



Stakeholder engagement in One Health antimicrobial resistance approaches

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Summary

Antimicrobial resistance (AMR) is a complex, cross-sectoral global health threat. AMR, along with other health risks, transcends traditional sector boundaries – it emerges and spreads across humans, animals, food systems and the environment – necessitating collaboration between human health, animal health and environmental disciplines. Therefore, a successful One Health response to AMR depends on the active engagement and collaboration of all key stakeholders, and on the alignment of actions for preserving the effectiveness of antimicrobials and thus addressing human health and animal welfare, securing food systems, safeguarding trade and economies, and strengthening resilience to future pandemics. In a multiple stakeholder landscape, international organisations and global initiatives are essential for coordinating cross-country and cross-sector actions, fostering cooperation, and facilitating data sharing through open access platforms. Currently, funding for One Health initiatives remains insufficient, despite growing recognition of their importance. This funding gap hampers the development and implementation of effective, integrated AMR strategies. Funding One Health is necessary because siloed investments are inefficient and silos increase the risk of duplicating efforts. Coordinated funding allows for integrated surveillance, stewardship and innovation across sectors, providing better solutions and long-term sustainability. The maturation of One Health programmes depends on having common goals, structured agendas, stakeholder alignment and measurable incentives, which

drive meaningful and sustainable impact. Thus, cross-sector collaboration and stakeholder engagement should not be underestimated.

Keywords

Animal health – Antimicrobial resistance – Interdisciplinary – Intersectoral – One Health – Stakeholder engagement.

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Introduction

A One Health approach is critical in addressing health threats such as antimicrobial resistance (AMR), zoonotic diseases and environmental contamination that transcend the domains of different health sectors [1]. Human, animal and environmental health are deeply interdependent, such that failure to address risks in one domain – or to understand the link between risks in different domains and their underlying common drivers – can amplify vulnerabilities in the others. The use and misuse of antimicrobials in agriculture, veterinary practice and human medicine contribute to AMR in human and zoonotic pathogens. Resistant infections in livestock can threaten food security, while resistant pathogens in the environment can re-enter humans through water, soil and food, providing interconnected drivers and creating cross-sectoral impact of AMR.

By integrating animal health, public health and ecosystem science, a One Health approach enables more accurate risk assessment, targeted interventions and sustainable solutions to emerging global health threats. Mitigating AMR in only one sector is ineffective, as resistance in one domain will undermine progress in others. Thus,

addressing AMR effectively requires collaboration across multiple sectors and disciplines as well as the national, regional and global levels.

However, data from the Global Antimicrobial Resistance Research and Development Hub (Global AMR R&D Hub) show that funding for One Health initiatives is lagging far behind other health research areas such as cancer research, even though AMR is one of the leading underlying causes of cancer mortality [2]. International organisations and initiatives play a crucial role in the coordination of actions and stakeholders in the global fight against AMR, coordinating efforts across countries and sectors to address this complex challenge. This includes open access global platforms that allow everyone engaged in One Health AMR initiatives to interact and share data and best practices. A successful One Health response to AMR depends on the active engagement and collaboration of all these stakeholders and on the alignment of actions for preserving the effectiveness of antimicrobials and protecting global health [3].

This article highlights engagement strategies to foster collaboration among all stakeholders (and sector-specific global platforms) engaged in the AMR landscape, including the human and veterinary medicine sectors, agriculture, environmental and ecosystem sciences, industry, civil society, interdisciplinary research and development, and policy-making. It considers maturation of One Health programming, emphasising the critical role of structured agendas, stakeholder alignment and measurable incentives in driving impact.

Policy reflections

The challenge

Over the past decade, the One Health approach has gained increasing recognition as a critical framework for addressing complex health challenges at the human–animal–environment interface. However, despite high-level endorsement, operationalisation of One Health has been constrained by fragmented stakeholder landscapes, sector-specific agendas and financing, and a lack of coordinated strategy development [4].

