Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

# Public Health Medicine Environment and Health Group

## Public Consultation on the draft River Basin Management Plan for Ireland

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## Summary


The River Basin Management Plan states that water is essential for life and wellbeing. Therefore Ireland needs to plan for the right quantity of safe water for drinking, recreation and other important uses in order to improve and protect health.

In order to protect human health, the plan needs to:

- Incorporate the drinking water safety of 100% of the Irish population, not only those on Irish Water or NFGWS supplies.
- Incorporate the recreational water safety of all of the population.
- Consider biohazards, such as pathogenic bacteria, in water protection. Currently the emphasis appears to be on protection from chemical hazards.
- Be aware that the validity of some of the underlying assumptions used in the protection of waters may be changing: die-off periods for microorganisms; specificity and sensitivity of indicator or screening tests; volume of water needed for testing.
- Ensure risk assessment methodology is robust enough to identify significant risks.
- Plan for protecting against the health impacts of climate change related to water – drought, flooding, contaminated water supplies, changed environmental fate and/or transport of pathogenic organisms.
- Address the environmental spread of anti-microbial resistance (AMR) in water – a national and international priority.

# Public Health Risks relevant to River Basin Management Plan

The public health risks from water generally relate to quantity and/or quality of water

**Quantity**

**Flooding**
- Physical danger and loss of life
- Property and other losses
- Disruption of essential services etc.

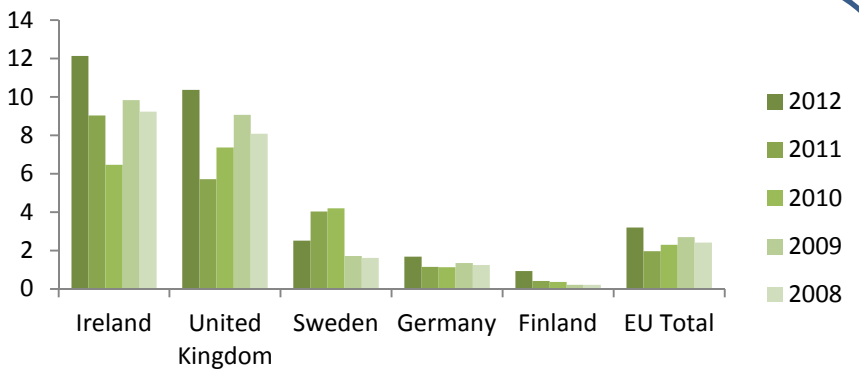
**Drought** or inadequate supply to meet essential needs

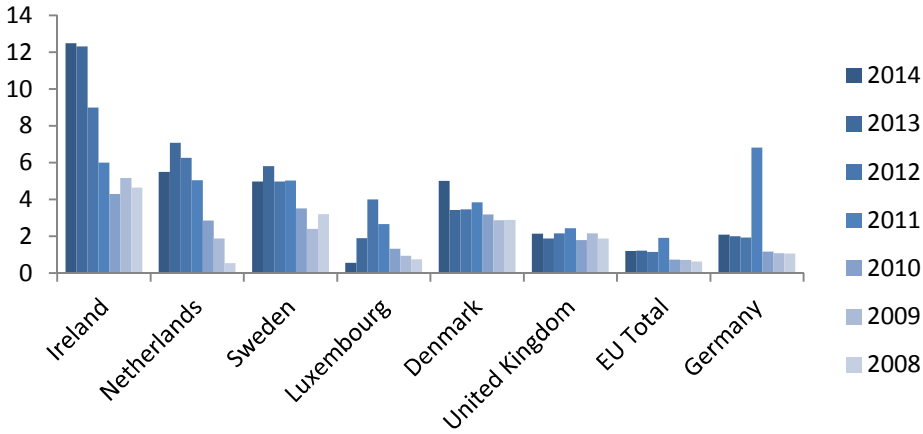
**Quality**
- Waterborne diseases from bacteria, viruses and parasites
- Chemical risks from biotoxins (e.g algal), natural occurring minerals, contaminants and by-products of treatment
- Radiological risks from radon and other radioactive substances

# Examples of Public Health Impacts - exposure to potentially waterborne infections

Ireland has the **highest** rate of confirmed **Cryptosporidiosis** per 100,000 population in Europe (i)

People with severe immuno-compromise are vulnerable to serious or even fatal illness




Ireland has the **highest** rate of confirmed **VTEC** per 100,000 population in Europe (ii)

Impacts of VTEC include children in intensive care with kidney and other organ failure.

**Many of these infections are associated with contaminated water and exposure to untreated water supplies**

# Ireland's public health vulnerabilities from water include:

1. **Heavy reliance on surface water as a source of drinking water**
2. **Reliance on private wells for drinking water by a sizable minority**
3. **Wide recreational use of waters that are not protected from contamination**
4. **Laws which don't protect the whole population & perverse incentives**
5. **Limited knowledge of completed exposure pathway to inform risk assessment**
6. **Emerging risks from climate change and need to prevent environmental spread of anti-microbial resistance (AMR)**

# Public Health Risks relevant to River Basin Management Plan

## 1 Ireland's heavy reliance on surface water as a source of drinking water

- The source of most of the Irish public's drinking water is from surface waters.
- These waters are vulnerable to contamination, and therefore need significant protection and treatment to provide safe drinking water.
- This increases the risk of by-products of chlorine disinfection such as THMs in our water.
- In order to reduce the production of THMs, greater emphasis is needed on preventing contamination of raw water with organic matter and physical methods of treatment.

