EMERGENCY PLANNING IN HEALTH:
Scoping study of the international literature, local information resources and key stakeholders.

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## Glossary of terms/abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>CBRN</td>
<td>Chemical, Biological, Radiological &amp; Nuclear</td>
</tr>
<tr>
<td>CHaPD</td>
<td>Chemical Hazards and Poisons Division, HPA (UK)</td>
</tr>
<tr>
<td>ED</td>
<td>Emergency department</td>
</tr>
<tr>
<td>EPO</td>
<td>Emergency planning officer</td>
</tr>
<tr>
<td>FEMA</td>
<td>Federal Emergency Management Agency (US)</td>
</tr>
<tr>
<td>EM-DAT</td>
<td>Emergency Events Database, Centre for Research on the Epidemiology of Disasters</td>
</tr>
<tr>
<td>HPA</td>
<td>Health Protection Agency (UK)</td>
</tr>
<tr>
<td>IEMS</td>
<td>Integrated Emergency Management System</td>
</tr>
<tr>
<td>LMIC</td>
<td>Low- and Middle-Income Countries</td>
</tr>
<tr>
<td>PCT</td>
<td>Primary Care Trust</td>
</tr>
<tr>
<td>SARS</td>
<td>Severe Acute Respiratory Syndrome</td>
</tr>
<tr>
<td>SHA</td>
<td>Strategic Health Authority</td>
</tr>
<tr>
<td>STAC</td>
<td>Scientific and Technical Advisory Cell</td>
</tr>
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</table>
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Executive Summary

Background

The emergency planning field in the past decade has grown and matured considerably, galvanised in part by key events such as the 11 September 2001 terrorist attacks and the London bombings on 7 July 2005. Its importance has also been codified in the Civil Contingencies Act, 2004 that set out key responsibilities for the various health agencies with the duty to be prepared for major incidents. This included planning, training and testing activities, as well as a duty to assess local hazards and risks and use this assessment to inform emergency planning.

However, deficiencies in NHS emergency planning have been previously noted and questions have been raised as to the evidence-base that underpins much of the activity of emergency planning for major incidents. An evidence base is also required to support planning around longer-term “rising tide” incidents such as infectious disease outbreaks, covert chemical, biological, radiological and nuclear (CBRN) events, and threats to infrastructure and business continuity such as floods and transport strikes. Our preparatory work revealed that there was a lack of consistency of terminologies and concepts used in emergency planning. Different (but similar) models of emergency management also exist that perhaps reflect the national cultures and contexts of the countries in which the systems have evolved. What is less clear is what systems and processes work best.

Aims

This project was commissioned to determine the evidence-base for emergency planning, specifically for the UK health context, and identify the evidence requirements of the emergency planning community.

Methods

The project was a collaborative partnership between academics, clinicians, public health and health protection specialists. It consisted of 4 subprojects: a scoping study of the published literature, a qualitative grey literature scoping review, key informant interviews, and an e-Delphi study. A mix of
methods was employed in order to approach the topic broadly and holistically. Notably, the key informant interviews sampled multi-agency stakeholders with an academic role, technical expertise or strategic role whilst the e-Delphi study included respondents who had either operational or training and educational responsibility.

Results

The scoping review of the internationally published academic literature examined 2,736 articles from 8 databases. This revealed that a significant proportion of the current literature is from the United States with only a small contribution from the UK. A large proportion is focussed on the emergency preparedness and response aspects in particular and relatively less on the other aspects such as hazard assessment, mitigation, and especially recovery. The studies were mostly descriptive or opinion-based.

Among the grey literature, we found that 97 of the 192 papers examined contained material that was relevant and potentially useful. The grey literature is potentially a major part of the existing evidence base for emergency planning but there was no easy way of gathering and assimilating this information. Having a central repository of this knowledge that is easily accessible would be helpful to practitioners and policymakers in the field. Furthermore, there is a need for evidence synthesis to convert this resource into a form that is both usable and useful for practitioners. The available material varied considerably in type, degree of analysis, breadth and depth. Qualitative analysis of the grey literature revealed a predominance of material on the response phase (66%). However, there was more material available on the recovery phase (a third of articles) than in the published literature. The main themes tended to focus on organisational issues mainly around response, communication issues, assessment of emergencies, decision-making and recovery problems.

