According to plan?
Disaster risk knowledge and organizational responses to heat wave risk in London, UK

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Abstract. This paper explores how disaster risk knowledge shapes local heat wave risk management in London, UK. Its focus is on the implementation of the UK National Heatwave Plan through public sector organizations in London. Empirical evidence stems from 49 semi-structured, expert interviews with risk managers from local authorities, and health and social care organizations in London. Findings suggest that the National Heatwave Plan is an important source of disaster risk knowledge, but that it has not been successful in steering sustainable change in the way that heat risk is planned for at the local level. The plan is perceived locally as a public health strategy focused on emergency response. This reinforces local heat wave planning approaches that are enacted through public health and that prioritize short-term response actions, rather than long-term preventive strategies. This paper argues that the provision of disaster risk knowledge can undermine paradigm shifts in local risk planning if it constrains consideration of alternatives to existing risk management approaches.

Key words: climate change; disaster; heat wave; knowledge; organization; risk management.

Introduction

Scientific findings suggest that heat waves and extreme temperatures are expected to increase in frequency, length, and magnitude in the context of climate change (IPCC 2012, 2014, Christidis et al. 2014). In the UK, projections on the health impacts of climate change suggest a significant increase in temperature-related mortality in the absence of adaptive management (Hajat et al. 2014). While there is clear epidemiological evidence that elderly and very young people are particularly vulnerable to adverse effects of extreme temperatures (Worfolk 2000, Schwartz 2005, Hajat et al. 2007, O’Neill et al. 2009, Schifano et al. 2013), less attention is given to social, environmental, and technical risk dimensions that mediate heat wave vulnerability.

There is evidence of the impact of disaster risk knowledge on the vulnerability of individuals to extreme heat (Abrahamson et al. 2009, Wolf et al. 2010), but less attention has been paid to the role of disaster risk knowledge in shaping organizational responses to heat risk. This gap in research seems relevant as organizations from public administration and health and social care play an important role in the implementation of disaster risk management policy at the local level (Shaw 2012, Heidrich et al. 2013). In the UK, for example, the 2004 Civil Contingencies Act (CCA) established a statutory responsibility for local authority organizations to plan for and respond to emergencies, including heat wave risk. This created demand in local public administration for knowledge and advice on disaster risk.

The 2003 European heat wave revealed that many European governments underestimated the adverse effects of heat on health. It was associated with 45 000–70 000 excess deaths across Europe (Robine et al. 2007, WHO 2009) and shed light on the need for more systematic heat wave planning of the public sector. Although heat wave warning systems were in place before the 2003 heat wave, for example in Lisbon and Rome (Pascal et al. 2006, Nogueira and Paixão 2008), it was only after the event that governments across Europe, including the UK, started to develop national risk planning strategies for heat. They responded to recommendations of the World Health Organization (WHO) Europe, which evaluated the 2003 heat wave...
and urged governments to develop heat health warning systems (HHWS; WHO 2003). It also called on member states to systematically include heat wave risk into emergency planning at local and national scales.

In the UK, heat risk has been planned for systematically since the 2003 heat wave, which is associated with 2000 casualties in the country (Kovats et al. 2006). The UK government reacted to this significant impact by introducing the National Heatwave Plan in 2004. The plan is a nonstatutory planning document that provides knowledge and advice on heat risk management to local authorities, health care, and social care organizations and voluntary sector organizations. It is issued by Public Health England (PHE), an executive agency of the UK Department of Health (DH). At the heart of the National Heatwave Plan is a forecasting and early warning system for extreme temperatures. This “Heat-Health Watch alert system” is operated by the UK Met Office. Between 1 June and 15 September of each year, it monitors temperatures and issues heat wave alerts according to threshold temperatures specified in the National Heatwave Plan. The heat alerts are disseminated from the Met Office to a broad set of stakeholders involved in heat wave risk management, including local authorities, health care, and social care organizations.

