

One Health antimicrobial resistance surveillance roundtable

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Abstract

Antimicrobial resistance (AMR) is a global threat to health, food security and economies across the world. To strengthen UK surveillance efforts, the Microbiology Society and the Pathogen Surveillance in Agriculture, Food and Environment Programme (PATH-SAFE) convened a One Health AMR Surveillance Roundtable in December 2024, bringing together 16 government agencies from the human, animal, plant, environmental and food sectors across the UK central government and devolved nations. The workshop identified key questions for a UK-focused national One Health AMR surveillance system and explored opportunities and challenges for implementation. Key challenges include fragmented data with limited sharing and underutilized microbiological samples. Participants called for greater cross-sector collaboration, a shared AMR vocabulary, sustained investment and the development of a national AMR data catalogue. Coordinated One Health surveillance, backed by political commitment, is essential to tackle AMR effectively.

INTRODUCTION

Antimicrobial resistance (AMR) is an existential threat to public health, healthcare systems, food security and economies across the world. A recent report estimates that bacterial AMR will cause 39 million deaths between 2025 and 2050, equivalent to three deaths every minute [1]. AMR undermines our ability to effectively treat infections and perform essential medical procedures, while also threatening agriculture and food security. Robust, integrated surveillance across human, animal, environmental and food systems is critical for detecting resistance early, tracking its spread between and across systems, and guiding effective, evidence-based interventions through a coordinated One Health approach.

Recognizing the urgent need to strengthen AMR surveillance and make use of the data gathered to inform interventions in the UK, the Microbiology Society, in collaboration with the cross-agency PATH-SAFE (Pathogen Surveillance in Agriculture, Food and the Environment) programme, convened a cross-sector workshop as part of the Knocking Out AMR initiative [2]. Held on Monday, 2 December 2024, at the Microbiology Society in London, this One Health AMR Surveillance Roundtable brought together representatives from 16 UK government departments and agencies, including devolved administrations, spanning human, animal, plant, environmental and food health sectors.

The primary objective of the workshop was to define the critical questions that a One Health AMR surveillance system should address and to explore opportunities for implementing such a system across sectors. The timing of the meeting coincided with the final period of the PATH-SAFE programme, a successful 4-year, cross-government, and UK-wide programme that piloted the development of a national surveillance network, using the latest DNA-sequencing technology and environmental sampling, to improve the detection and tracking of foodborne human pathogens and associated AMR throughout the whole agri-food system from farm-to-fork [3].

ROUNDTABLE STRUCTURE

The morning session focused on recent developments in AMR surveillance methodologies and approaches. Presentations from the Animal Plant Health Agency, the Veterinary Medicines Directorate, the Environment Agency, the Centre for Environment, Fisheries

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Abbreviations: AMR, antimicrobial resistance; DARC, Defra's AMR Coordination; Defra, Department for Environment, Food & Rural Affairs; NAP, national action plan; OHIS, One Health integrated surveillance; PATH-SAFE, Pathogen Surveillance in Agriculture, Food and the Environment.
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and Aquaculture Science, the UK Health Security Agency, the Food Standards Agency and the Department for Environment, Food and Rural Affairs covered sector-specific perspectives, including animal, environmental, plant, food and human surveillance systems. These presentations laid the foundation for a facilitated discussion aimed at identifying the essential questions and their importance for a One Health AMR surveillance system in the UK.

The afternoon session shifted focus to the practicalities of implementation. Participants examined both existing and emerging opportunities for the UK government to support and coordinate a sector-wide One Health AMR surveillance programme. This was followed by a summary discussion reflecting on the key insights from the day.

ROUNDTABLE SUMMARY

The roundtable built on previous work performed by the One Health Integrated Surveillance (OHIS) subgroup of the Department for Environment, Food & Rural Affairs (Defra)'s AMR Coordination (DARC) group, which conducted a comprehensive gap analysis of AMR surveillance across sectors and all four nations of the UK. While some of these gaps have subsequently been addressed, for example, through PATH-SAFE, major cross-cutting issues remain unresolved. Roundtable participants recognized that an integrated One Health surveillance system requires effective collaboration and data sharing between and among different agencies, as well as discrete planning. Monitoring and mitigating AMR is complex, and each agency collects data for its own specific purposes. The current AMR landscape is fragmented, with academics, industry, healthcare professionals, regulators and policymakers acting in relative isolation, and with different geographic units (across the UK as a whole and within individual nations), each having different immediate priorities. In addition, data relating to human or animal health, or food and environmental data, carry their own sensitivities, leading to concerns about data sharing between agencies. This complex picture inevitably produces a convoluted data landscape, preventing the full realization of the data's potential for One Health purposes.

