



Department  
for Environment  
Food & Rural Affairs

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# **Drinking Water Quality and Health Evidence Plan**

**Policy portfolio: Water and Flood Risk Management**

**Policy area within portfolio: Water Supply/ Water Quality**

**Timeframe covered by Evidence Plan: 2013/14 -2017/18**

**Date of Evidence Plan: March 2013**

This evidence plan was correct at the time of publication (March 2013). However, Defra is currently undertaking a review of its policy priorities and in some areas the policy, and therefore evidence needs, will continue to develop and may change quite rapidly. If you have any queries about the evidence priorities covered in this plan, please contact [StrategicEvidence@defra.gsi.gov.uk](mailto:StrategicEvidence@defra.gsi.gov.uk).

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# 1. Policy context

## **What are the key policy outcomes for the policy programme/area?**

The provision of an adequate supply of water that is safe to drink is a fundamental human requirement. The supply should also be aesthetically acceptable to consumers.

Government has a clear regulatory role in drinking water supply, and a duty to appropriately implement European Union legislation on drinking water. The self-regulatory system set up at the time of privatisation of the English & Welsh water industry requires a strong regulatory system to ensure that public health is independently protected and public concerns over safety and acceptability of drinking water can be addressed. This system is implemented by the Drinking Water Inspectorate (DWI), sponsored by Water and Flood Risks Management Directorate. DWI is delivering to the Ministerial Priority to “Help to enhance the environment and biodiversity to improve quality of life” through individual priorities 2.4 “achieve a more sustainable balance between demand for and availability of water, with improving water quality” and 2.5 “Improve human health and wellbeing ...”. The legal requirements concerning the quality of drinking water originate from the obligations of the EC Drinking Water Directive (98/83/EC). The Water Supply (Water Quality) Regulations 2000, as amended, implement the requirements of this Directive in England and parallel (2010) regulations apply in Wales. The Regulations also introduce additional national requirements, primarily in relation to water treatment and the requirement to conduct risk assessments of water supply systems in accordance with the Water Safety Plan approach advocated by the World Health Organisation (WHO). The Private Water Supply Regulations 2009 (2010 in Wales) implement the Directive requirements in relation to private water supplies (i.e. those not provided by an appointed water undertaker / water company).

The Drinking Water Inspectorate is the independent regulator of Drinking Water Quality and is responsible for providing guidance on, and enforcing the requirements of the legislation on public water supplies on behalf of the Secretary of State and Welsh Ministers. The Chief Inspector of Drinking Water and her Inspectors are also appointed technical advisers to Ministers on drinking water issues. The Private Water Supply Regulations are enforced by Local Authorities, although the Inspectorate has a role in providing technical advice and guidance to these authorities.

The rationale for publicly funded research is provision of credible and authoritative information on the health aspects of drinking water quality to ensure that standards and regulations protect public health. The Drinking Water Quality and Health (DWQH) research programme allows the Department for Environment, Food and Rural Affairs (Defra) and the Welsh Government (WG) to discharge their obligations in respect of ensuring the safety of drinking water based on credible scientific evidence.

Defra funds this research because of the UK Government's responsibility as the designated competent authority for implementation of the Drinking Water Directive. In this

respect, Defra funds only the research needed to guide the execution and delivery of drinking water policy (in particular by the independent regulator) and to address issues on which Ministers may need to take decisions in future. This includes evidence needs to support the assessment of impact of any proposed amendment to the Drinking water Directive through the Article 12 Committee. The research programme also supports regulation of the water industry in England and Wales and assesses risks to health in relation to emerging issues, new technology & processes.

The geographical remit of the plan is England and Wales. The water sector contributes to the economy through provision of clean drinking water and removal of sewage and trade effluent for over 99% of the population and the vast majority of Industry in England and Wales. The turnover of the water industry in 2000/1 was over 6 billion pounds and it employed 32,000 people<sup>1</sup>.

## 2. Current and near-term evidence objectives

### **What are the current and near-term objectives for evidence and how do they align to policy outcomes?**

The key areas of evidence objectives are summarised below and grouped under policy outcomes.

#### **Development & Implementation of national & European legislation**

- Provide a clear scientific evidence base to support the Technical Audit of water companies and provision of advice to Ministers on water companies' compliance with their legal obligations concerning provision of wholesome water. Research is needed to support the development of best practice in relation to water quality and health issues, including deterioration of water quality between treatment works and the point of use.
- Provide a scientific evidence base for the development and publication of revised and updated formal guidance on the Water Supply (Water Quality) Regulations 2000 (as amended) in England and Water Supply (Water Quality) Regulations 2010 in Wales. In particular specific guidance, where appropriate, on emerging issues.
- Provide a scientific evidence base for technical input into the Drinking Water Directive Article 12 committee, in particular assessments of the extent, impact and risks associated with proposed variations to the technical requirements or standards in Directive revisions. Areas of current interest include monitoring for radon, tritium and other parameters identified as part of the 2008 report by Dansk Hydraulisk Institut (DHI) (Final report on Establishment of a list of chemical parameters for the revision of the Drinking

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<sup>1</sup> Source: The business and financial structure of the water industry in England and Wales, CRI Research Report 14

Water Directive). The unpublished proposed amendments to Annexes II and III of the Directive are also of relevance.