This paper explores how the UK National Heatwave Plan informs and guides heat wave risk management of local authorities and National Health Service (NHS) organizations in London and the implications that this guidance has for adaptive disaster risk management in the context of climate change. It argues that the legal mandate of the 2004 CCA created demand at the local level for knowledge on heat risk management and that this demand is met by the provision of disaster risk knowledge and advice in the form of the National Heatwave Plan. Interviews conducted with risk planning officials in London suggest that the plan was used at the local level to reinforce reactive health-centered approaches for heat wave planning. Disaster risk knowledge thus supported a health focus of local heat risk management in London, and this undermined an acknowledgement of preventive risk planning strategies that emphasize social, environmental, and technical risk dimensions of heat risk management. The remainder of this paper is divided in three sections. First, the study context and the case study are described. Second, the research methodology is outlined. Third, research results are presented and contextualized through a discussion of the role of disaster risk knowledge in informing local planning strategies.

**Study Context**

London, UK was selected as a case study for this research because of its relatively large heat wave planning community of practice (Wenger 1998). London has 33 local authorities (“London boroughs”). Each of these local authorities has a statutory responsibility for emergency planning under the 2004 Civil Contingencies Act. Heat wave planning in London also includes regional- and national-level organizations from health care and social care. The National Heatwave Plan targets local authorities and health care and social care organizations, as well as voluntary organizations (PHE 2014). However, the boundaries of the heat wave community of practice are fuzzy: there is no formal regulation of which organizations are involved in heat wave planning and which are not. The density of relevant stakeholders in London offered a chance to study how different communities of practice helped to disseminate disaster risk knowledge through administrative scales, from the national to the local level, and how this informed risk management in demographically and economically diverse municipalities across London. The focus on London allows this study to build on previous research of the dynamics of heat wave vulnerability in the city (Wolf and McGregor 2013) and how these are mediated by local organizations and institutions (Zaidi and Pelling 2013).

Parts of central London are subject to the urban heat island effect (GLA 2006), with average temperatures up to 10°C above the countryside. In London, adverse effects on health start at temperatures ~19°C (Hajat et al. 2002). London, as a densely populated urban area, is vulnerable to the adverse effects of heat and has experienced several heat wave events over the last decades. Notable heat waves affecting London took place in 2003, 2006, 2009, and most recently, in 2013 (Robine et al. 2007, Green et al. 2012, PHE 2014). During July 2013, temperatures in the UK exceeded 30°C for seven consecutive days. This was the third warmest July in the UK since 1910 (Met Office 2013). Despite this meteorological significance, a recent study found only minor health impacts of the July 2013 heat wave in the UK (Elliot et al. 2014). Assessments of the extent to which heat wave risk management contributed to this minor health impact might be of relevance to future research in this area.

**Research Methodology**

Knowledge is constructed through social interaction (Berger and Luckmann 1991, Castree and Braun 2001, Detel 2001). This epistemology emphasizes differences in perceptions of individuals, which are constitutive of contextual rather than universally agreed upon and accepted realities. This framework allows for the exploration of the complexities and ambiguities of social and organizational learning that follow from the provision of disaster risk knowledge to local risk planning stakeholders. This study draws on theory that explores how individual and collective learning is mediated by social relationships. This includes studies that highlight social context as a determinant of individual learning (Bandura 1977, Jarvis et al. 1998),
but also refers to a body of literature that explores ways in which social collectives have the ability to learn in their own right (Senge 1990, Argyris and Schön 1996).

Empirical evidence for this study stems from 49 semi-structured interviews with senior and mid-level professionals involved in heat wave planning in London. Recruitment of participants followed a snowballing technique. Sampling started through the identification of initial contacts through a gate-keeping contact. Snowball sampling was used as a recruitment strategy, because responsibilities for heat wave risk management are subsumed under different roles across organizations, including emergency planning officers, public health officials, and social care professionals. This made an identification of individuals through formal channels, such as organizational websites, difficult.

The largest group of respondents came from London local authorities (n = 27). Fifteen different local authorities across London were interviewed for the study, including representatives of emergency planning, public health, social care, city planning, and sustainability and environment teams. Other respondents were representatives of the NHS (n = 7), from Public Health England (n = 4), from the voluntary sector (n = 4), the Greater London Authority (n = 3), from national government (n = 2), from the London Ambulance Service (n = 1), and the London Fire Brigade (n = 1). Thirteen individuals approached for participation in the study declined or did not respond to the inquiry. Ethical approval for the research was obtained through King’s College London.