The effective implementation of the One Health approach is hindered by structural, organisational and individual-level barriers. Structurally, siloed governance frameworks and funding mechanisms in the human, animal and environmental health sectors limit cross-sectoral coordination, impede joint priority-setting and constrain long-term, integrated planning. These systemic issues are reinforced by rigid institutional mandates

and sector-specific accountability structures that discourage collaboration and shared ownership of outcomes.

At the personal and organisational levels, additional barriers include limited awareness or understanding of the One Health concept, differing professional cultures and languages, and insufficient incentives for engagement beyond one's own sector. Competing priorities, lack of trust and communication gaps further challenge sustained interdisciplinary and cross-sector collaboration. Overcoming these multifaceted barriers requires deliberate efforts to establish inclusive governance models, flexible and pooled funding streams, joint cross-sector activities and capacity-building initiatives that foster mutual understanding and commitment among stakeholders. Joint priority-setting through wide engagement and consultation is a key step towards bridging those barriers to cooperation and developing a common language and understanding.

Mapping the landscape of global One Health initiatives and platforms

When engaging stakeholders across the One Health spectrum, it is essential to identify the main global actors that bring together key stakeholders by sector. A number of prominent stakeholders and platforms¹ are actively involved in addressing AMR through policy development, research, surveillance, advocacy and capacity building, among other areas. Their collaborative efforts reflect a unified global response to the complex and interconnected challenges of AMR.

These platforms can serve as strategic entry points and catalysts for engagement across various formats. Leveraging existing structures offers opportunities to integrate broader One Health perspectives, including animal, environmental and food system components.

This section presents an overview of the primary international platforms and initiatives that provide opportunities for engagement across different communities addressing the AMR challenge. This is a non-exhaustive selection recognising that there are many other

1. Platforms include the World Health Organization's Global Antimicrobial Resistance and Use Surveillance System (<https://www.who.int/initiatives/glass>), the World Organisation for Animal Health's ANIMUSE Global Database (<https://amu.woah.org/amu-system-portal/home>) and the InFARM System of the Food and Agriculture Organization of the United Nations (<https://www.fao.org/antimicrobial-resistance/resources/infarm-system/en>).

initiatives operating at local, national and regional level, including civil society, student groups, patient groups and AMR survivor groups, particularly in low- and middle-income settings.

For example, in Southeast Asia, stakeholder engagement is anchored in the ASEAN Strategic Framework on AMR [5], bringing together the health, agriculture and environmental sectors. Governments, clinicians, veterinarians and civil society collaborate through national AMR plans, while partners like the Fleming Fund strengthen laboratories and data systems. In Africa, stakeholder engagement is driven by the Africa Centres for Disease Control and Prevention AMR framework [6] and the Antimicrobial Resistance Surveillance Network, with ministries of health, veterinary authorities, laboratories and civil society working with partners like the African Society for Laboratory Medicine and the Fleming Fund to build a continent-wide One Health surveillance and response system.

International platforms that bring stakeholders together in different sectors include:

Policy

- The AMR Multi-Stakeholder Partnership Platform was established and facilitated by the Quadripartite Joint Secretariat on AMR, consisting of the Food and Agriculture Organization of the United Nations (FAO), the United Nations Environment Programme, the World Health Organization (WHO) and the World Organisation for Animal Health. It aims to catalyse a global movement for action against AMR by fostering cooperation among a diverse range of stakeholders at all levels across all One Health domains [7]. The Quadripartite also provides support for other international initiatives, such as the Global Leaders Group on Antimicrobial Resistance. This group comprises world leaders and experts and aims to accelerate political action on AMR by providing independent global advocacy for maintaining the prominence of AMR on the agendas of high-level international health and development meetings of the General Assembly of the United Nations [8].
- The Global AMR R&D Hub is a partnership of countries, non-governmental donor organisations and intergovernmental organisations formed to address challenges and improve coordination and collaboration in global AMR research and development using a One Health approach [9].
- The European Joint Action on Antimicrobial Resistance and Healthcare-Associated Infections 2 (EU-JAMRAI 2) aims at supporting the 30 European Union Member States and associated countries in their efforts to develop and update their national

action plans on AMR. The priorities of JAMRAI are to strengthen coordination between Member States and associated countries, strengthen the responsiveness of health systems, ensure access to critical antibiotics and diagnostic devices, and protect citizens from exposure to antimicrobial-resistant bacteria [10].

