One Health Priority Research Agenda for AMR

Top 10 Overall Priority Research Areas across pillars

These 10 research areas represent the highest-ranked areas from the five pillars of the agenda and can be considered the most important, having the greatest potential for strengthening research capacity and being the most actionable, inclusive and impactful in the field of One Health AMR. They require contextualization at the regional and country level and the development of specific research questions relevant to the needs of different countries and One Health settings.

1. Transmission
   - To what extent do various IPC practices in One Health settings impact the development and circulation of AMR in One Health sectors?
   - What impacts the transmission of resistant microorganisms between humans, animals, plants and the environment, with a focus on conditions relevant to LMICs?

2. Integrated surveillance
   - What are the optimum strategies and minimum standards (and resources) for adequate laboratory and human resource capacity to establish and maintain quality integrated AMR surveillance systems at scale?
   - How can existing AMR and AMU surveillance data from humans, animals, plants and the environment be meaningfully triangulated and/or integrated to allow early identification of the development, escalation or circulation of resistance across One Health sectors?

3. Interventions
   - How can One Health interventions that have proven impactful for AMR control and mitigation most effectively be translated and scaled up in different contexts or differently resourced settings?
   - What challenges exist to the systematic collection and analysis of data for risk assessment and intervention impact assessment (epidemiological, economic, social) in LMICs?

4. Behavioural insights and change
   - How can structural challenges and barriers to behaviours related to AMR be identified, characterized and assessed in different sociocultural contexts?
   - What strategies can be used to adapt effective behavioural interventions (e.g. immunization) from one context to another (e.g. Africa to Asia / rural to urban / human prescribers to veterinarians)?

5. Economics and policy
   - What would a One Health AMR socioeconomic impact assessment based on accurate and cost-effectively collected data (e.g. harmonized methodology and indicators) in low-resource settings optimally look like?
   - How can governments identify, prioritize and institutionalize the most relevant cross-cutting, sector-specific AMR policy options and regulatory frameworks, and financing strategies to sustainably tackle AMR across One Health sectors, given their different implementation challenges?
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Transmission

**The Priority Research Areas on Transmission** focus on generating evidence of dynamics and drivers of AMR. These areas also aim to elucidate knowledge on where interventions may be best targeted to curb the transmission of AMR and to reduce the spread of resistant microbes, particularly in the shared environment.

**Methodology development**

- What are the low cost, high quality, high reliability methodologies that can be used to identify and quantify sources and drivers, development, and circulation of AMR between One Health sectors?
- What are the highest quality, lowest cost, and most reliable methods and (meta) data for describing and predicting AMR transmission across One Health interfaces that could help inform policy?

**Operational research**

- To what extent do various infection prevention and control practices in One Health settings impact the development and circulation of AMR in One Health Sectors?
- How does AMR transmission (i.e., drivers, pathways, impact) across One Health sectors in HICs differ from LICs/LMICs?
- What are the relative impacts of different wastewater treatment solutions on the development and circulation of AMR among One Health sectors?
- How can the absence or poor management of critical water sanitation and hygiene infrastructure for human/animal/plant contribute to the circulation of AMR?
- How does AMR circulation across One Health Sectors vary in the case of resistance to different critically important antimicrobials?

**Dynamics & drivers**

- What impacts the transmission of resistant microorganisms between humans, animals, plants, and the environment, with a focus on conditions relevant to LIC/LMICs?
- To what extent are human and animal effluents and solid wastes, and their management and treatment, from humans (including healthcare facilities and community settings) and from agri-food systems (including consumers) contributing to the development and circulation of AMR across One Health, in different geographical settings?
- What are the most important AMR transmission pathways at the One Health interfaces in different settings including LIC/LMIC settings?
- What is the contribution of aquaculture to circulation of AMR in the One Health ecosystem by different types of aquatic farming techniques/systems?
- In different geographical settings, what economic factors affect AMU and AMR transmission between One Health sectors?
- To what extent are effluents and solid waste from pharmaceutical and other industrial production sites contributing to the circulation of AMR across One Health in different geographical settings?
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Integrated Surveillance

The Priority Research Areas on Integrated Surveillance focus on cross-sector surveillance to improve common technical understanding to generate and exchange information about AMR/AMU between One Health sectors.

Methodology development

What are the optimum strategies and minimum standards (and resources) for adequate laboratory and human resource capacity to establish and maintain quality integrated AMR surveillance systems at scale?

Which targets, methods and data-reporting formats most comprehensively characterize the risks of evolution and circulation of AMR across One Health sectors?

How can existing AMR and AMU surveillance data from humans, animals, plants and the environment be meaningfully triangulated and/or integrated to allow early identification of the development, escalation or circulation of resistance across One Health?

How can priorities for implementation of One Health integrated AMR/AMU surveillance components be identified and set and thereby address a current research gap?

What is the minimum feasible, representative and meaningful AMR/AMU monitoring/surveillance criteria and indicators package that can improve AMR/AMU monitoring across One Health in LMIC?

How can AMR hot spots be proactively identified and mitigated using a One Health approach?

What are the highest-quality, lowest-cost and most reliable approaches for sharing integrated AMR/AMU surveillance data in a standardized format for different resource settings and the international community?

What are the priority opportunities for environmentally and financially sustainable innovation in integrated surveillance based on existing and emerging technology?

Operational research

How can the limited availability of data from integrated, multisectoral AMR surveillance programmes be addressed in LMIC?

How can the results of integrated One Health AMR/AMU surveillance be used in practice by countries/regions?

Evaluation

What are the best approaches to monitor and evaluate integrated One Health surveillance frameworks for AMR/AMU in different LMICs?
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Interventions

The Priority Research Areas on Interventions focus on programmes, practices, tools and activities designed to prevent, contain or reduce the incidence, prevalence and circulation of AMR, including the evaluation of their respective impact.