Interviews shared similar opening and closing questions, but specific themes and questions of the interviews evolved throughout the research process. Scoping interviews (n = 17) aimed at developing an understanding of the organizational set-up of heat wave planning at the local level in London. Interviews focused on drivers of local heat wave planning and institutional platforms for collaboration on the subject. The main set of interviews (n = 26) focused more specifically on change and learning in organizational risk planning. The aim of the interviews was to explore how disaster risk knowledge shaped local risk planning. Finally, a small set of interviews (n = 6) was conducted after the empirical analysis of primary data to test preliminary results. Respondent types were distributed relatively evenly across the three different forms of interviews.

All interviews were conducted by the researcher. Interviews were not audio-recorded, but notes were taken during the interviews by the researcher. Interviews were not audio-recorded to maintain an informal and confidential atmosphere during the interviews. Notes from the interviews were transcribed immediately after interviews to limit loss of information. For the analysis of research data, the study relied on a grounded theory approach (Glaser and Strauss 1967, Glaser 1998). This allowed the analysis to be sensitive and responsive to dominant themes in the interview data. Interview transcripts were coded and categorized in thematic themes using MAXQDA 10 (VERBI GmbH, Berlin, Germany).

The analysis draws on viewpoints from respondents and revolves around a series of quotations. It offers explanation based on interpretations that condense and prioritize narratives. Data analysis was based on written protocols of interviews. Quotations are used in the analysis that represent and capture thematic themes. The analytical narrative emerged from the data. It was not hypothesized in advance. Data presented here is thus selective, but does not systematically omit contradictory evidence. The analysis is based on a nonrandomized, relatively small sample of individuals. During the time of the interviews in 2013, the public health sector in the UK underwent fundamental changes introduced by the 2012 Health and Social Care Act. This potentially biased the findings of the analysis, as efforts to adjust to new roles and responsibilities might have undermined heat wave planning in health organizations in London. As a consequence, the findings of the analysis may not be generalized. Names of individuals and organizations are not disclosed to maintain confidentiality.

**Findings and Discussion**

**Demand for disaster risk knowledge at the local level**

Heat wave risk planning in London is framed by the 2004 Civil Contingencies Act (CCA), which provides a legal mandate for UK local authorities to plan for and respond to emergencies. The act differentiates between category 1 and category 2 responders. Local authorities are category 1 responders: organizations with primary responsibility for contingency planning in the UK. Under the 2004 CCA, all UK local authorities, including London’s 33 boroughs, are required to develop risk assessments. These assessments are formal risk planning tools. They complement national and regional risk assessments (Cabinet Office 2013, GLA 2014). The 2014 London Risk Register, for example, specifies 67 potential risks, including hazards, major accidents, and malicious attacks (GLA 2014). For each risk, the risk register quantifies its likelihood and anticipated impact. Local authority risk assessments can divert from the regional risk register to account for locally specific risks, but national and regional risk assessments assist local authorities in developing risk assessments. An emergency planning officer from a London local authority suggested that local contingency planning in the context of the 2004 CCA, including heat wave planning, is based on risk assessments:

*Any emergency planning is done on a risk assessment basis. We look at different risks and assess their likelihood...*
and possible impact. This is the basis for planning and for prioritizing which issues are addressed more prominently than others.

—Respondent A

In London, the legal mandate for emergency planning given to local authorities is supported by the 2010 Minimum Standards for London, a policy instrument developed by the Greater London Authority that specifies a number of particular risks that need to be planned for by the 33 London boroughs. A head of emergency planning at a London local authority suggested that heat waves are one of the risks that London boroughs are required to plan for under the Minimum Standards policy instrument:

To a certain degree, planning at the local level is determined by policies at different scales. There are, for example, the Minimum Standards for London. They require us to have minimum planning arrangements in place, and heat waves are one of them.

—Respondent B

The role of the 2004 Civil Contingencies Act and the Minimum Standards for London was also highlighted by an emergency planning officer at another London local authority:

The Civil Contingencies Act and the Minimum Standards for London are two things that shape heat wave planning at the local level.