### **Assess emerging risks to public health via drinking water**

- The production of independent, authoritative risk assessments of potential exposure via drinking water (or directly related routes) for emerging issues. The timing and extent of these assessments will be governed by the nature of the emerging issue, and may also be in response to concerns raised by authoritative bodies, the results of international studies and media reports. Areas of current interest include; disinfection by-products such as haloacetic acids and nitrosamines; pharmaceutical residues; endocrine disrupters; chromium VI; lead intake; manganese; and pathogens such as viruses, cryptosporidium and E coli O157.

### **Contribute to and influence the international evidence base**

- To develop, in collaboration with the global leaders in drinking water safety and regulation such as the World Health Organisation (WHO) and associated organisations, risk-based approaches to safeguarding and regulating drinking water. This will involve both the review and development of risk-based approaches to water safety in England & Wales and also contributing to the development of international best practice in this area.
- To gather intelligence on, and influence the future direction of international developments in drinking water quality and health such as risk assessment and management of risks from source to tap.

### **Ensure evidenced-based support to the operation and development of the water industry**

- Develop new and improved methods of analysis that can be used in future research or to support water company routine monitoring and rapid methods of analysis for both microbiological and chemical contaminants that can be deployed in the event of a security threat to water supplies

Relative priorities of evidence activities are identified primarily through risk of infringement proceedings and risks to public health. So highest priorities will normally be given to projects identified under the themes “Development & Implementation of national & European legislation” and “Assess emerging risks to public health via drinking water”. Consequently priority evidence areas include: support to the Technical Audit of water companies; provision of advice to Ministers; development of best practice; investigation of deterioration of water quality between treatment works and the point of use; assessments of the risks associated with proposed variations to the Directive; and independent, authoritative risk assessments of potential exposure via drinking water (or directly related routes) for emerging issues. However other projects such as development of analytical methods may provide valuable enabling work for these themes. In particular, development of new methods to be used in the event of a threat to national security through deliberate or accidental contamination of drinking water is a priority area.

The programme will continue to canvas a broad range of organisations and opinions in support of its evidence needs. The process includes an internal DWI research ideas phase together with external consultation. External partners include Defra, WG, other UK Drinking-water regulators and outside organisations such as UK Water Industry Research Ltd (UKWIR), Health Protection Agency (HPA), Environment Agency (EA), Food Standards Agency (FSA), independent experts, and others. Wide engagement ensures a multi-disciplinary approach, with projects managed by in-house specialists wherever possible.

The programme is open to using any kind of research but is dominated by risk assessments and small scale monitoring exercises to determine both microbiological and chemical risks to health. The types of evidence required to support these exercises include; environmental modelling; water treatment modelling; quantitative microbial risk assessment; chemical exposure assessment; chemical hazard analysis; chemical analysis; and microbiological analysis. Historically the programme has included engineering and economic research where required. Water quality and health research considers economic valuation where appropriate e.g.

[http://dwi.defra.gov.uk/research/completed-research/reports/43042\\_Final\\_report.pdf](http://dwi.defra.gov.uk/research/completed-research/reports/43042_Final_report.pdf) and <http://dwi.defra.gov.uk/research/completed-research/reports/dwi0718.pdf>

The programme is integrated at a working level with the Water and Availability and Quality (WAAQ) Programme, for example, though inclusion of the WAAQ research manager at the DWI research ideas meeting. This prevents overlap between the two areas.

### 3. Future evidence needs

#### **What are the longer-term evidence needs for the policy area/ programme?**

It is difficult to predict specific long term needs since evidence needs are constantly changing as new issues and potential risks are identified. Identification of emerging requirements is done through annual formal ideas meeting with representatives from across Defra, WG, other UK drinking water regulators and outside organisations such as UKWIR, HPA, EA, independent experts, and others. This engagement also takes place on a continual basis between formal meetings and takes place alongside the national and international collaborative information gathering.

The DWQH research programme will continue to be required to provide an up-to-date, clear and robust scientific evidence base for both technical advice provided to Ministers and policy colleagues on drinking water issues now and in the future, and also to underpin the delivery of the Inspectorate's activities as the independent regulator of drinking water quality. It is also required to support the UK negotiating position in Europe on future developments in drinking water policy.