We conducted 17 key informant interviews to explore in greater depth the current state of emergency planning in the UK and identify key issues and gaps where further research would be useful. This provided a rich vein of information and multiple themes were identified. Notable findings were that the informants identified greater gaps in operational than technical aspects of emergency planning. Social and behavioural knowledge gaps were highlighted, both for individuals and organisations. Other threads were how knowledge was acquired, shared and retained, as well as aspects of communication, risk and how the emergency management system is set up and functions. These findings mirrored the themes identified from the grey literature scoping review.
The e-Delphi study involved 26 participants in three rounds. The strongest themes identified were education and training, planning and communication. Our international expert panel initially generated 221 statements in 11 topic areas that were prioritised by the e-Delphi process into 77 topics of research priority in major incident management. Other themes included recovery, acute response, and pre-hospital care. The expert panel only identified one area (triage) that they agreed was well researched and understood. Whilst a number of topics for research were prioritised, the study did not seek to order them further or investigate the feasibility of researching each area. Further assessment and ranking will be necessary before the topics can be rated as realistic research projects.

Conclusions

Four major thematic categories for future research emerged from the different work streams:

- **The knowledge-base for emergency planning in health** - Different approaches are needed for the acquisition of the knowledge-base relevant to emergency planning, its valuation, dissemination, adoption and retention.

- **Social and behavioural issues in disasters** - A greater understanding is needed of how individuals (particularly decision-makers) behave in emergencies and how they approach risk.

- **Individual behaviour and organisational issues in emergencies** - Numerous organisational issues relating to how organisations respond to emergencies need investigation; e.g. the relative value of planning over plans, flexible versus standardized approaches to major incidents, top-down versus bottom-up command and control hierarchies, generic versus specific planning, and reactive versus proactive approaches to hazards.

- **Emergency Management System Issues** - Research is needed into system-wide issues relating to how the emergency management system is organized, how it engages the public, and how its performance and outputs can be measured and compared against systems elsewhere.
1 Background to the study

1.1 Introduction

The UK suffers around 11 “classic” major incidents per year (1). These often will require coordinated responses by multiple agencies involved in emergency response including health. In the past much of this work has gone on quietly in the background. But the terrorist attacks of 11 September 2001 and 7 July 2005 marked seminal moments in the development of the emergency planning field in the UK, catapulting emergency management up the political agenda (2). Similarly, research and publications in this field has accelerated, as demonstrated by the US experience following 11 September 2011. In the last 10 years alone, nearly seven hundred articles have been published pertaining to this single event alone (3).

As a consequence, over the past decade the field has seen considerable growth and maturation, and its importance was further codified by Parliament in the Civil Contingencies Act 2004(4). The Act set out key responsibilities for all primary care, acute hospital and ambulance service trusts and Category 1 responders with the duty to be prepared appropriately for major incidents. This included planning, training and testing activities, as well as a concurrent duty to assess local risk and use this assessment to inform emergency planning.

One of the key drivers for this was the political perception and prioritisation of the risks of a potential terrorist incident. More current are events such as the London 2012 Olympics that urgently require a guiding evidence base for health planning. However, whilst these priorities have galvanised the agencies involved in emergency management to prepare and plan for major incidents, such activities are not clearly underpinned by a UK evidence base. No information for example is available on which interventions are effective in ensuring safety and cost-efficiency (3). An evidence base is also required to support planning around longer-term “rising tide” incidents such as infectious disease outbreaks, covert chemical, biological, radiological and nuclear (CBRN) events, and threats to infrastructure and business continuity such as floods and transport strikes.

Over ten years ago arguments were made for centralised reporting and investigation of major incidents to inform future planning (1) and, subsequently, this has been reiterated (5). Various systems have also been
suggested to standardise methods of reporting (6,7). A need to learn from major incident exercises was also expressed (8). It is clear from the literature that there is a mismatch between emergency plans and what actually happens during major incidents (9,10). However, although attempts have been made to catalogue incidents internationally (11), and a number of UK organisations (Emergency Planning College, Health and Safety Executive, BASICs) hold databases of incidents, no attempt has yet been made to collate these into a coherent resource for UK Emergency Planning.

In addition, the use of the evidence base in emergency planning in health care is not always apparent. Our recent work in the field has demonstrated patchy and inconsistent compliance with national guidance amongst PCTs (12), acute hospitals (13) and at the PCT-secondary care interface (14), and the lack of evidence for systems currently advocated in emergency response (15).

It was therefore timely that the National Institute for Health Research sought to scope out the extent of the evidence base for emergency planning in health care. This project is a scoping study that seeks to address this issue. It differs from conventional evidence reviews in that it is a non-systematic review of the literature that seeks to map out both the gaps in the evidence base as well as policy and conceptual issues (16). It is our intention that the study will help inform research commissioners to identify questions and issues for further research.

1.2 Aims and objectives

1.2.1 Aims

This project aims to provide an underpinning scoping review of the evidence base to support emergency planning in health in the UK.