—Respondent C

Besides the 2004 CCA and the 2010 Minimum Standards for London, demand for disaster risk knowledge at the local level was also created by the 2012 Health and Social Care Act, which fundamentally transformed the public health system in the UK, as the responsibility for public health moved from the NHS to local authorities. This created responsibilities for local authority public health teams to plan for emergencies. According to a representative from the NHS England, this reinforced demand in local authority organizations for knowledge and advice on emergency planning:

The director of public health is now a local authority officer. They now have a statutory requirement to plan for emergencies and to have all plans in place. This should drive initiative at the local authority level and should therefore give momentum to the approach of planning and cascading alerts.

—Respondent D

National authorities in the UK suggested that local authorities rely on information and advice from the national level to carry out their statutory responsibilities for disaster risk management. A representative of the UK Civil Contingencies Secretariat indicated that national risk assessments for the UK, as well as regional risk assessment processes, are guiding the development of local risk assessments by emergency planning teams of the local authorities. The respondent argued that local-level risk planners relied on information about the risk assessment process being provided to them from the regional and national level:

National risk assessment is carried out as a statutory guidance by the Civil Contingencies Secretariat. This means we have to carry out this guidance to local authorities. […] However, local authorities often don’t have the detailed information they require, so the communication between the national and local level needs to be improved.

—Respondent E

Demand for disaster risk knowledge was also expressed during the 2013 Heatwave Seminar. The conference is organized annually by Public Health England and the Department of Health and brings together stakeholders in heat wave planning in the UK, including local authorities, national and regional public health authorities, and academics. It seeks to gather feedback on the National Heatwave Plan. In the recommendations outlined in the 2013 conference report, attendees reiterated demand for disaster risk knowledge to be provided to them. Among others, one recommendation suggested the Department of Health and Public Health England “[p]rovide clearer responsibilities for people in Local Authorities” and to “[h]ighlight in the HWP [Heatwave Plan] particular actions which are statutory” (DH&HPA 2013:16–17).

Demand for knowledge and advice on disaster risk management was also articulated within the public health system. A representative from a local Health Protection Unit, a sub-branch of Public Health England that serves as a local knowledge hub between Public Health England and stakeholders in public health, suggested that more guidance from the national level on how to carry out responsibilities in disaster risk management would be helpful:

Sometimes it would be really helpful to have more guidance from above, to have someone say: these are the issues that you need to look at.

—Respondent F

In sum, legal requirements for contingency planning and the devolution of responsibility for disaster planning and response to local authorities created local demand for knowledge about heat wave risk management. The next section will explore how this demand is satisfied by the provision of knowledge and advice outlined in the National Heatwave Plan and how this shapes local heat wave risk management approaches in London.

Disaster risk knowledge: the National Heatwave Plan

Local heat wave plans of risk planning organizations in London were modeled on the National Heatwave Plan. The plan was considered an important source of disaster
risk knowledge by many respondents. An emergency planning officer from a London local authority suggested that the National Heatwave Plan serves as a blueprint for heat wave plans developed by local authorities in London:

Most of the heat wave planning actions at lower levels are determined by the Department of Health heat wave plan. This cascades through the different levels to the local level. Most of the plans are cut and pastes of the National Heatwave Plan.

—Respondent G

Within local authority organizations, knowledge on heat wave planning provided through the National Heatwave Plan was appreciated for the guidance it gives in developing statutory risk management plans. An emergency planning officer from another London local authority suggested that the National Heatwave Plan informed the development of the local severe weather plan:

There is a severe weather plan for [the local authority], which includes a chapter on heat waves. It dates from 2010. It was produced by the emergency planning unit, with strong guidance from the Department of Health National Heatwave Plan.

—Respondent G

The respondent reported that their organizational heat wave plan was updated only in reaction to changes and updates to the National Heatwave Plan. This suggests that local heat wave plans in London are closely tied to the annual cycles of revision of the National Heatwave Plan:

The severe weather plan is updated every year. These updates are done in relation to the National Heatwave Plan.