Research funding mechanisms

- The European Partnership on Animal Health and Welfare generates key knowledge and develops innovative methodologies, tools and products to promote sustainability in livestock production, for both terrestrial and aquatic animals. It supports the development of an animal-friendly livestock sector and reduce the risk of animal infections, both endemic and emerging [11].
- The European Partnership on One Health AMR (EUP OHAMR) aims to coordinate and align activities and research funding between over 30 countries and the European Commission [12]. It will also facilitate national coherence between different services and ministries with responsibility for the various aspects of AMR (e.g. human health, agriculture, environment, industry, finances). Its main goal is to contribute to achieving the objectives of the European One Health Action Plan against AMR and WHO's Global Action Plan on AMR by reducing the threat of AMR [13,14]. The new partnership builds on the work of the Joint Programming Initiative on AMR (JPIAMR), which, by engaging 29 nations and the European Commission, coordinates national research funding and supports collaborative action for filling knowledge gaps on AMR with a One Health perspective. The JPIAMR Strategic Research and Innovation Agenda (SRIA) was a pioneering international effort to outline shared key areas to be addressed and provided guidance for countries to align their AMR research agendas nationally and internationally with the EUP OHAMR SRIA [15].
- The Combating Antibiotic-Resistant Bacteria Biopharmaceutical Accelerator (CARB-X) is a global consortium of governments and foundations accelerating antibacterial products to address drug-resistant bacteria. The CARB-X portfolio supports the early development pipeline of new antibiotics, preventatives, rapid diagnostics and other products [16].
- International private donors with a more central approach into human health, such as the Wellcome Trust, the Gates Foundation and the Novo Nordisk Foundation, are also relevant, as are the international funding initiatives the Global Antibiotic Research and Development Partnership, the Foundation for Innovative New Diagnostics, the Fleming Fund and the AMR Action Fund.

Civil society

- The European Public Health Alliance (EPHA) has established an AMR Stakeholder Network at European level. The AMR Stakeholder Network brings together more than 60 organisations and individuals, including patient groups, health professional organisations, non-governmental organisations for public health, veterinarians and others, at national, regional and European levels, covering all dimensions of the One Health approach: human health, animal health and environmental factors [17].
- Action on Antibiotic Resistance, known as ReAct, and the International Centre for Antimicrobial Resistance Solutions are other important international organisations that focus on access to antibiotics and the response to AMR in low- and middle-income countries by facilitating uptake of research results and solutions in different socio-economic settings [18,19].
- Access to Medicine Foundation, World Farmers' Organisation and World Alliance Against Antibiotic Resistance are examples of diverse groups and associations that also work at international level to mitigate the threat of AMR. They share a common goal: to reduce drug-resistant infections and secure equitable access to effective medicines, each contributing complementary perspectives from the health, agriculture and private sectors.

Industry

- Pharmaceutical, diagnostic and biotech companies with interest in antimicrobials and infectious diseases are organised in industrial associations, which serve as an efficient interface with other AMR stakeholders. Relevant actors in the human health field include the Biotechnology Innovation Organization, the BEAM Alliance [20], which gathers biotech companies from Europe innovating in AMR, the International Federation of Pharmaceutical Manufacturers and Associations, and the Advanced Medical Technology Association, as well as the AMR Action Fund, which includes both industry partners and philanthropic contributors. HealthforAnimals, the global animal health association, is a relevant stakeholder in the animal sector.
- Engaging directly with the scientific community and researchers is also critical to implement evidence-based strategies and interventions.