1.2.2 Objectives

The project’s objectives are to:

- Systematically identify the scope and categorise the international published academic literature on emergency planning (Chapter 2),
- Carry out a qualitative systematic scoping review of the grey literature from the UK (Chapter 3),
1.2.3 Outputs

The main knowledge outputs include an overview of the existing evidence base for emergency planning, improved understanding of the scope and nature of the emergency planning community and the research needs of the emergency planning community, identification of priority areas for future research, and identification of appropriate methods for emergency planning research. The literature scoping study and accompanying narrative synthesis are intended as a suitable vehicle for further stakeholder consultation, research as well as a platform to engage with high-level decision-makers.

1.3 Need

Emergency planning is mandated for all NHS organisations (Care Quality Commission Core Standard 24) (17). As such, research in this area can produce evidence to guide effective and cost-effective emergency planning to organisations across the healthcare spectrum.

However, as stated earlier, there currently appears to be an evidence void in health emergency planning. The information that does exist is diffuse and from multiple sources. Furthermore it is difficult to gauge its applicability to the NHS. Farther afield, international approaches in health emergency planning vary widely in terms of infrastructure and command structure, surge capacity, clinical prioritisation and post-incident investigation. A multi-method study is therefore required to collate and distil this information so that it is relevant to UK health system, as well as accessible and useful to decision-makers.
1.4 The project partnership

This project is a partnership between the Centre for Effective Emergency Care (Manchester Metropolitan University), the School of Health and Related Research (the University of Sheffield), University Hospital South Manchester NHS Foundation Trust and the Health Protection Agency. It is therefore a collaborative effort of specialists from public health and emergency care together with experts in primary and secondary research with the aim of delivering research outputs of high-quality and relevance to the practical needs of emergency planners and decision-makers.
2 Scoping study of the published academic literature

A Lee, K Challen, A Booth, P Gardois, & H Buckley-Woods

2.1 Introduction

This section covers the search of published academic literature on key emergency planning topics. It details the search strategy employed, as well as sifting process by which relevant articles are identified and subsequently collated into a database. Also included is a summary of key issues and challenges identified, and insights gained from the process.

2.2 Conceptual framework

Several conceptual frameworks for emergency management have been proposed over the years, including the PPRR approach\(^1\) as well as 3- and 4-phase emergency management cycles (Figures 1 & 2) (18-21). Unsurprisingly all the models exhibit considerable similarities. Whilst considered useful semantically as broad categories, the 3- and 4-phase cycles did not provide an adequate framework for exploring the breadth and depth of subtopics in emergency planning.

![Figure 1. Four phase emergency management cycle](image)

\(^1\)PPRR – Prevention, preparedness, response & recovery.
2.2.1 Integrated Emergency Management System (IEMS)

The IEMS model elaborates further the emergency management cycle and identifies additional broad categories including hazard analysis, capability assessment, capability maintenance, and development plans, whilst overlapping with the simpler models. The additional themes allow for a more structured analysis to be employed. We therefore mapped the 4-phase cycle on to the expanded Integrated Emergency Management System (IEMS) model as used by the US Federal Emergency Management Agency (see Figure 3) (22).

However, the IEMS model does not include all relevant themes, notably omitting cross-cutting issues such as business continuity, organisational behaviour, communications, surge capacity and bio-security.
2.3 Methodology

2.3.1 Literature search strategy

Following compilation by the team of themes and topics considered relevant to the field, pilot searching (in the sub-topic of business continuity) was carried out. A final search strategy was then developed to retrieve evidence relevant to the whole subject area, subdivided into Business continuity, Hazard analysis, Capability assessment and maintenance, Recovery, Communications/informatics and Organisational behaviour/Human Resources. This final search aimed to identify slices of the evidence, but was designed to be more focussed, producing a higher yield of relevant papers and therefore more time effective to review.

We searched the electronic databases Embase, Medline, Medline in Process and Psychinfo via Ovid SP, Biosis and Science Citation Index via Web of Science, Cinahl via EBSCO, the Cochrane library via Wiley and Clinicaltrials.gov. (Full details are in Table 1). We did not limit to “human” in order to identify literature on bio-security and zoonoses that...
might be relevant. A cut-off year was agreed by our topic experts to limit the search only to articles published from 1990 onwards. The rationale for this is due to health system changes, advances in emergency management and the current socio-political context that render articles pre-1990 less applicable at the present time.