—Respondent G

Knowledge of heat wave risk management provided through the National Heatwave Plan also seemed to shape heat wave planning in local organizations from the NHS. This was suggested by an emergency planning officer at a NHS trust in London. According to the respondent, the National Heatwave Plan shaped planning for heat stress in the organization:

[... ] the Department of Health heat wave plan is of course crucial for planning. If it would change, so would responses on the ground. In that sense, it’s a top down approach to planning.

—Respondent H

These statements suggest that disaster risk knowledge was provided from the national level to local risk planning organizations through the National Heatwave Plan. This knowledge seemed to harmonize local heat wave planning approaches in London.

Health focus of local heat wave planning

Heat stress was considered by many risk planning officials in London as predominantly a public health problem. According to an emergency planning officer from a London local authority, adverse effects from heat stress primarily concerned public health. The respondent suggested that heat wave planning in the organization was consequently led by the public health team:

Heat wave planning is quintessentially a health care issue, and Health also owns the heat wave plan.

—Respondent I

A similar statement was made by an emergency planning officer from another London local authority. The respondent pointed to the limited scope of action on heat stress for the emergency planning team of the local authority, which they associated with the health implications that severe temperatures have:

Weather is generally a health thing. There is only so much we can do from the side of emergency planning.

—Respondent J

The framing of heat risk as a public health problem seemed to be closely intertwined with the perception of organizational and policy ownership of heat risk. The UK Department of Health and Public Health England were perceived by many respondents as custodians of the heat wave plan. Respondents that referred to the National Heatwave Plan as the “Department of Health plan” discursively underlined the close association of existing heat wave planning frameworks with public health and its organizational representations in the UK. An emergency planning officer at a NHS trust in London spoke of the “Department of Health plan” as a blueprint for planning approaches in their organization:

Our plan is inevitably build around the thresholds provided by the Met Office and the Department of Health heat wave plan.

—Respondent K

The perceived ownership of existing heat wave planning frameworks by public health seemed to root in efforts of the predecessor of Public Health England, the Health Protection Agency (HPA), to establish its role as a public policy actor in the UK. The Health Protection Agency became part of the newly formed Public Health England in 2013, following the reforms of the 2012 Health and Social Care Act. According to a representative of a national health organization, attempts of the HPA to establish its role after being created in 2003, as well as efforts of the WHO in guiding the development of the UK National Heatwave Plan, shaped the perception of organizational ownership of heat wave planning in the UK:

The people involved in the National Heatwave Plan, which were mostly political staff from the HPA and the DH, were quite shocked about the high number of deaths, both in Europe and also in the UK. The HPA had just been born at that time, and I believe there was also an element to it that...
the HPA needed to prove itself and show that it is relevant. Moreover, WHO Europe was also driving our work around the National Heatwave Plan. They were involved in lots of research following the 2003 heat wave.

—Respondent L

At the local level, public health organizations were considered by risk planning officials as integral to the delivery of heat wave planning frameworks. An emergency planning officer from a London local authority suggested that the local NHS Primary Care Trust was a focal point for the dissemination of the National Heatwave Plan to the local authority prior to the 2012 healthcare reforms:

Previously, we would receive our heat wave plan from the Primary Care Trust [PCT]. They always passed on to us a template, which was derived from the National Heatwave Plan. The PCT passed this on to us because heat waves are primarily a health-related risk. We would receive the new plan annually.

—Respondent M

A risk planner at the Greater London Authority underlined the role of the Department of Health in shaping the emergence of existing heat wave planning frameworks in the UK:

The changes that were implemented after the heat wave in 2003, for example the Heat-Health Watch alert system, were all driven by the national level, and the Department of Health, in particular.

—Respondent D

In summary, the National Heatwave Plan was perceived by many respondents as a public health strategy, and thus supported a framing of heat risk as a health care issue at the local level. The next section will explore how this health focus of heat wave risk management in London might affect paradigm shifts in disaster risk management approaches at the local level.