WHO water safety plan/risk based approach is used to prioritise future issues. These are likely to include: a gas chromatography mass spectrometry (GCMS) survey of di-t-butyl-oxaspirodecadiene-dione; toxicological evaluation of pharmaceuticals; the pesticide 2,4-D

as a potential disinfection by-product (DBP); booster chlorination contribution to DBP levels; the effect of tap water constituents on skin function; EDCs; the effect of UV on chemical composition; microbial growth testing; private supplies; and Cryptosporidium in the distribution system.

## 4. Meeting evidence needs

### What approach(es) will be taken to meeting evidence needs?

The programme will continue to canvas a broad range of organisations and opinions in support of its evidence needs. The process includes an internal DWI research ideas phase together with external consultation. Key external partners include, Welsh Government (WG), Drinking Water Quality Regulator for Scotland (DWQR), Drinking Water Inspectorate for Northern Ireland (DWI-NI), UK Water Industry Research Ltd (UKWIR), Health Protection Agency (HPA), Environment Agency (EA), Food Standards Agency (FSA), Water research Foundation (WRF), OFWAT and others. Key internal partners include Defra Water Availability and Quality (WAAQ) programme, Chemical and Emerging technologies, Animal Health, Food and Farming Group (bottled water team).

Wide engagement ensures a multi-disciplinary approach, with projects managed by in-house specialists wherever possible. Final prioritisation and decision are taken by the DWI senior management team based on expert judgement including criteria such as risk to public health, legal drivers, consumer and media concern water industry need and international drivers. DWI uses a risk-based prioritisation procedure for new evidence needs, as outlined in section 3.

The method of evidence gathering is based on a case-by-case basis and can include

- internal analysis drawing on existing evidence sources
- externally commissioned secondary evidence
- externally commissioned primary evidence
- partnering with other evidence funders (internal and external)
- working with the Defra network to deliver evidence needs.

Links with external partners such as UKWIR and WRF will be maintained to ensure opportunities for co-funding are taken. This includes at least annual meetings with each organisation. DWI will investigate options to contribute funding to EU projects where appropriate. Links will be made with the Research Councils' programme as appropriate, for example, the Small World Environmental Nanoscience Initiative will be considered should any future work on nanoparticles be developed.

DWI will continue to work with the World Health Organisation (WHO) in its role as a WHO collaborating centre to commission research to support the development of the water safety plan approach to drinking water regulation

Recent links within and outside Defra have include Chemicals and Emerging Technologies Division for our project on nano-particles and brominated flame retardants, Veterinary Medicines Directorate (VMD) for the work on veterinary medicines, Chemical Regulation Directorate of HSE for the project on pesticide regulation, HPA on any issues that relate to toxicity, Medicines and Healthcare products Regulatory Agency (MHRA) on pharmaceuticals. Links are established on a case-by-case basis. All the organisations invited to the research ideas meeting are engaged at a strategic level to identify opportunities for collaboration and to minimise the risk of overlap.

Almost every project in water supply depends on interdisciplinary approaches typically involving the underlying sciences of engineering, microbiology and chemistry. On top of this practical experience of water treatment and distribution are key. Many projects require a combination of modelling expertise alongside toxicology expertise to deliver risk assessments. Other projects are reliant on high quality analytical capability combined with sampling resources. Water companies possess these capabilities and other contractors often rely on water company laboratory analysis.

## 5. Evaluating value for money and impact

### **What approach(es) will be taken to maximise and evaluate value for money and impact from evidence?**

The programme will continue to be competitively let to ensure value for money. The programme will be evaluated every ten years and was last done in 2006. In view of the range of interfaces with different public bodies and private industry and Defra's commitment to transparency and accountability, external evaluators will normally be used for this evaluation. After the next review the frequency will be reconsidered in light of the funding cycle.

The evaluation will assess the policy relevance of research, its scientific quality, and the use that is made of the findings (for example through additional guidance issued to the industry, avoidance of infraction and support for our negotiating position) and value for money. This will involve a desk study of documentation as well as interviews with those involved in all stages of the procurement, management and utilisation of the research.

Other factors to be considered in the evaluation will be the extent and mode of collaborative work, success in attracting EU funding to research new areas of interest related to the protection and improvement of water resources and water supply, awareness of the programme of activities in the water industry, related stakeholders and elsewhere. The strategic positioning of the research programme in relation to the overall national programme of research on issues relevant to the responsibilities and activities of Defra drinking water policy will be an important consideration in the evaluation.

Outputs from the programme will be published on the DWI and Defra websites and contractors will be encouraged to publish in the scientific literature. Summary findings will be disseminated throughout the Inspectorate and to a wider audience by means of

Newsletters. The Inspectorate's research pages have recently received a favourable review from the Royal Society of Chemistry's Water Science Forum. Consideration has been given to further enhancing dissemination.