

Executive Summary

Introduction: Water shortages have been documented as a result of flooding and other extreme events in many European countries over recent years. Water shortages may be associated with a range of human health impacts such as increased risk of dehydration, communicable disease and psychological distress.

The incidence of extreme events has been rising and the impact of climate change is projected to increase the risk for millions of individuals, their homes, their communities, and the infrastructure that supports them. Following extensive flooding and related water shortages in the UK during the summer of 2007, the UK government commissioned Sir Michael Pitt to review the emergency response / recovery and offer recommendations for future event management. This review reported the largest loss of combined electricity, water and sewage services since World War II, with almost half a million people without mains water or electricity.

Aim: This study by Health Protection Agency (HPA) in collaboration with the Drinking Water Inspectorate (DWI) looks at specific health issues. Whilst it is recognised that water companies have plans in place for failures in supply, this document looks at the health effects of extreme weather events that cause longer term shortage¹ requiring a sustained response over a longer period of time. A search of the scientific literature and evidence base on loss of water supply in flooding and other extreme events was combined with the findings generated from an interactive workshop of UK water company and health care professionals held on 8th July 2011. This completed report elaborates on aspects of the existing document “Drinking Water Safety – A guide for Water and Health Professionals” which was published in 2009 (DWI/HPA 2009).

Methods: A literature review was undertaken to gather evidence, studies and information from a wide range of peer reviewed and grey literature. Published journals were consulted in conjunction with official water company reports, national and international guidance. A workshop was facilitated in order to gain feedback from water company and health professionals on this document and offer them the opportunity to incorporate their own experiences and knowledge.

¹ In this document a prolonged incident is defined as 5 days after a Major Incident is declared. (SEMD guidance 6 (DEFRA 2009))

Results: The findings reconfirm the importance of water companies and health care professionals achieving a common understanding of the roles and responsibilities in delivering a synchronised response, and a coordinated communication strategy that is diverse in its delivery yet consistent in content. The absence of robust evidence based scientific studies on water shortages in extreme events was demonstrated. Despite the number of published reports and reflective reviews following extreme events, these do not contain rigorous scientific evidence on the health outcomes of these same episodes. This demonstrates the need for health professionals to focus on their role of health surveillance during and following events in order to develop the empirical data base to underpin policies and practice.

Points for Consideration: Government policy is for emergency plans to go beyond the routine operational events and prepare for events which may cut off water to a large number of consumers for over 72 hours and may involve more than one water supply or company (DEFRA/Welsh Assembly Government 2007) It also needs to be taken into account how the extreme event will affect logistics of distribution of alternate supplies, the health of the population without a water, supply, power sanitation and how these periods will differ from routine operational events. Extreme events affect health beyond drinking water and this is to be taken into account when planning the response and recovery.

It is also important that water companies and health professionals have a common understanding of the needs of vulnerable populations, who will require help and why certain groups of people may be more susceptible to potential adverse health effects as a result of water shortages with wider sanitation issues

During the first workshop it was suggested that this document be updated and revised following extreme events when enhanced surveillance is undertaken. The aim of this will be to identify and incorporate published evidence, scientific literature and the lessons identified from events that will take place after publication of this initial document. It was noted that DWI holds regular seminars with water companies each year and one of these should focus on health surveillance and learning.

Finally, it has been shown that the research in this area needs to be built and expanded on. Although the SIGN guidance categorises most of the literature as a level D, it is recognised by the research team the value that reports by the DWI and other DWQ regulators in the UK bring. Due to the nature of disasters, their inherent unpredictability and the immediacy required of the response it is often not possible to undertake rigorously pre-planned

randomised control trials. However, pre-planned enhanced health surveillance protocols can and should be developed and applied to improve the knowledge base. Expanding the scientific literature and making the opportunity to conduct research in this field is essential for the future knowledge base and developing our resilience.

Points for Consideration

The following tables summarise the points for consideration that have been obtained through the literature review, workshop and expert consultation. They have been split into four main categories.