### Table 1. Literature search strategies

| Business continuity | 1. Disasters/pc  
|                    | 2. (emergency response or emergency preparedness or emergency plan$ or emergency operation plan$ or disaster or major incident$ or incident plan$).ti,ab.  
|                    | 3. 1 or 2  
|                    | 4. (business continuity or organisational resilience or business interruption or adaptive capacity or strategic or coordination).ti,ab.  
|                    | 5. 3 and 4  
|                    | 6. limit 5 to yr="1990 -Current" |
| Hazard analysis    | 1. Disasters/pc  
|                    | 2. (emergency response or emergency preparedness or emergency plan$ or emergency operation plan$ or disaster or major incident$ or incident plan$).ti,ab.  
|                    | 3. 1 or 2  
|                    | 4. (hazard analysis or risk factor or risk assessment or forecasting simulation or modelling).ti,ab.  
|                    | 5. 3 and 4  
|                    | 6. limit 5 to yr="1990 -Current" |
| Capability assessment or maintenance | 1. Disasters/pc  
|                                | 2. (emergency response or emergency preparedness or emergency plan$ or emergency operation plan$ or disaster or major incident$ or incident plan$).ti,ab.  
|                                | 3. 1 or 2  
|                                | 4. (capability assessment or capability maintenance or gap analysis or needs assessment or drill or simulation or preparedness training).ti,ab.  
|                                | 5. 3 and 4  
|                                | 6. limit 5 to yr="1990 -Current" |
| Recovery            | 1. Disasters/pc  
|                    | 2. (emergency response or emergency preparedness or emergency plan$ or emergency operation plan$ or disaster or major incident$ or incident plan$).ti,ab.  
|                    | 3. 1 or 2  
|                    | 4. (significant event analysis or serious untoward incident$ or root cause analysis or debrief or organisational learning or rehabilitation).ti,ab.  
|                    | 5. 3 and 4  
|                    | 6. limit 5 to yr="1990 -Current" |
The references identified were downloaded into a Reference Manager database, de-duplicated and imported into a Microsoft Excel spreadsheet for coding.

**Table 1 continued**

| Communications/informatics | 1. Disasters/pc  
|                            | 2. (emergency response or emergency preparedness or emergency plan$ or emergency operation plan$ or disaster or major incident$ or incident plan$).ti,ab.  
|                            | 3. 1 or 2  
|                            | 4. (communication$ or mass media or public relations or information system$ or information service$).ti,ab.  
|                            | 5. 3 and 4  
|                            | 6. limit 5 to yr="1990 -Current"  

| Organisational behaviour    | 1. Disasters/pc  
|                            | 2. (emergency response or emergency preparedness or emergency plan$ or emergency operation plan$ or disaster or major incident$ or incident plan$).ti,ab.  
|                            | 3. 1 or 2  
|                            | 4. (community engagement or community involvement or participatory involvement or participatory engagement or consumer participation or organisational behaviour or health personnel or human resources).ti,ab.  
|                            | 5. *"Attitude of Health Personnel"/  
|                            | 6. *Interprofessional Relations/  
|                            | 7. 4 or 5 or 6  
|                            | 8. 3 and 7  
|                            | 9. limit 8 to yr="1990 -Current"  

### 2.3.2 Coding team

Extracted titles and abstracts were assessed for relevance and coded by a coding team of 4 consisting of 2 topic experts (AL, KC) and 2 information specialists (AB, PG). A topic expert and an information specialist were paired together (AL+AB, KC+PG). The 2,736 articles were divided equally between the 4 coding team members who coded their articles independently.

Several measures were instituted to minimize inter-observer variability in the coding process. Prior to commencement of the coding, one of the topic experts (AL) provided an orientation tutorial on emergency planning for the information specialists. Discussions were held by the coding team to clarify any points of contention or ambiguity. Concordance between coding team members was also confirmed by initial double assessment of a subset of 225 articles by each topic expert-information specialist pair using Cohen’s Kappa (23).
2.3.3 Filtering for relevance

Each title or abstract was reviewed and deemed to be relevant (subject matter relevant to emergency planning and/or management), equivocal (subject matter suggestive of relevance to emergency planning and/or management), not relevant or containing inadequate information for coding. As the commissioning brief related to research relevant to UK health emergency planning we sought to include literature relating to comparable health services. Articles relating to non-health emergency planning, non-emergency planning, and non-UK legislative issues, and those from low- and middle-income countries were therefore excluded unless they were likely to be generalisable.

2.3.4 Coding framework

Where the title and abstract were considered to be relevant or equivocal we extracted further information relating to country of origin, type of publication and type of event discussed; coding groups are shown in Table 2. Publications were coded on an Microsoft Excel spreadsheet using aggregative synthesis, a technique appropriate for exploring qualitative data where the concepts are secure, predefined and not contested (24). We used a thematic framework developed as described above from the FEMA Emergency Management Cycle (Figure 3) (22). This cycle is widely known and used within the emergency planning community, and covers the range of issues in the field using mutually exclusive concepts. Framework synthesis can be used in conjunction with either aggregative or interpretive reviews, has been shown to facilitate more rapid coding of the literature and is, therefore, particularly suited to the objectives of a scoping review (25).
Table 2. Coding framework

