



Workshop Title	Expert elicitation for a risk assessment of environmental AMR across water and reuse systems using Bayesian networks
Facilitators and contributors Details of the individuals leading and contributing to the workshop, including: - Workshop facilitators - Guest speakers or contributors - Their roles in the session	Professor Nicholas Ashbolt (Chair & co-facilitator) Dr Claire Hayward (Co-facilitator) Dr Steven Mascaro (Co-facilitator) Dr Owen Woodberry (Co-facilitator) Dr Ben van den Akker (Co-facilitator) Dr Oz Sahin (Co-facilitator) Stephanie Faulks (Co-facilitator)
Background An overview of the context and rationale for the workshop, outlining the key issue, challenge, or opportunity it addresses, and why this topic is timely and relevant.	Antimicrobial resistance (AMR) is an escalating One Health challenge that links healthcare, agriculture, and environmental systems. Water plays a central role in AMR emergence and movement, yet quantitative risk assessment remains difficult due to complex microbial interactions, variable system design, and scarce or siloed data on resistance dynamics under environmental stressors. Our project within SAAFE CRC uses Bayesian Network modelling to map causal pathways of AMR emergence, persistence, and transmission through sewage, wastewater treatment, and reuse in agricultural applications. This workshop addresses the need for expert-derived data to fill key evidence gaps, particularly for stress-response, mutation, and gene transfer nodes that are not well parameterised by existing datasets. EDAR8 provides an ideal platform to gather interdisciplinary insight from experts across water, health, and environmental risk sectors.
Workshop Aims A description of the purpose of the workshop and its intended focus. This section highlights what participants can expect to explore, learn, or develop during the session.	This workshop will engage participants in an expert elicitation process to inform the Bayesian Network model for environmental AMR risk. Participants will explore cross-sector pathways linking wastewater, reuse, and horticultural systems, focusing on environmental niches that drive resistance development, with specific focus on: - Rates of Rank 1/2 ARG exchange/amplification in various ecological niches - Associated chemical selection pressures - Resistance selection mechanisms and evolution in the environment The session will examine how different treatment operations and management decisions influence AMR persistence and potential exposure risk, using the example organism ESK <i>E. coli</i> to illustrate risk pathways and management trade-offs.
Participant Takeaways A summary of what participants will gain from attending the workshop. This may include new knowledge, practical skills, tools, frameworks, or shared resources, as well as any tangible outputs (e.g. ideas, draft materials, or collaborative outcomes).	Participants will contribute directly to refining an environmental AMR Bayesian Network model through structured discussion and expert input on key uncertainties and plausible causal relationships. The workshop will: - Capture expert perspectives on factors influencing AMR development in environmental niches (e.g., stress response, mutation, gene transfer) - Explore how sectoral collaboration and data sharing can improve model reliability and inform adaptive management approaches Participants will leave with a deeper understanding of how Bayesian methods and expert elicitation can be applied to complex environmental risk problems. Their contributions will help prioritise data needs, refine conceptual linkages, and inform future model development and scenario testing within the SAAFE CRC program.
Expected Impact An outline of the broader value of the workshop, including how it may:	This workshop will advance interdisciplinary understanding of AMR in environmental systems by combining systems thinking, risk modelling, and operational expertise. The discussion will help refine how Bayesian

• Influence research, policy, or practice • Support collaboration and knowledge exchange • Contribute to future work or ongoing initiatives	approaches can capture the interconnected pathways of AMR emergence and control across wastewater, reuse, and environmental interfaces. By drawing together researchers of diverse disciplines, the session will strengthen shared understanding of the drivers of AMR persistence and promote collaboration. Expert elicitation will provide valuable insight into processes that are difficult to parameterise with quantitative data, such as stress responses, mutation, and gene transfer under different chemical or operational pressures. These discussions will enhance the conceptual foundations of the model and support the identification of realistic mitigation strategies and policy levers. In the longer term, the workshop outcomes will contribute to a framework for integrating probabilistic modelling with sectoral expertise, supporting risk-based decision-making and resilience planning for AMR management across water systems.
Who should attend? Information on the intended audience for the workshop, including: • Relevant backgrounds, sectors, or expertise • The level of participation expected (e.g. discussion, group work, problem-solving)	This is a workshop for researchers with hands-on expertise in one or more of: • molecular microbiology/genomics (horizontal gene transfer, mobile genetic elements) • environmental chemistry/ecotoxicology (chemical selection pressures, co-selecting contaminants) • microbial ecology and evolutionary biology (resistance selection mechanisms, stress response) • and/or quantitative/One Health risk assessment (QMRA, Bayesian/probabilistic modelling). Active participation is expected, including small-group discussions and completion of an elicitation exercise. No specialist Bayesian modelling experience is required – facilitators will provide background information and guide the process throughout the session – but attendees should be comfortable contributing expert judgement in their own technical area. Pre-work (mandatory): attendees are required to watch Dr Claire Hayward's presentation of this project in the main conference program – Tuesday 4 August, 11am–1pm ('From environmental AMR data to decisions' session), 'Bayesian modelling to support water utilities in managing antimicrobial resistance risks'. This will be treated as required background to ensure the workshop itself can move efficiently through the technical discussion.
Workshop Schedule and Duration A summary of the structure and flow of the workshop, including: • Key session components • Interactive or breakout activities	0–10 min – Welcome, overview of project and BN approach (Nicholas Ashbolt) 10–25 min – Model structure and illustrative examples (Steven Mascaro & Owen Woodberry) 25–70 min – Expert elicitation and group discussion (All facilitators) 70–85 min – Plenary synthesis and reflections (Steven Mascaro & Nicholas Ashbolt) 85–90 min – Wrap-up and next steps (Nicholas Ashbolt)