Strategies and solutions

National-level One Health programming has often originated from human-centric AMR action plans, later expanded to include animal and environmental components. The

integration of these sectoral plans into comprehensive One Health national action plans underscores the need for multi-agency coordination, broad stakeholder consultation and a clear roadmap for implementation. When designed inclusively, these processes not only align strategic objectives but also drive joint programming and shared accountability.

At the international level, institutions such as WHO and the World Organisation for Animal Health have traditionally pursued parallel agendas in human and animal health. Only recently have they begun to align under a joint One Health agenda, including the harmonisation of critical issues like antimicrobial use, which requires coordinated prioritisation and risk assessment across sectors.

One example of a global coordinated One Health initiative is the One Health Priority Research Agenda for Antimicrobial Resistance [21], which is a globally coordinated research framework developed by the Quadripartite. This agenda responds to the urgent need for evidence-based, integrated, cross-sectoral approaches to tackle the growing threat of AMR, which is recognised as a critical challenge to human, animal, plant and environmental health, as well as to global health security and sustainable development.

Recognising the inherently transdisciplinary and multisectoral nature of AMR emergence and spread, the agenda applies a One Health approach that acknowledges the biological, ecological and socio-economic interdependence of human, animal and environmental systems. The research priorities identified in the agenda are grounded in a rigorous, mixed-methods process, which included systematic reviews of academic and grey literature, a global open-call stakeholder survey, and a modified Delphi consensus process involving 89 international experts across multiple disciplines and regions.

Through this evidence-informed, participatory process, five thematic pillars were identified as key domains requiring targeted research investment and coordination:

- 1) transmission dynamics across the human–animal–environment interface;
- 2) integrated surveillance systems for AMR and antimicrobial use across sectors;
- 3) interventions to prevent, control and mitigate AMR through actionable, scalable strategies;
- 4) behavioural insights and change, focusing on the sociocultural and structural determinants of antimicrobial use and resistance;
- 5) economics and policy, including governance, regulation, cost-effectiveness and sustainable financing mechanisms.

A cross-cutting equity lens was applied throughout the process, emphasising gender, vulnerability and sustainability to ensure that research outcomes are contextually relevant and socially inclusive.

This agenda serves as a strategic guide for research funders, policy-makers and scientific communities by promoting evidence generation, capacity building and multisectoral collaboration. Its implementation aims to support the development and refinement of AMR national action plans and to contribute to achieving sustainable, integrated and context-responsive One Health solutions.

Key enablers of the One Health approach include fit-for-purpose governance and financing structures, systematic communication and collaboration across sectors, and clearly defined roles and responsibilities. This would include dedicated funding mechanisms, resource sharing and the use of cross-sectoral platforms that are essential for breaking down institutional silos and enabling sustained, coordinated implementation. In addition, it should be recognised that not all actors need to be involved in every process to ensure meaningful progress.

Moving from strategic agendas to joint programming of research and innovation funding programmes and national research programmes is a critical step for enabling One Health projects, as it is largely dependent on the mandate and organisation of national funding streams to the different One Health sectors.

JPIAMR, when it started ten years ago, was dominated by funding agencies focusing more on human health than One Health, but through strategic support from the European Commission and the inclusion of funding agencies with broader scope it has progressively moved towards funding a wide range of One Health projects. These joint projects have had a profound effect on the understanding of the value of trans- and cross-disciplinary collaborations in addressing One Health AMR challenges. These include studies on AMR in wastewater and hospital effluents (AWARE-WWTP, STRESST), pathogen transmission across humans, animals and the environment (ST131TS, KleNET), surveillance in low- and middle-income countries (ALARUM, OASIS) and resistance in aquatic ecosystems and wildlife (BALTIC-AMR). Collectively, these projects highlight the value of cross-sector collaboration in tackling AMR. It has brought scientists and experts from different scientific fields together and created a common perception and language around the problems faced. Development of awareness and a common language has proven key in advancing integrated approaches to tackle AMR challenges, and it is for this reason that stakeholder engagement is indispensable,

...serving as an example of how international initiatives provide a platform for collaboration across sectors.

