

CRC SAAFE: Solving Antimicrobial Resistance in Catchments, Source Water & Stormwater



Antimicrobial resistance (AMR) – the ability of microorganisms to resist antibiotics, antifungals, and antivirals – is one of the greatest health threats of the 21st century. It also presents a major challenge to agricultural industries, with significant impacts for biosecurity, productivity, food safety and quality, and market access. Through focused collaboration between researchers and industry, CRC SAAFE will lead the AMR response for the Australian water, waste, agribusiness, and food sectors, anticipating and addressing future challenges and capitalizing on emerging opportunities.

Benchmarking AMR risks in catchments

Surface water catchments in Australia are well managed; however, catchments are subject to various point-source and diffuse pollution sources that have unknown AMR implications. The presence of both wildlife and livestock in catchments have uncharacterized consequences for AMR loads in our drinking water supplies. Sewage contamination is another key source and risk, both from point-source contamination by centralized wastewater treatment plant discharges and diffuse contamination from decentralized on-site (unsewered) wastewater systems which are much less well managed and have less regulatory oversight, and which surveys often show to perform poorly. The impacts of opening previously protected catchments for recreational use are very uncertain in the context of AMR, but there are potential implications both from a contamination and community exposure perspective. Research is needed to benchmark and understand AMR sources and risks in catchments to allow water authorities and regulators to better manage surface water quality and AMR-related health risks (both for humans and animals).

Stormwater management and recycling

Stormwater is increasingly being recovered and recycled for both potable and non-potable uses. Managed aquifer recharge linked to aquifer storage and recovery using stormwater is a priority water security initiative for many water utilities and local government authorities; however, insights into AMR risks in stormwater are only just beginning to emerge. A key knowledge gap relates to AMR co-selection from metals and other contaminants in stormwater. Co-selection is a key mechanism affecting the proliferation and persistence of resistant microbes and likely plays a driving role in AMR dynamics in stormwater environments. Its importance will vary depending on the nature of stormwater catchments (e.g. prevalence of certain industries, degree of urbanization/population density, exposure to sewage, proximity to agriculture and livestock etc.). Key risks for

stormwater quality from a microbial perspective are linked to heavy rainfall events, so there is a need to better understand these risks from an AMR perspective and look at ways to better manage health risks under extreme weather events. CRC SAAFE research will address these knowledge gaps to ensure that stormwater remains a viable and safe water source for our future water security.

Alternative water sources

(In)direct potable recycling is emerging as a viable, sustainable and climate-independent alternative source option for future water security. Despite high-level treatment, substantial residual AMR genetic material remains even in reverse osmosis permeate and carrying with it as-yet uncharacterised human health risks. Research is needed to rank, understand, and manage AMR risks in recycled water to ensure safe, sustainable supply.



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The Cooperative Research Centre for Solving Antimicrobial Resistance in Agribusiness, Food, and Environments (CRC SAAFE) will coordinate a multi-sector 'One Health' response to AMR. By providing the tools and knowledge to proactively monitor, manage, and mitigate the spread of AMR, CRC SAAFE will protect human and animal health, food security, and economic prosperity, and maintain our nation's reputation as a producer with low AMR risk. Through successful AMR management, CRC SAAFE presents a significant opportunity for Australia to consolidate its market access advantage for premium quality produce, and to secure the future growth of Australian agriculture and related sectors.

Become part of the solution

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