| Country of disaster | United Kingdom  
|                     | Europe  
|                     | Australia/New Zealand  
|                     | United States  
|                     | Canada  
|                     | Other high-income country (e.g. Japan, Israel)  
|                     | Low- or middle-income country (e.g. China, Turkey, India, Iran)  
|                     | Multiple (2 or more countries)  
|                     | Not specified (country not specified or material of a generic nature)  
| Type of disaster | Natural (e.g. tsunami, hurricane, earthquake, bush fire)  
|                     | Industrial (including pollution)  
|                     | Chemical/biological/radiological/nuclear (CBRN)  
|                     | Transport (including air, ship, road, train)  
|                     | Conflict-related/war  
|                     | Terrorism  
|                     | Civil disturbance/riots  
|                     | Outbreaks/epidemics/pandemics (including influenza, SARS)  
|                     | Multiple (i.e. 2 or more hazards involved)  
|                     | Generic  
|                     | Other  
| Publication type | Commentary/editorial/letter/book  
|                     | Event report or review  
|                     | Randomised controlled trial  
|                     | Literature review  
|                     | Systematic review  
|                     | Survey (of population or health care providers)  
|                     | Modelling  
|                     | Educationalist  
|                     | Other  
| Topic focus (up to 4 foci) | Mitigation (activity to reduce consequences or likelihood of a disaster)  
|                     | Hazard analysis  
|                     | Emergency planning and/or preparation  
|                     | Capability assessment  
|                     | Development plans (activity to address gaps)  
|                     | Capability maintenance (activity to maintain capacity e.g. training, exercises, simulations)  
|                     | Emergency response  
|                     | Recovery  
|                     | Communications/mass media  
|                     | Informatics and intelligence  
|                     | Other organisational issues (including legal, human resources, organisational behaviour)  

Country categorisation by income-levels is based on the World Bank country classification of analytical income categories.
2.4 Findings

2,736 articles were initially identified by the literature search. Of these, 1,545 (56%) were deemed to be either relevant or equivocal by the reviewers. The remaining 1,191 (44%) were either irrelevant, had insufficient information in the abstract to make a judgment as to their relevance or were duplicates. In the subset coded by a pair of reviewers, the reviewing pair achieved kappa values of 0.578 (AL/AB) and 0.740 (KC/PG). Of note, there were a few articles that had a duplicate published in separate journals. One article from each duplicate pair was retained whilst the other was discounted from the study. Articles deemed irrelevant, or of insufficient information or duplicates were not further examined.

2.4.1 Publications by country of disaster

The distribution of publications by country of disaster is shown in Table 3 and Figure 4. For comparison, the number of events reported to the EM-DAT database at the Centre for Research on the Epidemiology of Disasters from 2000-2011 is also shown (26). EM-DAT is a multi-source validated database of disasters where 10 or more people are killed, 100 or more affected, a state of emergency is declared or a call for international assistance is made. With much of the literature from low- and middle-income countries having been deliberately excluded, percentages shown relate to EM-DAT records for high-income countries.

Figure 4. Publications by country of disaster
Table 3. Publications by country of disaster

<table>
<thead>
<tr>
<th>Country</th>
<th>Number</th>
<th>Proportion from all countries</th>
<th>Proportion from high income countries</th>
<th>Number of EM-DAT entries 2000-11</th>
<th>Proportion of EM-DAT entries from high income countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>United Kingdom</td>
<td>47</td>
<td>3.0%</td>
<td>4.8%</td>
<td>38</td>
<td>2.8%</td>
</tr>
<tr>
<td>United States/Canada</td>
<td>701</td>
<td>45.4%</td>
<td>71.2%</td>
<td>372</td>
<td>27.6%</td>
</tr>
<tr>
<td>Europe (not UK)</td>
<td>114</td>
<td>7.4%</td>
<td>11.6%</td>
<td>535</td>
<td>39.6%</td>
</tr>
<tr>
<td>Japan</td>
<td>45</td>
<td>2.9%</td>
<td>4.6%</td>
<td>84</td>
<td>6.2%</td>
</tr>
<tr>
<td>Australasia</td>
<td>26</td>
<td>1.7%</td>
<td>2.6%</td>
<td>205</td>
<td>15.2%</td>
</tr>
<tr>
<td>Other high-income country</td>
<td>51</td>
<td>3.3%</td>
<td>5.2%</td>
<td>116</td>
<td>8.6%</td>
</tr>
<tr>
<td>Low/middle-income country</td>
<td>178</td>
<td>11.5%</td>
<td></td>
<td>6870</td>
<td></td>
</tr>
<tr>
<td>Multiple</td>
<td>75</td>
<td>4.9%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unspecified</td>
<td>308</td>
<td>19.9%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,545</td>
<td></td>
<td></td>
<td><strong>(n=984)</strong></td>
<td><strong>8,220</strong> (n=1,350)</td>
</tr>
</tbody>
</table>

2.4.2 Publications by disaster type

Distribution of publications by disaster type is shown in Table 4 and Figure 5. 41.9% of articles were of a generic nature. Of the remainder, the majority (339; 21.9%) were based on natural disasters. CBRN (135) and terrorism events (119) also featured prominently. Articles related to infectious disease outbreaks and epidemics such as pandemic influenza were relatively few (89; 5.8%), and there were even fewer addressing industrial disasters (42; 2.7%).