In parallel, national action plans and national research agendas have evolved from a narrow human focus to include animal and environmental health. This trend should be strengthened through broad stakeholder consultations that drive One Health joint programming and actions by connecting the present silos.

Clear and visible incentives and ‘gains’ from a One Health approach are needed to motivate stakeholders in continuing or starting collaboration and joint activities.

Discussion

Coordinated governance structures at regional, national and global level as well as inclusive platforms in support of a One Health approach are needed to bring together veterinary, medical, environmental and agricultural stakeholders, alongside private sector actors, to jointly define priorities and share responsibilities. Partnering with the private sector (e.g. through associations), including farmers, veterinary pharmaceutical companies, food producers and supply chain actors, is critical to ensure that solutions are practical, scalable and aligned with market realities. Tools such as research matrices can support alignment across sectors by identifying common goals and monitoring progress. Research programming must provide concrete opportunities for collaboration, supported by funding mechanisms that promote joint innovation and implementation. National integrated approaches and interministerial governance structures driven in, for example, the United Kingdom and France provide a setting for developing common understanding and joint action. The Danish Integrated Antimicrobial Resistance Monitoring and Research Programme – known as DANMAP – is an example of such an approach, with integrated surveillance of AMR in humans and animals providing evidence for policy and helping preserve consumer confidence in agricultural products. Demonstrating clear benefits such as improved herd health, production efficiency, market competitiveness and public trust will be key to sustaining engagement for better health outcomes and long-term resilience in the agricultural economy.

Conclusions

From the perspective of the animal health sector, effective stakeholder engagement in the One Health approach is essential not only for safeguarding animal and public health but also for enabling sustainable economic growth in agriculture. One Health enablers and common goals need to be identified, such as multisectoral research, governance

structures and collaboration mechanisms, and joint capacity building and joint One Health training and skills development need to be in place to support this. A One Health strategy bridging the silos by engaging established platforms is thus crucial in addressing both existing and future global health threats related to the multiple and complex AMR challenges.

An effective One Health AMR response should, therefore, integrate efforts from all sectors and disciplines involved. Global coordination is essential. International bodies play a pivotal role in harmonising efforts and providing platforms for shared learning and action through engagement of multiple stakeholders. Strategic planning and incentives matter. Clear agendas, aligned actions and tangible incentives are necessary to maintain engagement and track progress.

Investment must be aligned with priorities as there is a critical need to increase funding for One Health initiatives to ensure impactful holistic solutions. While the European Commission and national funding agencies from 29 countries in JPIAMR have supported 186 projects and networks in 84 countries in calls between 2014 and 2024, its investment of € 181.5 million [22] is modest compared to the cost of the overall comprehensive One Health response needed to address the global challenge of AMR.

In sum, tackling AMR through a One Health lens offers the best chance for sustainable, global impact – provided that stakeholders from all sectors are aligned, engaged, financially well-supported and coordinated.

Mobilisation des parties prenantes dans les approches « Une seule santé » en matière de résistance aux antimicrobiens