## 2 Ireland's reliance on private wells as a source of drinking water for a sizable minority

- 720,000 people supplied by private groundwater sources in Ireland (iii) are unprotected in this plan.
- Groundwater is the main source of water in rural areas (iv).
- Microbiological pathogens of concern in Ireland such as verotoxigenic E. Coli and cryptosporidium, have animal reservoirs i.e. the source of such infections is from animals including farm animals.

**Construction**

- Poor siting of wells relative to septic tanks and other sources of pathogens is common.
- There is no legal requirement to build safe wells - Institute of Geologists of Ireland's guidelines (v) are not mandatory. Wells are often poorly constructed (iv) and failing to install an effective sanitary seal to exclude contaminated water is also common.

**Governance**

- There is no coordinated policy in relation to the safety of unregulated private water supplies.
  - Local authorities have a duty to inform private well owners of the issues/risks under Drinking Water Regs 2014 (vi), but without a register of well-owners, cannot ensure that all are informed.
  - Local authorities may give grants for wells that are potentially unsafe, as only once-off sampling is required.
  - Local authorities may give planning permission without conditions on safety of private drinking water.

## 3 Widespread recreational use of waters that are not protected from contamination

Only a limited number of sites used by bathers in Ireland are "identified" as bathing waters under the Bathing Water Quality Regulations 2008 (vii). Therefore many bathing sites, including venues for large sporting events are not protected, and there is no process for maximising the safety of the water quality. Inadequate waste water treatment contributes to this public health risk.

## 4 Legislative deficits and perverse incentives

- Drinking Water Regulations 2014 do not protect everyone as only drinking water for larger numbers of people is regulated. Individuals, including children, on "exempted supplies" are not protected (6).
- Bathing Water Quality Regulations 2008 do not protect everyone – just those using identified bathing waters.
- The microbiological parameters for monitoring water quality in the 2015 Drinking Water Regulations are enterococci and E. coli. These are used as indicators of faecal contamination but their absence may not indicate microbiological safety (viii), given low infectious doses and greater environmental resilience for certain pathogens.
- Currently, minimum sampling frequency is based on volume of water distributed rather than risk from the supply. Infrequent sampling may miss intermittent contamination, which is a public health risk, and may give false reassurance of the safety of drinking water.
- EU regulations for protection of waters place the emphasis on nitrates and pesticides rather than on biological hazards (ix).
- Grant aiding of some forms of agriculture (e.g. increased animal production) and and slurry/waste management on farms may increase the biohazard burden in the environment.

# Public Health Risks relevant to River Basin Management Plan

## Inadequate Knowledge for Risk Assessment

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- There is limited knowledge on many aspects of source to receptor pathway of microbiological pathogens of animal origin. More evidence is required on how to disrupt this pathway effectively.
- Risk assessments are relevant to several sectors but are not standardised or agreed across sectors.
- Use of indicator organisms may not be a sufficiently safe screening test for excluding the presence of serious pathogens (viii). Understanding the false negative rate, due to low sensitivity, is important.
- Buffer distances may or may not be protective, depending on the environmental fate of pathogens. The assumptions regarding die-off periods for microorganisms may not hold with changing climatic conditions.
- The volume of water needed to detect serious micro-organisms is poorly understood.
- Waste water collection systems may leak and may be a possible source of contamination.

## Emerging risks

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### Climate Change

- Climate change is likely to result in increased precipitation in Ireland, as well as increased temperature. This may result in flooding, contaminated water supplies, changed environmental fate and/or transport of pathogenic organisms and anti-microbial resistant genes. Drought is also a possibility. Climate migration and pressure due to predicted increase in population will increase demand on all services including water services. All of these increase the risk to public health.

### Uncontrolled spread of Anti-Microbial Resistance in the aquatic environment

- Antimicrobial resistance (AMR) occurs when microorganisms such as bacteria, viruses, fungi and parasites change in ways that render the medications used to cure the infections they cause ineffective (WHO). Human and animal waste containing these microorganisms can contaminate drinking and bathing water exposing people to infection. An example of this risk in Ireland was published in 2017 (x). Pharmaceuticals in the aquatic environment can also contribute to the development of resistance. AMR is considered 'a crisis' and a critical risk to human health that 'must be managed with the utmost urgency' (WHO). It is on the draft National Risk Assessment 2017 (xi).

# References


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iii. **EPA Private Wells Infographic** at http://www.epa.ie/pubs/advice/drinkingwater/Infographics_Eng_june2014.pdf

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vi. **Drinking Water Regulations 2014** at http://www.irishstatutebook.ie/eli/2014/si/122/made/en/print

vii. **Bathing Water Quality Regulations 2008** at http://www.irishstatutebook.ie/eli/2008/si/79/made/en/print

viii. **Contamination of Groundwater Systems in the US and Canada by Enteric Pathogens, 1990–2013: A Review and Pooled- Analysis** at http://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0093301&type=printable

ix. **European Union (Good Agricultural Practice for Protection of Waters) Regulations 2014** at http://www.irishstatutebook.ie/eli/2014/si/31/made/en/pdf

x. **Indistinguishable NDM-producing Escherichia coli isolated from recreational waters, sewage, and a clinical specimen in Ireland, 2016 to 2017** at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5476983/pdf/eurosurv-22-30513.pdf

xi. **National Risk Assessment 2017 Overview of Strategic Risks (Draft)** at http://www.taoiseach.gov.ie/eng/Publications/Publications_2017/DRAFT_NATIONAL_RISK_ASSESSMENT_2017.pdf