Scope exists to improve the efficiency of data collection by conducting additional testing on samples that are already collected for statutory purposes. For example, in the UK, there is a statutory food safety requirement to regularly monitor bivalve shellfish in primary production for *Escherichia coli* to provide an indication of the sanitary quality of growing areas, after which samples are discarded. This practice overlooks a valuable opportunity to test the same samples for AMR, providing valuable additional insights at minimal additional costs [4].

A consistent theme among participants was the recognition that a substantial volume of AMR data is already collected, but that there are significant challenges in maximizing the value of this existing information in timely and effective ways. There should be more focus on information sharing alongside data sharing, enabling all end users to have sufficient context to understand how best to use data and interpret sectoral data.

There was strong consensus that ambitious sharing of, or between, existing data sets would require major investment and that realistic proposals in the immediate term would be needed to identify practical ways of sharing information. Information sharing needs to be embedded and underpinned by formal and informal relationship building across departments. There also needs to be a willingness to share data, and whilst cross-agency collaboration has recently happened through PATH-SAFE, the termination of this programme highlights the need to create sustainable systems for data sharing that can function effectively in the long term. Ideally, this would be supported by a dedicated and sustained funding source to ensure continuity and capacity for ongoing collaboration.

There is an urgent need for an AMR data catalogue to provide readily discoverable information about what data exist; their quality, ownership and accessibility; and how they interconnect. The National Biosurveillance Network has developed a prototype of such a catalogue, which could be used as the basis for further developments.

The overarching governance of any data-sharing initiatives is essential to ensure effectiveness, minimizing the risk of duplication, maximizing the accessibility and usefulness of information generated in different ways by different agencies for different purposes, and ensuring that the data remain safeguarded and are used responsibly. As part of this governance, surveillance projects should have sharing and communication mechanisms built into their design from the start. The re-formed AMR national action plan (NAP) Strategic Board and Delivery Board, along with the forthcoming Surveillance Group, were identified as an appropriate forum(s) to further discuss and develop AMR One Health surveillance actions.

Notwithstanding the potential benefits to be gained from enhanced sharing of existing data, clear gaps and deficiencies were identified, including the following:

- The need for greater genomic data to achieve a better mechanistic understanding of AMR development and transmission across the different sectors: plants, animals, humans and the environment.
- Improved understanding of the drivers of drug resistance, with an identified need to think more broadly in terms of appropriate metrics in clinical settings, both human and animal.
- A more complete picture of AMR in food, encompassing domestic and farm animals, imported food and plant agriculture, with recognition that clearer agreement is needed on what should be prioritized.
- More representative data on AMR in fungi and antifungal use.

- AMR in animals, prioritized as follows:
 - Veterinary pathogens for clinical surveillance.
 - Companion animals and under-surveyed food-producing species.
 - Wildlife, including predators and game birds, which feeds into farm and companion animals.
- Prevalence of AMR in water, prioritized as follows:
 - Wastewater, which could be used to estimate the overall prevalence of carriage/disease of AMR in the human gut.
 - Drinking water, especially private water supplies.
 - The wider aquatic environment, including rivers, lakes and coastal waters, which can serve as reservoirs and transmission routes for AMR.
- The impact of flooding, sewage leaks and, more widely, climate change on the spread of AMR.

Success in plugging gaps and optimizing the use of existing data depends on cross-departmental collaboration, which in turn depends on high-level commitment across government, including appropriate staffing and resourcing. Securing this support will rely on effective communication about the main effects of AMR, its causes and how they can be reduced, mitigated and, in some cases, prevented. Given the need for a One Health approach to tackle the crisis, a common vocabulary associated with AMR should be developed, drawing on parallels with other global challenges and health concerns. In promoting collaborative efforts across government, it is important to share expertise as well as data. For example, PATH-SAFE encountered a language barrier stemming from differing ontologies used by human and environmental microbiologists, which could be bridged by each group having access to the right people from the other.

CONCLUSION

In the battle against AMR, effective surveillance is essential to determine effective interventions that can minimize AMR development and transmission between and across sectors. Given the scale and complexity of the challenge, especially when looked at from a comprehensive One Health perspective, AMR surveillance produces large amounts of data – collected with different objectives in mind and variable in nature with different information collected. This, together with a lack of quality and accessibility, severely hampers its coordinated use between different agencies and across sectors to generate the best outcomes for human, animal and environmental health. Sustained financial investment is critical to ensure that AMR surveillance systems can be maintained, expanded and continually improved to meet evolving public health needs and to provide evidence for new, innovative interventions. Prioritizing collaboration, both financially and in other ways, would be an efficient way of optimizing finite resources in the fight against AMR.

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Author contributions

R.B.: Conceptualization of the meeting. T.D., A.G., A.K., E.L., C.B., F.M., E.H., J.W., H.G., E.K., K.C. and K.M.: Writing – reviewing and editing. K.H.: Chaired afternoon session, writing – reviewing and editing. A.P.: Writing. C.E.M.: Chaired afternoon session, writing – reviewing and editing. P.C.: Chaired morning session, writing – original draft.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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