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POLICY BRIEF

Advancing One Health Solutions for Antimicrobial Resistance and Zoonotic Diseases

Novel Therapeutics · Integrated Surveillance · Cross-Sectoral Innovation

Outcomes of the ONE-Bridge Workshop · Lille, 18–19 November 2025

Executive Summary

Antimicrobial resistance (AMR) is one of the most pressing public health threats facing Europe and the world. More than 35,000 deaths annually in Europe are associated with healthcare-related infections caused by antimicrobial-resistant pathogens. At the same time, the emergence and spread of zoonotic diseases continue to highlight the interconnectedness of human, animal, and environmental health.

Traditional approaches focused solely on antibiotic stewardship are no longer sufficient. Innovative and integrated One Health solutions are urgently needed to reduce dependence on antibiotics, improve preparedness for emerging infectious diseases, and strengthen resilience across human, animal, and environmental health sectors.

35,000+ Deaths annually in Europe from healthcare-related infections caused by AMR pathogens	**5** Promising therapeutic frontiers: phages · glycans · antivirulence · immune modulation · targeted delivery	**6** Policy recommendations spanning surveillance, regulation, agriculture, research, and public engagement	**One Health** AMR and zoonotic diseases require coordinated action across human, animal, food, and environmental sectors

Key Messages

- Antimicrobial resistance is a One Health challenge requiring coordinated action across human, animal, food, and environmental sectors.
- Human-to-human transmission remains a major driver of resistant bacterial dissemination in high-income countries, while foodborne transmission remains significant in many regions worldwide.
- Novel alternatives to conventional antibiotics are rapidly emerging and should be supported through dedicated research and regulatory frameworks.
- Glycan-based therapeutics, bacteriophage therapy, antivirulence approaches, immune modulation, and targeted antimicrobial delivery systems represent promising complementary tools to combat multidrug-resistant infections.
- Surveillance systems must integrate human, animal, and environmental data to better anticipate emerging threats and guide evidence-based interventions.

ONE- Bridge project is supported by co-funding from the European Union's EU4Health programme under Grant Agreement Nr 101233407.

Workshop Insights

The ONE-Bridge workshop brought together experts from microbiology, veterinary sciences, glycobiology, aquaculture, environmental sciences, and public health to discuss innovative responses to infectious diseases and AMR.

Presentations highlighted:

- The role of glycans in host-pathogen interactions and their influence on pathogen transmission and host susceptibility.
- Novel antiviral approaches in aquaculture, including RNA interference technologies and microalgae-based production systems for double-stranded RNA therapies.
- The potential of mucinoglycans and antivirulence strategies to prevent bacterial colonization and biofilm formation without exerting strong selective pressure for resistance.
- Emerging evidence supporting bacteriophage therapy as a safe and effective treatment option for multidrug-resistant infections.
- The importance of understanding environmental reservoirs of antimicrobial resistance and contamination pathways.
- Research on animal genetic factors influencing susceptibility to foodborne pathogens such as Salmonella, opening opportunities for disease-resistant livestock breeding.
- Development of innovative antimicrobial strategies including Trojan Horse delivery systems, efflux pump inhibitors, and immune-based interventions.

CORE INSIGHT	*Collectively, these approaches illustrate how interdisciplinary One Health research can generate new tools to reduce reliance on conventional antibiotics.*

Policy Recommendations

1. Strengthen One Health AMR Surveillance

The European Union and Member States should expand integrated surveillance systems linking human, veterinary, food production, and environmental sectors. Monitoring should include antimicrobial use, resistance genes, and environmental contamination hotspots.

2. Accelerate Support for Alternative Therapeutics

Dedicated funding mechanisms should be established to support translational research and clinical development of:

- Bacteriophage therapies
- Glycan-based anti-infective strategies
- Antivirulence compounds
- Immune-modulating therapies
- Targeted antimicrobial delivery systems

3. Modernize Regulatory Frameworks

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European regulatory pathways should be adapted to facilitate evaluation and approval of innovative biological therapies, including personalized bacteriophage treatments and other non-traditional antimicrobial approaches.

REGULATORY IMPERATIVE	*Personalized bacteriophage therapy and other next-generation biologics cannot be evaluated through regulatory frameworks designed for small-molecule pharmaceuticals. EMA must develop dedicated pathways that acknowledge the biological uniqueness of these approaches — or promising treatments will remain stuck in regulatory limbo while patients run out of options.*

4. Reduce Antibiotic Dependence in Agriculture and Aquaculture

Member States should encourage adoption of alternative disease control strategies, including vaccination, selective breeding for disease resistance, improved biosecurity measures, and biological control approaches.

5. Promote Cross-Sectoral Research and Innovation

Future EU research programs should continue prioritizing interdisciplinary collaborations linking public health, veterinary medicine, environmental sciences, biotechnology, and social sciences under the One Health framework.

6. Invest in Public Awareness and Stakeholder Engagement

Awareness campaigns should address responsible antimicrobial use and improve understanding of emerging therapeutic alternatives among healthcare professionals, veterinarians, farmers, policymakers, and the public.

Expected Impact

Implementing these recommendations would:

- Reduce the burden of antimicrobial-resistant infections.
- Strengthen preparedness for emerging zoonotic diseases.
- Accelerate innovation in antimicrobial development.
- Improve food system resilience and sustainability.
- Support implementation of the European One Health Action Plan.
- Enhance Europe's leadership in developing integrated solutions for complex health challenges.

Conclusion

The ONE-Bridge workshop demonstrated that addressing antimicrobial resistance and emerging zoonotic threats requires a comprehensive One Health approach. Innovative therapies, integrated surveillance, and cross-sectoral collaboration offer significant opportunities to strengthen health resilience across Europe. Policymakers should act now to support the development, evaluation, and implementation of these promising solutions before current treatment options become increasingly ineffective.

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FINAL MESSAGE	*AMR does not wait. Every year without adequate action is another 35,000 deaths in Europe alone — and a narrowing window for the novel therapeutics, regulatory modernisation, and cross-sectoral governance that could change the trajectory.*

Source

This policy brief is based on the outcomes of the ONE-Bridge Workshop 'Advancing One Health Solutions for Antimicrobial Resistance and Zoonotic Diseases', held in Lille on 18–19 November 2025. ONE-Bridge consortium: University of Patras, Technical University Dresden, CNRS France, ISGlobal Spain, EMVIO.

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