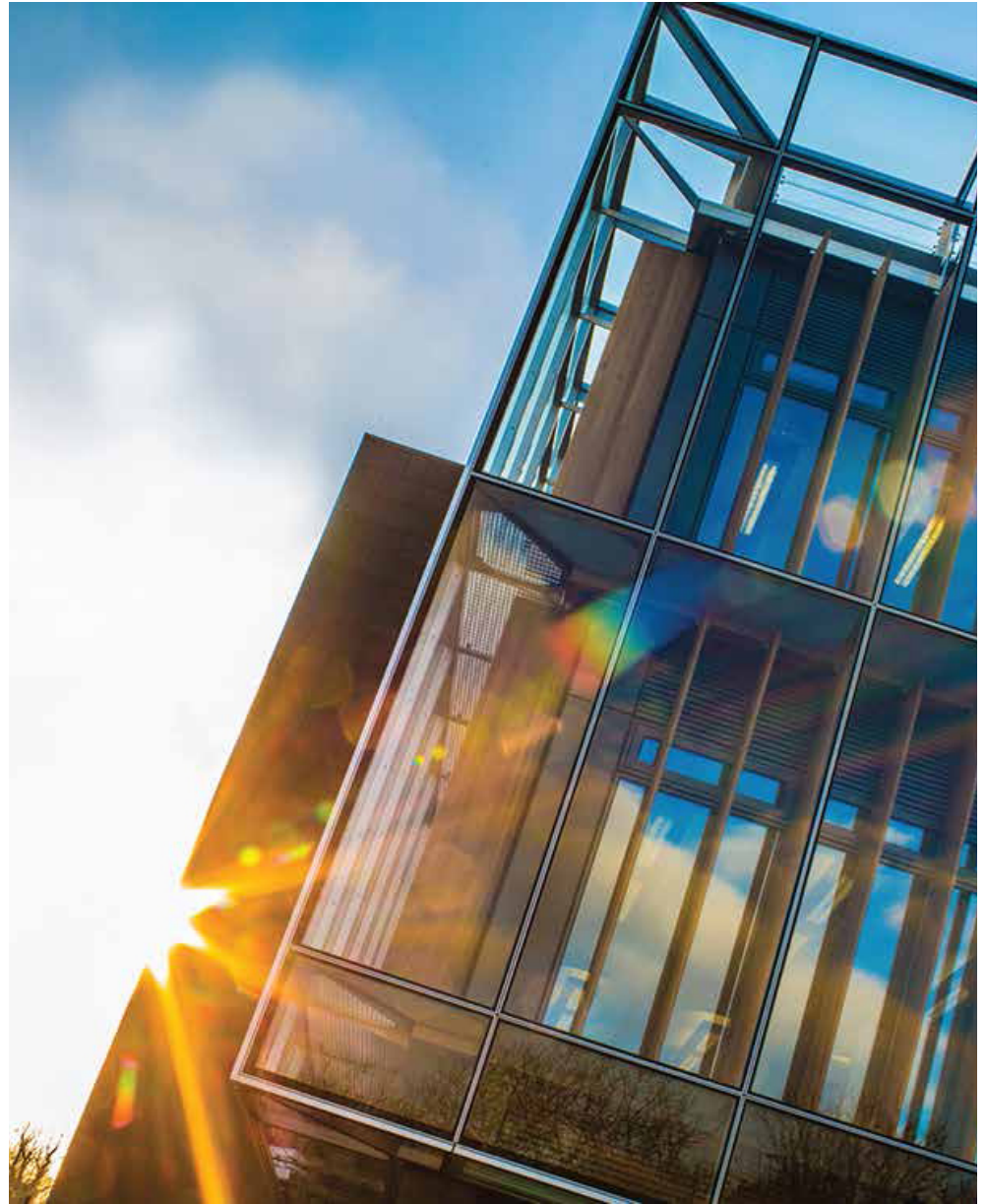




**Maynooth
University**
National University
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Environment & Antibiotic Resistance

Dr Fiona Walsh



Current + future research interests

Links between animal, human and environment in terms of antibiotic resistance



Environment

- Water JPI project (WWTP effluent)
- Soil/plants Agroscope (Department of agriculture, Switzerland)