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Figure 5. Publications by disaster type

<table>
<thead>
<tr>
<th>Disaster type</th>
<th>Number</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural disaster</td>
<td>339</td>
<td>21.9%</td>
</tr>
<tr>
<td>Industrial disaster</td>
<td>42</td>
<td>2.7%</td>
</tr>
<tr>
<td>CBRN</td>
<td>135</td>
<td>8.7%</td>
</tr>
<tr>
<td>Conflict-related/War</td>
<td>13</td>
<td>0.8%</td>
</tr>
<tr>
<td>Terrorism</td>
<td>119</td>
<td>7.7%</td>
</tr>
<tr>
<td>Civil disturbance,riot,strife</td>
<td>11</td>
<td>0.7%</td>
</tr>
<tr>
<td>Outbreaks,epidemics,pandemics</td>
<td>89</td>
<td>5.8%</td>
</tr>
<tr>
<td>Transport accidents</td>
<td>35</td>
<td>2.3%</td>
</tr>
<tr>
<td>Generic</td>
<td>647</td>
<td>41.9%</td>
</tr>
<tr>
<td>Multiple</td>
<td>84</td>
<td>5.4%</td>
</tr>
<tr>
<td>Other</td>
<td>31</td>
<td>2.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,545</td>
<td></td>
</tr>
</tbody>
</table>
2.4.3 Types of publications

The distribution of the publications by type is shown in Table 5 and Figure 6. More than a quarter of articles were commentaries or editorials, and a significant proportion of included articles were event reports.

Figure 6. Types of publications

Table 5. Types of publications

<table>
<thead>
<tr>
<th>Type of publication</th>
<th>Number</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other research study or survey</td>
<td>491</td>
<td>31.8%</td>
</tr>
<tr>
<td>Commentary/editorial/letter</td>
<td>422</td>
<td>27.3%</td>
</tr>
<tr>
<td>Event report/review</td>
<td>371</td>
<td>24.0%</td>
</tr>
<tr>
<td>Expert guidance</td>
<td>122</td>
<td>7.9%</td>
</tr>
<tr>
<td>Educational</td>
<td>75</td>
<td>4.9%</td>
</tr>
<tr>
<td>Narrative review</td>
<td>51</td>
<td>3.3%</td>
</tr>
<tr>
<td>Systematic review</td>
<td>11</td>
<td>0.7%</td>
</tr>
<tr>
<td>RCT</td>
<td>2</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

| Total                                | 1,545  |                |

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2.4.4 Thematic analysis of publications by adapted IEMS categories

Results of the thematic analysis are shown in Table 6 and Figure 7. The thematic categories are not exclusive with some articles addressing more than one category. The analysis demonstrates a predominance of publications relating to emergency planning (55.3%) and emergency response (35.5%), with relatively few addressing mitigation (11.5%) or recovery (11.7%).

Figure 7. Proportion of publications by theme
Table 6. Thematic analysis of publications

<table>
<thead>
<tr>
<th>Theme</th>
<th>Number</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency response</td>
<td>548</td>
<td>35.5%</td>
</tr>
<tr>
<td>Emergency planning</td>
<td>376</td>
<td>24.3%</td>
</tr>
<tr>
<td>Capability maintenance</td>
<td>225</td>
<td>14.6%</td>
</tr>
<tr>
<td>Other organizational issues</td>
<td>179</td>
<td>11.6%</td>
</tr>
<tr>
<td>Informatics &amp; intelligence</td>
<td>174</td>
<td>11.3%</td>
</tr>
<tr>
<td>Recovery</td>
<td>171</td>
<td>11.1%</td>
</tr>
<tr>
<td>Capability assessment</td>
<td>165</td>
<td>10.7%</td>
</tr>
<tr>
<td>Communications &amp; the Mass Media</td>
<td>151</td>
<td>9.8%</td>
</tr>
<tr>
<td>Hazard Analysis</td>
<td>122</td>
<td>7.9%</td>
</tr>
<tr>
<td>Development Plans</td>
<td>88</td>
<td>5.7%</td>
</tr>
<tr>
<td>Mitigation</td>
<td>56</td>
<td>3.6%</td>
</tr>
</tbody>
</table>

The eleven systematic reviews addressed:
- Disaster research methods;
- Priorities for research in pre-hospital care;
- Public health systems research in emergency preparedness;
- Earthquake-related literature in medical journals;
- Hospital staff mass-casualty incident training methods;
- Effectiveness of disaster training for health care workers;
- Rapid Health and Needs assessments after disasters;
- Air pollution and daily mortality;
- Art therapy with children after a disaster;
- Reduction of psychological harm from traumatic events among children and adolescents; and

Table 7 shows the distribution by thematic analysis of publications in the event report, narrative review, systematic review, expert guidance, other research studies and RCT categories.

