



REPORT

Green Foundation Ireland

invites you to an evening online TALK
with **Ciaran Monahan**

Antibiotics in Surface Waters: The Irish Scenario



Venue: **by Zoom** (*details given after registration*)

Wednesday 9 August 2023 – 19:00 to 20:00

Admission to this event is **FREE** but you **MUST** register beforehand.
You can do so through **our Eventbrite page here.**

Antibiotics in Surface Waters: The Irish Scenario

THEME

Antibiotics, during manufacture, as well as administration to human patients and livestock, enter surface waters worldwide. This antibiotic pollution of the environment can lead to both ecological damage, and resistance development in environmental bacteria.

This talk looked at antibiotic resistance development risks in the environment and the resulting human health risks. It covered how antibiotic pollution and bacterial resistance occurs, problems arising in Ireland and potential solutions to reducing pollution and resistance from developing.

ABOUT OUR SPEAKER

Ciaran Monahan

A Researcher and Events Co-Ordinator with Green Foundation Ireland, Ciaran is a postdoctoral researcher in University College Dublin, his research thus far focussing on antibiotic resistance development risks in the environment and the **resulting** human health risks. Having graduated in zoology from UCD, he has a particular interest in wildlife, creativity and education, and has completed a study for Green Foundation Ireland on sustainability assessment in the Leaving Certificate.



ABOUT OUR FACILITATOR

Claire Downey



Claire, who is a Director of Green Foundation Ireland, is Policy and Research Director at the [Rediscovery Centre](#).

Prior to this, she was the National Network Co-Ordinator with Community Reuse Network Ireland (CRNI), an all-Ireland umbrella body funded by the Environmental Protection Agency (EPA) that represents community based organisations involved in reuse and recycling.

ABOUT OUR TALK

Ciaran began by explaining that antibiotic resistance occurs especially in pathogenic bacteria, and refers to a reduced response to antibiotic intervention by bacteria. It increases mortality as the resistant strains of bacteria are three times more likely to cause death or impairment. It complicates medical procedures and places pressure on health services, and increases cost to the economy due to lost productivity in workplace, medical expenses and more. Antibiotic resistant bacteria are predicted to be a leading cause of death worldwide in 2050 – and are currently responsible for 200 deaths per year in Ireland.

Resistance develops in bacteria through contact with antibiotics over time. Antibiotics are used in large quantities throughout the world in both human and animal healthcare, and the quantities used are growing globally, primarily for agricultural purposes and also medicinally in developing countries (although usage levels are static in the US and Europe). It was highlighted that no new antibiotics have been discovered in quite some time, meaning that once these stop working due to resistance, there are limited other options.

Antibiotics can pollute waters through:

- Effluent from **manufacturing processes**, which can lead to high levels of antibiotics in waterways. This is a particular problem in developing countries where many antibiotics are produced.
- **Wastewater** from humans treated with antibiotics, which then pass into wastewater treatment plants, which typically do not have adequate means to fully treat antibiotics. Worse still, wastewater treatment plants – due to high levels of antibiotics – can actually exacerbate antibiotic resistance. Finally, where wastewater treatment plant sludge is used as fertiliser, which can often occur in Ireland, antibiotics are returned to the field via the sludge and in turn washed back into waterways.
- **Manure** excreted by animals treated with antibiotics, and this being washed into waterways directly from the field or due to manure being landspread.
- Direct **disposal**.

Antibiotics in waterways can cause a number of problems including further development of antibiotic resistance in bacteria, allergic reactions and digestive issues (as they affect gut bacteria) for swimmers, can disturb the food chain due to growth of algae/cyanobacteria and interrupt photosynthesis. Ciaran pointed out that data shows 15 antibiotics have been detected in Irish waters of which 5 in high concentrations.

Resistant bacteria have been found in Irish rivers, lakes, coastal waters and pristine areas that are not directly impacted by runoff, showing the extent to which this has proliferated in natural systems. High resistance levels and multi resistance in bacteria have been found. Resistance to penicillin is widespread.

Methods for managing or reducing antibiotic resistance development and antibiotic pollution include:

- Regular monitoring of water bodies for resistant bacteria and antibiotic residue levels.
- Ensuring individuals finish antibiotic courses fully and more stringent prescribing practices.
- Proper disposal pathways for antibiotics, e.g. drug takeback schemes.
- Storage of animal manure during which certain antibiotics break down to tackle agricultural antibiotics.
- Reducing untreated release of wastewater.
- Treatment of hospital wastewater separately or additionally to municipal treatment.
- Municipal wastewater sludge treatment through membrane bioreactors or other treatments.

Many questions were asked and the talk was very well received by all of those present. Ciaran was thanked for his contribution.

You can [access our video of the talk here](#).

Green Foundation Ireland

25 August 2023