



Urban Flooding

Health impacts of urban flooding

FRMRC2 has produced:

- An improved understanding of the health impacts of floods, by providing information on the likely levels of microbial pollution in flood water, how people behave when confronted by flooding and assessing the overall health impact of a flood event

Intended readership:

- Researchers
- Consultants
- Policy makers and operating authorities

Where to find more information:

www.floodrisk.org.uk

Summary

Exposure to floodwater and sediment can result a variety of health effects ranging from mild cold symptoms and stomach upsets to death.

The health effects of flooding depend on both the 'quality' of the floodwater (source factors) and the people on whom it impacts (receptor factors). Both of these factors have been explored in order to provide a better understanding of possible health impact mitigation strategies.

Source factors have been explored by constructing a microbial contaminant profile of the River Caldew in Cumbria. The Caldew is a significant tributary of the River Eden, and was responsible for some of the flooding experienced in Carlisle in 2005.

Rivers are generally a major component of urban flooding and the microbial loading of riverine floodwaters was identified as a significant information gap in the first phase of research. The contaminant profile identified possible microbial exposure routes in both the urban infrastructure and rural catchment.

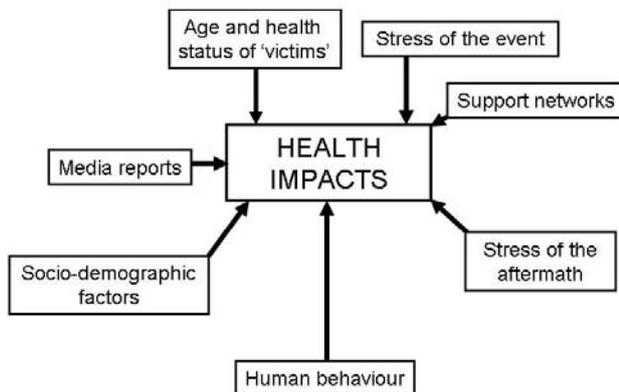


Behaviour during flooding, especially during withdrawal (evacuation) and clean-up, has largely been overlooked, which means that the assessment of exposure is quite uncertain.

This aspect was addressed through the use of a questionnaire survey conducted in two areas that experienced flooding in summer 2007.



The figure below shows that a number of people-related factors can impact on health



In addition to examining human behaviour, the possible impacts of news reporting were investigated by conducting a media analysis of the summer 2007 floods, based on the online versions of two national newspapers, the Sun and the Guardian.

A small-scale survey of possible mental health problems was also conducted, to examine the impact of flooding three years after the event.

The results of these separate pieces of research were combined with an extensive literature review to establish an overall health impact assessment of an example flood (based on the population of Carlisle flooded by the River Caldew in 2007).

Mental health symptoms were found to dominate the assessment, despite the prediction, based on the depth and speed of the floodwater) of at least one fatality. Given the importance of mental health (even allowing for possible over-reporting of symptoms in the published literature), this is a key area with regard to mitigating flood-related impacts.

The risks of gastrointestinal illness were explored in two different ways; using relative risk values derived from the published literature and by employing quantitative microbial risk assessment (QMRA) techniques. The QMRA allowed account to be taken of the expected floodwater contamination level and also exposure based on both flood-related and clean-up related behaviour. It was found that people were most likely to experience illness as a result of contact with viral pathogens during

Other sources of information

Fewtrell et al. (2011) The microbiology of urban UK floodwaters and a quantitative microbial risk assessment of flooding and gastrointestinal illness. *Journal of Flood Risk Management* 4(2), 77-87.

Fewtrell (2010) The microbiology of flooding: homes and health, *Microbiologist* 11(4), 37-40.

Research Team

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FRMRC is an interdisciplinary research consortium made up of partners from universities, government bodies and practitioners supported by:

- Engineering and Physical Sciences Research Council
- Department of Environment, Food and Rural Affairs/Environment Agency Joint Research Programme
- United Kingdom Water Industry Research
- Office of Public Works Dublin
- Northern Ireland Rivers Agency

Data were provided by the Environment Agency and the Ordnance Survey.