1. Points for consideration with established and documented processes, protocols, roles and responsibilities
2. Points for consideration which may not currently be adopted across all stakeholders
3. Points considered where further work is recommended.
4. Research and future development needs – A summary of the research needs that were identified during the literature review process that would strengthen the evidence base on which guidance is made

Points for consideration with established and documented processes, protocols, roles and responsibilities

AREA	Status and Owner Organisation	Grading by SIGN Guidance
Emergency planning that includes		
<ul style="list-style-type: none"> The planning for severe supply interruptions that exceed the duration and scale of routine operational events 	In place with Water Companies and DEFRA (SEMD) (DEFRA 2008)	D
<ul style="list-style-type: none"> A clear description of the roles of each organisation, agency, individual, voluntary group or team that will respond 	In place with Water Companies and DEFRA (planning for Major Water and Waste water Incidents in England and Wales Generic guidance 2006)	D
<ul style="list-style-type: none"> Identification of alternative sources of water and any early changes in their quantity and quality (Aergeerts, 2010) 	Water Companies through Regulation 27 risk assessments. The Water Supply (Water Quality) Regulations 2000 as amended.	D
<ul style="list-style-type: none"> Responses that are able to be activated remotely and should not depend on the emergency team having to access buildings or roads that may be cut off by flooding/snow or windstorm damage. 	DEFRA, DWI and Water Company contingency plans	D
<ul style="list-style-type: none"> An understanding of how extreme events can impact on services, showing the management and mitigation of these risks.(Ofwat, 2007) 	Water Companies through Regulation 27 risk assessments. The Water Supply (Water Quality) Regulations 2000 as amended	D

AREA	Status and Owner Organisation	Grading by SIGN Guidance
Emergency planning that includes (cont...)		
<ul style="list-style-type: none"> Involvement of the community and supermarkets in formulation of plans and engagement with Local Resilience Forums 	Local Resilience Forum Water Industry and Local Resilience Forums (LRFs)- see http://www.cabinetoffice.gov.uk/sites/default/files/resources/vulnerable_guidance.pdf	D
<ul style="list-style-type: none"> Quantity 		
<ul style="list-style-type: none"> A statement about the minimum quantity of water required per person after an extreme event. Currently, the sphere standards state the minimum quantity of water to provide should be 15 – 20 litres / person / day to allow for drinking and essential hygiene activities (Sphere 2011). In the UK it is 10 litres and after five days, 20 litres is strongly recommended (Ofwat, 2007; Water UK, 2008) 	SEMD guidelines – guidance 6.	C
Quality		
<ul style="list-style-type: none"> Advice to the public that water from tankers is advised to be boiled to avoid secondary contamination. Duty of water companies to oversee supplies. 	Duty of water companies to oversee supplies. Code of practice (BS8551) is due to be published. Provision and management of temporary water supplies and distribution networks (not including provisions for statutory emergencies).	D
Communication		
<ul style="list-style-type: none"> Pro-actively inform stakeholders on the importance of protecting water pipes during cold weather and their own responsibility 	Through water industry websites and other communication	D

Points for consideration which may not currently be adopted across all stakeholders

AREA	Status and owner organisation	Grading by SIGN Guidance
Emergency planning that includes		
<ul style="list-style-type: none"> • Training and practice exercises in water delivery in extreme events to include the use of large sized vehicles and identification of which roads could be suitable to travel on. 	Government, DEFRA and Water industry exercises	D
<ul style="list-style-type: none"> • Allowing communities to view plans to strengthen relationships and build trust. 		
<ul style="list-style-type: none"> • Identifying all possible vulnerable groups at risk from water shortage 	Water Company will liaise with Local Authorities	
<ul style="list-style-type: none"> • Consideration for the indirect public health effects of using many tankers on roads and the carrying of heavy containers 		D
<ul style="list-style-type: none"> • The description of activities and actions required in the event that critical sites and / or infrastructure become unavailable due to an extreme event (Aergeerts, 2010) 		D
Alternative Supplies		
<ul style="list-style-type: none"> • The possibility of military involvement to support mobilisation and assist secure distribution of supplies, although with due consideration to the criteria for their deployment. 	Military Aid to the Civil Community (MACC) or Military Aid to the Civil Power (MACP) requested by SCG.	D
<ul style="list-style-type: none"> • The supervision of tankers, where feasible, to avoid vandalism, aid filling and allow dispersal of important health advice and information in person. Category 1 responders could assist if operational needs arise. 		D