*Total exceeds 100% due to multiple themes in individual publications*
### Table 7. Thematic analysis by publication type

<table>
<thead>
<tr>
<th>Theme</th>
<th>Event reports (n=371)</th>
<th>Narrative review (n=51)</th>
<th>Systematic review (n=11)</th>
<th>Other research study (n=491)</th>
<th>Expert Guidance (n=122)</th>
<th>RCT (n=2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitigation</td>
<td>1.6%</td>
<td>3.9%</td>
<td>0.0%</td>
<td>3.1%</td>
<td>6.6%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Hazard analysis</td>
<td>1.9%</td>
<td>5.9%</td>
<td>0.0%</td>
<td>13.2%</td>
<td>9.8%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Capability assessment</td>
<td>5.1%</td>
<td>13.7%</td>
<td>18.2%</td>
<td>16.3%</td>
<td>9.8%</td>
<td>50.0%</td>
</tr>
<tr>
<td>Emergency planning</td>
<td>15.6%</td>
<td>45.1%</td>
<td>36.4%</td>
<td>20.8%</td>
<td>43.4%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Capability maintenance</td>
<td>10.5%</td>
<td>7.8%</td>
<td>9.1%</td>
<td>16.9%</td>
<td>9.0%</td>
<td>50.0%</td>
</tr>
<tr>
<td>Emergency response</td>
<td>62.0%</td>
<td>39.2%</td>
<td>54.5%</td>
<td>22.2%</td>
<td>24.6%</td>
<td>50.0%</td>
</tr>
<tr>
<td>Recovery</td>
<td>14.3%</td>
<td>13.7%</td>
<td>18.2%</td>
<td>12.8%</td>
<td>6.6%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Development plans</td>
<td>4.6%</td>
<td>5.9%</td>
<td>9.1%</td>
<td>4.1%</td>
<td>9.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Communications/mass media</td>
<td>8.9%</td>
<td>5.9%</td>
<td>0.0%</td>
<td>9.0%</td>
<td>9.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Informatics and intelligence</td>
<td>7.8%</td>
<td>5.9%</td>
<td>0.0%</td>
<td>13.2%</td>
<td>10.7%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Other organisational issues</td>
<td>8.9%</td>
<td>13.7%</td>
<td>0.0%</td>
<td>11.2%</td>
<td>8.2%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

#### 2.5 Discussion

**2.5.1 Main conclusions**

The published literature relating to health emergency planning is disproportionately centred on North America. Australasia and Europe\(^v\) have produced surprisingly little academic literature given the number of reported incidents in these areas, although there may be non-English

\(^v\) The totals in each column exceeds (n) as individual publications frequently covered multiple themes.

\(^v\) This includes Eastern Europe. However, there were only a few publications from there: 2 papers on Chernobyl, 1 on rehabilitation post-Yugoslav war, 1 report from Sarajevo, and 1 on floods in Poland.

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publications from Europe which we did not assess. This echoes the earlier findings from the systematic review of disaster management conducted by Lettieri (11). This predominance of mainly American disaster literature may reflect the galvanising effect that the terrorist events of 11 September 2001 had on publications in this topic area (3).

There was also a preponderance of descriptive event reports and commentaries. Most of the observational studies lacked controls against which to compare the reported effectiveness, making it difficult to assess the efficacy of reported interventions. As such, this suggests the need for more robust and systematic ways of reporting disasters (3).

Finally, the emphasis of most of the articles is focused on the emergency response and planning phases. Much less is published on other aspects such as hazard assessment, mitigation and recovery.

2.5.2 Limitations

Whilst there have been previous reviews of the public health systems research in emergency preparedness (27) and disaster management (11), to our knowledge this represents the first attempt to scope and map the entirety of emergency planning academic literature relevant to health. Publications relating to disasters and emergencies tended not to be coded well bibliographically and there is no universal taxonomy, possibly reflecting the different conceptions and variants of the emergency management cycle used worldwide. This heterogeneity made the identification of relevant articles from diverse MeSH headings challenging and it is not possible to guarantee that all relevant articles were identified. However, our search strategy was deliberately inclusive and is likely to have identified the vast majority of relevant articles in the published academic literature; the inclusive nature of the strategy may have rendered our findings optimistic in terms of generalisable evidence.