Methodology development

How can research capacity in LMICs be strengthened to catalyse locally tailored collaboration and cooperation between One Health-related sectors?

What priority tools and frameworks can assist tailoring of One Health interventions for national AMR action plans?

What criteria should be used to assess interventions that aim to prevent and control AMR at the One Health interface?

Operational research

How can One Health interventions that have proven impactful for AMR control and mitigation most effectively be translated and scaled up in different contexts or differently resourced settings?

How can existing health and food production systems be effectively integrated and enhance One Health AMR interventions?

What are the minimal resource interventions required for supporting national integrated, multisectoral One Health AMR/AMU surveillance systems?

Evaluation

What challenges exist to the systematic collection and analysis of data for risk assessment and intervention impact assessment (epidemiological, economic, social) in LMICs?

What have been the most impactful interventions to prevent, control and mitigate AMR at the One Health interface?

What has been the relative impact on AMR occurrence of: IPC, farm biosecurity, food safety, WASH and integrated pest management measures?

What has been the impact on AMR across One Health sectors of nationwide interventions (e.g. vaccination, creation of/improvements to sewerage systems, legislation, education)?

Framework conditions

How can we improve early adaptation and innovation for the prevention, control and mitigation of AMR across human health, animal health, plant health and the environment in LMICs?

How could implementation research be systematically incorporated into the design of appropriate One Health interventions for AMR in LMICs?

What mix of evidence and evaluation is needed to understand how to implement One Health AMR solutions most effectively in LMICs?

How could research capacity in LMICs be strengthened to catalyse locally tailored collaboration and cooperation between One Health-related sectors?

What priority tools and frameworks can assist tailoring of One Health interventions for national AMR action plans?

What criteria should be used to assess interventions that aim to prevent and control AMR at the One Health interface?
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## Behavioural Insights and Change

The Priority Research Areas on Behavioural Insights and Change focus on human behaviour that affects AMR on the One Health interface. They include understanding influences on human behaviour in varying contexts, such as social influences that support AMU in human, animal and plant sectors; livelihoods; and financial resources.

### Methodology development

- How can **structural challenges and barriers** to behaviours related to AMR be identified, characterized and assessed in different sociocultural contexts?

- What is the role of **communication strategies** in promoting One Health AMR risk-reductive behaviours, and how can this role be leveraged?

- What social/behavioural/economic strategies are most relevant for addressing One Health approaches to AMR?

### Operational research

- What strategies can be used to adapt effective behavioural interventions (e.g. immunization) from one context to another (e.g. Africa to Asia / rural to urban / human prescribers to vets)?

- What behaviours and practices of antimicrobial product manufacturers, wholesalers and retailers create/drive development of AMR at the One Health interface, and how can these be changed to support prevention, control and mitigation of AMR?

- Which **actors and which of their behaviours** are believed to contribute most to AMR prevention, control and response across One Health sectors?

- What methods and tools are needed to translate gender and vulnerable group considerations into inclusive behaviours related to AMR across One Health sectors?

### Dynamics and drivers

- How can **information design sciences** (presenting information in an accessible and understandable way) be leveraged to improve effective understanding of the information across different stakeholders in the One Health AMR field?

- Which strategies can improve community ownership and build consensus for AMR interventions directed at rationalizing the use of antimicrobials across sectors?

- What are the barriers or drivers to translating behavioural insights and change findings into policy and implementation in different settings?

- What are the drivers of human exposure to AMR in diverse workplaces, communities and occupations across One Health sectors from a behavioural insights and change point of view?

### Evaluation

- What role do people’s **attitudes and understanding of health and well-being** (for humans, animals, plants and the environment) play in influencing their attitudes and behaviour with respect to AMU and AMR?

- What is the impact of incentives and disincentives (financial and nonfinancial) on AMR-relevant behaviour change across sectors and in different settings (e.g. diverse geographical contexts)?

- What lessons can we learn from COVID-19 regarding behaviour change that can be adapted for the One Health approach to AMR?
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Economics and Policy

The Priority Research Areas on Economics and Policy focus on investment and action in AMR prevention and control from a One Health perspective. They include policy, governance, legislative and regulatory instruments; cross-sector processes and strategies affecting AMR and also cost effectiveness and financial sustainability.

What would a One Health AMR socioeconomic impact assessment based on accurate and cost-effectively collected data (e.g. harmonized methodology and indicators) in low-resource settings optimally look like?

How can governments identify, prioritize and institutionalize the most relevant cross-cutting, sector-specific AMR policy options and regulatory frameworks, and financing strategies to sustainably tackle AMR across One Health sectors, given their different implementation challenges?

Which innovative (either new or adapted) methods that lead to actions are needed for the evaluation of AMR prevention and control across One Health sectors in LMICs, with a focus on low-cost, high-quality, high reliability policy relevance?

What is the optimal financial resource strategy that will sustain support for One Health AMR interventions?

What would a harmonized conceptual framework, method and key indicators that systematically include equity considerations in One Health AMR policies optimally look like?

How can operational and/or implementation research systematically capture learning from AMR NAP implementation practice and serve as the basis for improvement at the country, regional and global level (for instance identification and development of impactful policies and legislation)?

How can appropriate and acceptable AMU or AMR reduction indicators or targets for national governments or sectors be developed, reached and reported?

What impacts can national and subnational policies have on AMR prevention, control and response across One Health sectors, and how should they be measured?

What lessons and synergies for AMR reduction can be learnt and leveraged from other policy initiatives (e.g. climate change, fisheries management) to tackle collective action problems?

How should governments incentivize and drive material and immaterial innovation into solutions to AMR in areas where the profit motive is currently insufficient?