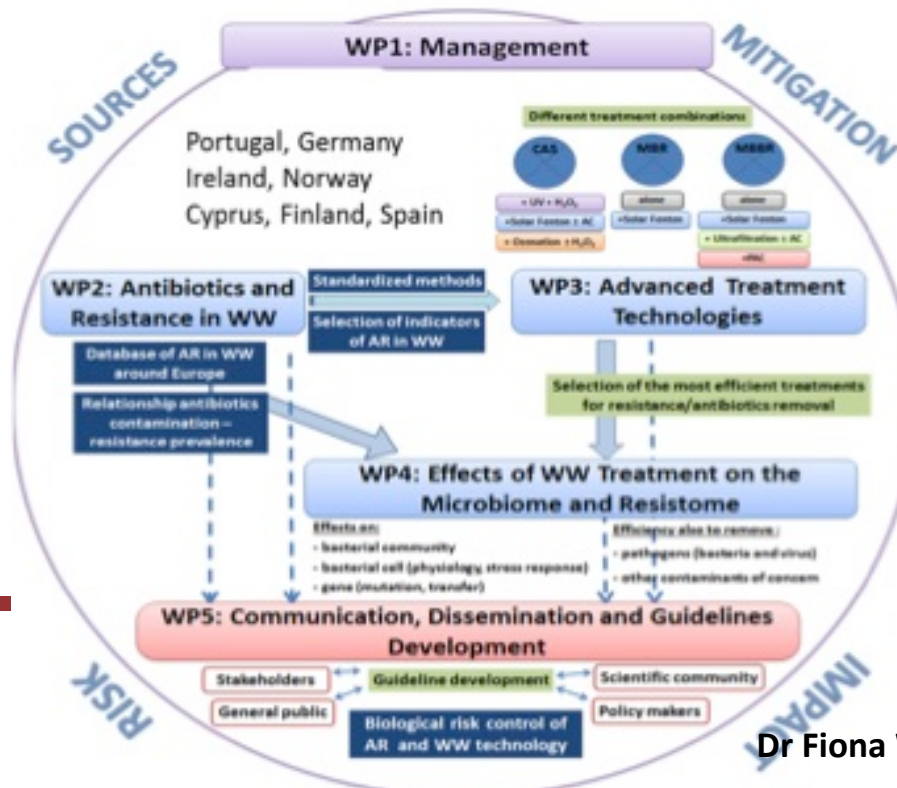
Animal

- ANIHWA ERA-Net project (Pig gut)

Human

- Human gut microbiome & AR dynamics

Water JPI project 2015-2018



Gaps in our knowledge

The two most related Directives, the Water Framework Directive (WFD) and Council Directive 91/271/EEC, have **not addressed the role played by water bodies in the emergence, selection and spread of ARB&G among bacterial pathogens as well as the consequences for human health**, they are not receiving the level of attention required.

Our recent opinion paper in Nature Reviews Microbiology:

Key measures required to **reduce risks posed by AR** in environment

- ID critical points of control
- Development of reliable surveillance
- Risk assessment procedures
- Implementation of technological solutions: prevent contaminants entering/spreading in the environment

EU project aims

1. What is leaving our WWTPs?

StARE will investigate a high number of European WWTPs to evaluate ARB&G abundance *versus* chemical contamination and regional backgrounds.

2. How can we monitor these on the ground?

Guidelines for ARB&G monitoring in water will be developed.

3. What technologies can be used to reduce/remove these from entering our water?

The efficiency, impact and cost- effectiveness of advanced wastewater technologies will be evaluated, based on an innovative biological risk control strategy.

Scientific & Societal Relevance

- Generate open database on A&ARB/G occurrence in effluent from WWTP across EU
 - ID if
 - relationship between environmental contamination & Abs
 - Relationship with healthcare associated ARB/ARG
- Improve WWT processes & ID Critical control points
 - Waste management
 - Waste/water policy development

Irish components

- Two WWTP sampled twice a year
 - ID bacteria & AR genes & mobile elements
 - Chemical analysis of AB concentrations present
- Member of WP1 - WP4, WP5 leader
- Feed data into mesocosm WWTP studies
 - Develop technologies to prevent or reduce ARG & bacteria transfer into environment

Irish experiments


Two WWTPs (A, B)

Sampled 3 consecutive days in March & Oct 2015, March 2016 & will sample Sept 2016

Standard procedures across all countries



- Bacterial loads:
 - *Escherichia coli*
 - *Enterococcus*
 - additionally *Pseudomonas* species
- Resistance phenotype
 - Bacteria & total DNA
 - Amoxicillin, tetracycline, ciprofloxacin
- Plasmid analysis from water & bacteria
 - ID if clinical plasmids present in effluent
- Samples sent for chemical analysis
 - Antibiotic concentrations

Current & future EU funding = JPI



**FIRST EVER CALL ON AMR
TRANSMISSION DYNAMICS**
JPI-EC-AMR COFUND CALL NOW OPEN

To unravel dynamics of transmission and selection of AMR at genetic, bacterial, animal, human, societal, and environmental levels, in order to design and evaluate preventive and intervening measures for controlling resistance.

 CALL CLOSURE: March 2016	 NUMBER OF PARTICIPATING COUNTRIES: 17
 TOTAL CALL BUDGET: 24 M EUR	 EUROPEAN COMMISSION CONTRIBUTION: 6 M EUR

TOTAL: 30 M EUR

 www.jpiamr.eu

Currently 22 members (EU listed)

Belgium
Czech republic
Denmark
Finland
Estonia
France
Germany
Greece
Israel
Italy
Netherlands
Norway
Poland
Romania
Spain
Sweden
UK

From €200k – 2 million per country

Total project worth (5 partners min = €1m)

Acknowledgements

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