policy initiatives, directly measuring the impact of PACCARB on AMR rates has proven challenging, precluding rigorous assessment of the model.

Lessons learned: PACCARB is unique in its inclusive approach to multisectoral collaboration. Because it operates within and outside of federal agencies, the initiative is able to draw upon vast expertise and diverse perspectives from public health, veterinary health, agriculture, environment, research, and policy sectors, enabling comprehensive and coordinated policies. Experts interviewed in the KII suggested that cross-sector collaboration was not always seamless – it took years to build trust and rapport among actors who traditionally did not have platforms to compare insights from their respective fields. Nevertheless, by constructing multisectoral working groups that focused on specific AMR research questions, PACCARB representatives quickly saw the value of overlaying their disparate lenses, leading to policy recommendations that were holistic, nuanced, and agreeable to audiences with diverse needs and incentives.

By grounding its recommendations in rigorous evidence from surveillance and proactive research, PACCARB has built credibility with policymakers, ensuring its advocacy efforts translate into national policies. Moreover, relative to other evidence to policy initiatives, PACCARB has demonstrated a long,

[13]HHS, "Presidential Advisory Council on Combating Attibiotic-Resistant Bacteria" https://www.hhs.gov/ash/advisory-committees/paccarb/index.html

sustained commitment to AMR science and policy, enabling continuous dialogue with key stakeholders, long-term monitoring of impact, and refinement of its model over time. Experts reflected in the KII that this longevity led to outsized impact over time: credibility and efficiency increased with each year of operation, enabling a refinement of the PACCARB model and greater uptake of its recommendations with each national action plan review cycle.

The IPEA can incorporate several of these lessons learned into its new operating model. Firstly, evidence review processes need to prioritize governance structures that enable equal input from experts across all relevant One Health sectors. It is not sufficient to nominally invite representatives from each sector, but rather the IPEA should promote processes that foster collaboration and require equal input from all relevant stakeholder groups. Secondly, PACCARB benefited from having a practical primary output to its policy recommendations: the US national action plans on AMR. While the federal agencies developing the national action plans were not PACCARB's only target audience, it provided a consistent avenue through which to raise and respond to salient AMR policy questions. The IPEA should look for similar primary outputs to ensure its policy recommendations have a clear path towards uptake and implementation. Finally, PACCARB exemplifies perseverance and progress over time. Even outside of policy interventions, the AMR landscape is fraught with initiatives that have stunted impact due to their short lifespans (often a symptom of fickle funding sources). With complex research questions, non-traditional multisectoral collaboration, and limited resources and capacity for downstream uptake, it is understandable that there will be initial challenges in operationalizing any AMR evidence to policy interface. By persevering through these inevitable initial hurdles, the IPEA can refine its operating model, build downstream demand for its recommendations, and generate outsized impact through longevity and consistency.

LESSONS LEARNED FOR THE IPEA

The IPEA has an opportunity to advance global and national efforts to translate evidence into policy for AMR. To maximize the outcomes from this opportunity, the IPEA needs to consider the rich lessons learned from parallel efforts to translate evidence into action within the AMR field. Recent AMR policy efforts have yielded incremental successes, but have been hampered by several cross-cutting and context-specific challenges – many of which are likely to impact the ultimate outcomes from the IPEA.

Across initiatives and contexts, several interviewees and authors highlighted the following key actions for effective AMR policy:

- Identify and close key data gaps and generate new, high-priority data from across LMIC and One Health contexts
- Engage and promote collaboration from stakeholders across One Health contexts, ensuring resources are equitably available to bring each sector to the table for evidence generation, problem identification, policy development, implementation, and outcomes monitoring

- Acknowledge and actively plan for the downstream components of the knowledge translation process, ensuring adequate resources and mechanisms are in place for policy implementation, monitoring, and evaluation
- Promote an incremental, practical, context-specific approach to policymaking for AMR, recognizing that disparate settings will have vastly different needs, priorities, and capacity to develop and implement AMR policies
- Build capacity in AMR knowledge translation processes, especially in settings where limited AMR awareness and infrastructure will preclude effective implementation of AMR policies
- Avoid duplication and waste of resources through coordination with existing actors, including, parallel knowledge translation initiatives, enabling more comprehensive, end-to-end execution and scale-up of knowledge translation processes

Antibiotics have been a pillar of modern medicine for nearly a century, yet the global community still has a lot to learn in terms of how to preserve their effectiveness across geographical and One Health contexts. There is ample evidence to show that infection and prevention control, WASH, vaccines, access to antibiotics, and R&D for new antimicrobials are efficacious interventions that can reduce the burden of AMR. We have isolated examples of how various initiatives have developed policies to safeguard the effectiveness of antimicrobials in distinct settings over the past 10-15 years, but we lack a comprehensive understanding of how to tailor and scale these models up and down to fit disparate global, national, and sub-national contexts, and how these models will work over time.

In light of this imperfect evidence base and in the face of a dramatically shifting funding environment for health, the IPEA has a responsibility to advance the field of AMR policy by digesting the lessons learned from prior efforts while attempting innovative approaches that respond to the stark, unprecedented realities of the current AMR policy ecosystem. Repeating the same missteps that have hampered previous AMR evidence to policy interfaces could be viewed as a squandering of desperately-needed resources for AMR activities. Nevertheless, funding for the IPEA should not be considered as a "zero sum game" (whereby resources earmarked for the IPEA potentially detract from alternative AMR programming), but ideally as a catalyst for crowding in new funding sources that direct resources towards the targeted, evidence-based AMR policies and programs that are proven to be effective. If successful, the IPEA can help to build upon and scale the select models that we know work, while shining a light on the many components of the AMR evidence and policy infrastructure that need additional development, enabling the systematic narrowing of evidence gaps and an accelerated uptake of evidence-based, context-specific AMR policies.