Lack of preventive, social, and environmental risk planning approaches

The institutionally configured health focus of local heat wave planning approaches in London seemed to undermine a paradigm shift in disaster risk management toward preventive-planning strategies that consider environmental, social, and technical risk dimensions, according to planning officials in London. Several respondents distinguished between responsive and preventive approaches to heat wave planning. Research suggests that such preventive planning should consider social dimensions of heat wave vulnerability, in particular (Klinenberg 2003, McGregor et al. 2007). This includes social isolation, which renders individuals vulnerable because they lack regular support through social networks during extreme temperatures (Naughton and Henderson 2002).

A representative of the Greater London Authority suggested that heat wave planning in London was characterized by a dichotomy between response-based planning delivered through the public health community of practice, on the one side, and preventive planning that focuses on social responses, on the other side:

There are two areas in heat wave planning: a) short-term planning, mostly looking at the health impacts, and b) the longer term perspective, looking at adaptation.

—Respondent N

Social and technical aspects of heat wave planning were insufficiently considered in current disaster risk management practices in London, according to the respondent. The risk planner suggested that their organization failed to include social and technical aspects into heat wave planning arrangements:

However, I believe that we need to think more broadly about the impacts of heat waves, to consider social issues, housing, and planning, etc. These things are more on the forward-planning side and not yet well-considered in heat wave planning and not in our plan.

—Respondent N

Environmental and technical risk dimensions relating to housing and city planning appear to be of particular relevance in London, as its densely populated built environment is subject to the urban heat island effect (GLA 2006). A head of emergency planning from a London local authority expressed concerns over the adverse effects of heat on transport infrastructure and electricity generation, underlining the relevance of risk dimensions beyond public health:

Health is very important, but heat waves are not solely a health issue. There are other very important things to consider for heat wave planning. This includes effects on transport, for example melting asphalt, and implications for power generation.

—Respondent A

Concerns with heat risk management approaches that fall short of grasping the complexities of heat wave vulnerability also existed within the NHS. An emergency planning officer from a Clinical Commissioning Group in London suggested that a response focus of disaster risk management was inappropriate if it failed to address long-term preventive aspects of heat wave planning:

I am a firm believer that we should not only be reacting, but that our approach towards hazards like heat should be broad and inclusive, and should tie in with other areas, for example, when we target vulnerable people. We should try to target providers early on, get the message to them, and make it their culture to care about these things, too. This is an exercise that goes all the way from the school to the care home. It’s about information and changing the perception of the relevance of issues.

—Respondent O
Short-term, response-focused approaches to disaster risk management seemed to be particularly prevalent during the July 2013 heat wave. A level 3 heat wave alert was issued for London and parts of South East England by the Met Office for several days in July (Elliot et al. 2014). An environmental officer from a London local authority suggested that attention paid by organizations toward responding to the hot weather contrasted with a lack of recognition of long-term aspects of heat wave planning:

Heat waves are in the headlines now, and it is all about the response, of course. But there is this longer-term planning side to it that we really need to consider.

—Respondent P

As the above demonstrates, risk planners in London recognized the need to go beyond public health aspects in heat wave planning and felt that such a paradigm shift away from responsive planning was undermined by an institutionally configured focus of heat wave planning on aspects related to public health.

Conclusion

Findings from this paper suggest that the UK National Heatwave Plan is an important source of disaster risk knowledge. Heat wave risk management approaches of local planning organizations in London were modeled on the National Heatwave Plan, but this reinforced emergency response strategies focused on the health aspects of heat wave risk. Organizational ownership of the National Heatwave Plan by the Department of Health contributed to the perception of local risk planners that heat wave planning is a public health issue. The National Heatwave Plan thus so far is not successful in facilitating a shift toward preventive risk planning that considers social, environmental, and technical risk dimensions. These aspects were considered important by local risk planners, but were rarely implemented in organizational heat wave plans. Future research could analyze how local heat wave planning might have changed after the adjustment process of the 2012 Health and Social Care Act, which might have influenced some of the findings of this paper. Moreover, this study only concentrated on implications rather than on the processes of how disaster risk knowledge shapes local heat wave planning approaches. It was unable to explore in more detail the pathways and constraints of how disaster risk knowledge informs paradigm shifts in local risk planning organizations. Research should therefore concentrate on opportunities for social learning in local risk planning organizations. This will allow for valuable insights on how the role of disaster risk knowledge in shaping local risk planning approaches is institutionally constrained.

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