A new methodology for modelling of health risk from urban flooding exemplified by cholera - DTU Orbit (24/04/2019)

A new methodology for modelling of health risk from urban flooding exemplified by cholera: Case Dhaka, Bangladesh

The phenomenon of urban flooding due to rainfall exceeding the design capacity of drainage systems is a global problem and can have significant economic and social consequences. This is even more extreme in developing countries, where poor sanitation still causes a high infectious disease burden and mortality, especially during floods. At present, there are no software tools capable of combining hydrodynamic modelling and health risk analyses, and the links between urban flooding and the health risk for the population due to direct contact with the flood water are poorly understood. The present paper outlines a novel methodology for linking dynamic urban flood modelling with quantitative microbial risk assessment (QMRA). This provides a unique possibility for understanding the interaction between urban flooding and health risk caused by direct human contact with the flood water and hence gives an option for reducing the burden of disease in the population by use of intelligent urban flood risk management. The model linking urban flooding and health risk is applied to Dhaka City in Bangladesh, where waterborne diseases including cholera are endemic. The application to Dhaka City is supported by measurements of pathogens in the urban drainage system. The outcome of the application indicates that direct contact with polluted flood water is a plausible route of primary transmission of cholera and demonstrates the applicability and the potential for linking urban flood models with QMRA in order to identify interventions to reduce the burden of disease on the population in Dhaka City.

General information
Publication status: Published
Organisations: National Food Institute, Division of Risk Assessment and Nutrition, University of Exeter, Institute for Water Modelling, DHI Water Environment Health
Contributors: Mark, O., Jørgensen, C., Hammond, M., Khan, D., Tjener, R., Erichsen, A., Helwigh, B.
Pages: S28-S42
Publication date: 2018
Peer-reviewed: Yes

Publication information
Journal: Journal of Flood Risk Management
Volume: 11
Issue number: 51
ISSN (Print): 1753-318X
Ratings:
Web of Science (2018): Indexed yes
Original language: English
Keywords: Dhaka, Health risk, QMRA, Sewer modelling, Urban drainage, Urban flooding, Wastewater
Electronic versions:
jfr312182.pdf. Embargo ended: 06/03/2018
DOIs:
10.1111/jfr3.12182
Research output: Contribution to journal › Journal article – Annual report year: 2015 › Research › peer-review