L. Marin, T. Jorgensen & P. Fagerstedt

Résumé

La résistance aux antimicrobiens (RAM) constitue une menace sanitaire mondiale complexe et intersectorielle. En effet, comme d'autres risques sanitaires, la RAM ignore les frontières sectorielles traditionnelles : elle émerge et se propage aussi bien chez les humains que chez les animaux, dans les systèmes alimentaires et dans l'environnement, ce qui impose une collaboration interdisciplinaire faisant intervenir la santé humaine, la santé animale et l'environnement. Par conséquent, la réussite d'une réponse « Une seule santé » contre la RAM repose sur la mobilisation et la collaboration actives de l'ensemble des parties prenantes clés, ainsi que sur un alignement des mesures visant à préserver l'efficacité des antimicrobiens pour une meilleure protection de la santé humaine et du bien-être animal, une sécurisation des systèmes alimentaires, la sauvegarde du commerce et de l'économie et le renforcement de la résilience face à de futures pandémies. Dans un contexte caractérisé par la multiplicité des parties prenantes, les organisations internationales et les initiatives mondiales jouent un rôle essentiel pour coordonner les actions transnationales et intersectorielles, promouvoir la coopération et faciliter le partage des données via des plateformes en libre accès. Le financement des initiatives « Une seule santé » reste actuellement insuffisant malgré la reconnaissance croissante de leur importance. Ce déficit entrave l'élaboration et la mise en œuvre de stratégies efficaces et intégrées contre la RAM. Le financement « Une seule santé » est d'autant plus indispensable que les investissements cloisonnés se sont révélés inefficaces et augmentent le risque de duplication des efforts. Des mécanismes de financement coordonnés permettent une surveillance et une gestion intégrées des antimicrobiens ainsi qu'une innovation concertée entre secteurs, avec de bien meilleurs résultats en termes de solutions et de durabilité. Les programmes « Une seule santé » parviennent à maturité grâce à la définition d'objectifs communs, de plans de travail structurés sur lesquels l'ensemble des parties prenantes peuvent s'aligner, et d'incitations mesurables avec des effets de levier durables et significatifs. Il convient donc de ne pas sous-estimer la collaboration intersectorielle et la mobilisation des parties prenantes.

Mots-clés

Interdisciplinaire – Intersectoriel – Mobilisation des parties prenantes – Résistance aux antimicrobiens – Santé animale – Une seule santé.

Participación de las partes interesadas en los métodos de resistencia a los antimicrobianos dentro del enfoque «Una sola salud»

L. Marin, T. Jorgensen & P. Fagerstedt

Resumen

La resistencia a los antimicrobianos (RAM) es una amenaza sanitaria mundial compleja e intersectorial. La RAM, junto con otros riesgos sanitarios, trasciende las fronteras sectoriales tradicionales: emerge y se propaga entre humanos, animales, sistemas alimentarios y el medio ambiente, para lo cual se requiere la colaboración entre las disciplinas de salud humana, sanidad animal y medio ambiente. Una respuesta satisfactoria del enfoque «Una sola salud» ante la RAM depende, por consiguiente, de la participación activa y la colaboración de todas las partes interesadas clave, así como de la aplicación de acciones adaptadas para preservar la eficacia de los antimicrobianos y, por lo tanto, abordar la salud humana y el bienestar animal; asegurar los sistemas alimentarios; proteger el comercio y las economías, y fortalecer la resiliencia ante futuras pandemias. En un contexto de múltiples partes interesadas, las organizaciones internacionales y las iniciativas mundiales son esenciales para coordinar acciones transnacionales e intersectoriales, promover la cooperación y facilitar el intercambio de datos a través de plataformas de acceso abierto. La financiación para las iniciativas de «Una sola salud» sigue siendo insuficiente en la actualidad, a pesar de que su importancia se reconoce cada vez más. Esta brecha de financiación perjudica el desarrollo y la implementación de estrategias eficaces e integradas contra la RAM. La financiación de «Una sola salud» es necesaria, ya que las inversiones aisladas son ineficaces y aumentan el riesgo de duplicar esfuerzos. La financiación coordinada permite la vigilancia, gestión e innovación integradas en todos los sectores, lo que proporciona mejores soluciones y sostenibilidad a largo plazo. La optimización de los programas de «Una sola salud» depende de la existencia de objetivos comunes, agendas estructuradas, adaptación de las partes interesadas e incentivos cuantificables que promuevan un impacto significativo y sostenible. Por lo tanto, no se deben subestimar ni la colaboración intersectorial ni la participación de las partes interesadas.

Palabras clave

Interdisciplinario – Intersectorial – Participación de las partes interesadas – Resistencia a los antimicrobianos – Sanidad animal – Una sola salud.

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