AREA	Status and owner organisation	Grading by SIGN Guidance
Communication		
<ul style="list-style-type: none"> Advice that is easy to access and understand, incorporating a range of languages. It should be pre-prepared and ready to be disseminated immediately 	Water Companies have established plans for use of notices.	D
<ul style="list-style-type: none"> A statement that the aim of communication about health impacts should be diversity in delivery but consistency in content. 		D
<ul style="list-style-type: none"> One designated agency leading on advice delivery where possible. . Volume of advice being delivered should be controlled to avoid overloading the public with too many messages at once. 	Water Companies Lead on communications about the water supply. This will feed in any external response structure eg LGD, Gold	D
<ul style="list-style-type: none"> Advice incorporating the health related reasons <i>why</i> consumers are being asked to perform techniques such as boiling and also information on avoidance of burns and carbon monoxide poisoning. Generic FAQs should be developed in partnership 		D
Vulnerable Groups		
<ul style="list-style-type: none"> Extensive use of the third sector to help the authorities in the distribution of water, particularly for those who are unable to leave their houses or carry heavy loads. 	Local authorities co-ordinate the activities of the various sector agencies and spontaneous volunteers.	D
<ul style="list-style-type: none"> In a protracted event, communication regarding possible unsuitable alternative water sources and potentially unsafe methods of boiling water. 	Bouchier Report DWI website	D

Points considered where further work is recommended

AREA	Status and owner organisation	Grading by SIGN Guidance
Vulnerable Groups		
<ul style="list-style-type: none"> During and following an extreme event there must be monitoring of those classed as vulnerable to ensure that they are gaining access to sufficient safe clean water, particularly the elderly. 	Recommendation for further consideration – HPA to lead in conjunction with other Health Professionals	D
<ul style="list-style-type: none"> Review of literature to ascertain evidence base to assure communication on advice for infants requiring bottle feeding are receiving bottled water with the correct sodium content. 	HPA and partner organisations researching to provide evidence base.	D

Research and areas for future development

Quantity
<ul style="list-style-type: none">• The quantity of water required by populations after an extreme weather event requires future research. Reflections from case studies have shown that this may need to be revised.
Vulnerable Groups
<ul style="list-style-type: none">• The requirements during water shortages by vulnerable populations need to be further researched.
Documenting & Publishing Events
<ul style="list-style-type: none">• Grading of evidence needs to take account of the fact that during extreme events, it is not possible to conduct studies at the higher end of the research hierarchy. Case studies, grey literature and reflective reports from actual events are an extremely valuable method of identifying lessons for future events.
Health related studies
<ul style="list-style-type: none">• Explore the need for an agreement between Health Protection Agency and Primary Care Trusts/Clinical Commissioning Groups to undertake appropriate enhanced surveillance of the health of the affected population during and after an extreme weather event, to include the development of “how to” protocols relating to enhanced surveillance, health and water shortages• Professional development of health sector staff in water related information should form part of their routine training• Enhanced surveillance undertaken in extreme weather events to be formally documented and written up for publication where applicable

Conclusion: Given the recent projections on climate change and the future impacts it will have on extreme events, it is clear that European preparedness, response and recovery within public health and water shortages is essential. Recent reports of water shortages as a result of extreme events affect significant numbers of people and have highlighted the need to build robust, coordinated plans which are based on scientific evidence.

Overall Conclusions

1 Health impacts change over time during large events. Loss of water supply in conjunction with loss of power over time may create sanitation problems, so these events cannot be viewed as only in terms of water quality.

2 These impacts can be predicted in advance and planned for, in relation to alternate supply provision, advice to consumers and health surveillance.