



Antimicrobial Resistance and the Environment – Sources, Persistence, Transmission and Risk Management (AREST)

Authors: Dearbháile Morris, Niamh Cahill, Catherine Burgess, Enda Cummins, Finola Leonard, Brigid Hooban, Carlos Chique, Ciara Tyrrell, Shun Wang, Ciarán Monahan, Aoife Joyce, Kelly Fitzhenry, John Cullinan, Georgios Miliotis, Louise O'Connor, Deirdre Prendergast, Martin Cormican, Rita Gately, Rajat Nag, Fiona Brennan, Fiona Walsh and Xinmin Zhan.

Identifying pressures

Antimicrobial resistance (AMR) is recognised globally as one of the greatest challenges to human and animal health. It has major implications for our agriculture and food production systems, the environment and the economy. The World Health Organization Global Action Plan on AMR sets out five key solutions to tackle the challenge of AMR. In 2021, Ireland's second National Action Plan on AMR (iNAP2) strengthened Ireland's commitment to tackling the challenge of AMR using the One Health approach, which recognises the link between human, animal and environmental health.

The role of the environment in the persistence and transmission of AMR is the least studied element of the One Health paradigm. This was further highlighted by the analysis commissioned by the EPA in preparation for iNAP2. The findings of the AREST project add significantly to our understanding of this environmental dimension of AMR.

Informing policy

iNAP2 acknowledges that there remains a growing need to enhance our understanding of the environmental dimension of AMR and generate evidence to support the development and implementation of effective risk management and preventative strategies to halt further spread. The AREST project provides key data and recommendations to support iNAP2, in particular strategic objectives 2, 3 and 5, and informs several different national and international policies.¹

Developing solutions

The AREST project aligned with global and national One Health approaches in bringing together a wide range of partners in the areas of human health, animal health, agriculture, the environment, geographical information systems, risk assessment, high-throughput sequencing technologies and metagenomics. The AREST project (1) provides evidence of the extent of contamination of the Irish environment with antimicrobial-resistant organisms and antimicrobial resistance genes of clinical concern, (2) has generated national-level data on the key sources, hotspots and drivers of AMR in the environment from the human health and agriculture sectors, and (3) provides key data and recommendations to inform relevant policies and support Ireland's National Action Plan on AMR.

¹ Water Framework Directive (2000/60/EC); Bathing Water Directive (2006/7/EC); Groundwater Directive (2006/118/EC); EC (Drinking Water) Regulations 2014 (S.I. 122 of 2014); Environmental Impact Assessment Directive (85/337/EEC); Sewage Sludge Directive (86/278/EEC); Urban Waste-water Treatment Directive (91/271/EEC); Plant Protection Products Directive (91/414/EEC); Food Wise 2025; Food Vision 2030; National Farmed Animal Biosecurity Strategy 2021–2024; Working together for Animal Welfare: Ireland's Animal Welfare Strategy 2021–2025.