Articles without an abstract were not coded. Some of these had titles suggestive of relevance to the topic but it was not possible to elucidate this without recourse to the individual publications.

Pragmatically, phases of the emergency management cycle are not always distinct. For example, hazard analysis may form part of both the Mitigation and Planning and Preparation phases. Similarly, emergency response often will merge into recovery activities. The delineation of articles by phase therefore artificially demarcates what is essentially a continuum of interwoven and related activities from the mitigation, planning and preparedness stage through to response and eventual recovery. The categorisation by phase as used in this scoping study was however necessary in order to facilitate some measure of analysis of the articles identified.
2.5.3 Implications for research and practice

There is a preponderance of publications relating to emergency preparedness and response compared with those addressing mitigation and recovery, suggesting a lack of published literature on the latter topics. A more balanced redistribution of research towards these two themes may therefore prove fruitful. Similarly, a disproportionate number of publications originate from the US. The generalisability of US findings to the rest of the world is questionable, given national variations in legal frameworks and emergency response infrastructure. This raises the issues of the paucity of UK-based research and the scarcity of evidential base for current emergency preparedness and response plans.

The traditional hierarchy of evidence applied to clinical research (valuing meta-analyses and randomised controlled trials most highly) is unlikely to be appropriate in this field (3). Except in very specific areas (for example brief psychological intervention for survivors) randomised controlled trial designs are not practical. Narrative synthesis of observational studies may be possible but is currently hampered by the lack of consistent data collection policies (28). Repeated calls have been made for the standardisation of major incident reporting and suggestions exist for the format this should take (1, 6). We have found little evidence of this occurring; although multiple event reports exist we found no meta-synthesis of these to provide a comprehensive evidence base.

The type and structure of evidence that would be of most value of emergency planners and policymakers has yet to be identified. Further research into stakeholder perceptions will be required to determine this.

We noted a distinction between emergency management in high-income country settings and in low-/middle-income country (LMIC) settings. Whilst conceptually the emergency management cycle should apply and operate in both settings, the contextual divide appears to drive an emphasis in high-income country settings on emergency planning and preparedness, whilst in LMICs it is on disaster response and recovery (29). The latter is unsurprising as it is often the most vulnerable societies that are likely to experience disasters. Over the past decade globally there have been policy shifts with a move towards more ‘disaster risk reduction’ activities in LMICs similar to high-income country settings. Experience and expertise in the 2 different settings is not antagonistic but potentially offers learning opportunities in both directions.

Our findings have exposed the limited evidence base available to assist emergency planners and policymakers, particularly in the areas of mitigation and recovery. Future research should identify consensus areas perceived as priorities for research amongst those involved in the field.
3 Grey literature scoping study

P Gardois, A Lee, K Challen & W Philips

3.1 Introduction

The objective of the grey literature search was to search and identify relevant documents on emergency planning and management, and to carry out a scoping review of them using thematic analysis. The grey literature is defined as the collection of documents that are not published in peer-reviewed academic journals.

The grey literature review was restricted to documents pertaining specifically to the UK context and included the following:

- incident (post-event) reports with some health-related aspects;
- guidance documents on public health emergency preparedness and planning produced by the Department of Health (DH) or other health organizations in the UK; as well as
- protocols and guidelines for emergency preparedness in the UK.

3.2 Methodology

3.2.1 Sources

Potential sources of grey literature were identified in advance by our expert advisory group. Other potential databases were also ascertained from the initial literature mapping exercise as well as qualitative stakeholder interviews.

Based on these two identification strategies, the following databases were searched for relevant documents:

- Health Protection Agency
- NHS Evidence Search
- British Association of Immediate Care Schemes
- Emergency Planning College
- Health and Safety Executive Major Hazardous Incident Data Service

This search yielded a number of relevant documents which were available online and consequently downloaded and included in the review. In addition, 11 further papers were judged relevant by the title. However, it was not possible to add them to the review as they were not available online.
Incident reports were searched from the following databases:

a) **Health Protection Agency**

The Health Protection Agency website was searched for relevant event and/or incident reports. Most notable was the Chemical Incidents and Poisons Reports database for the period 1999-2003. All reports here for 2010 and 2011, as well as a small sample of previous years were looked at.

b) **Inquiries into major incidents**

An internet search was also conducted for all publicly accessible reports from inquiries initiative by the UK Government for various major incidents e.g. July 7 terrorist bombings, Carlisle floods, the Sea Empress and Aberfan disasters.

c) **Coroner’s reports**

The *Summary of Reports and Responses under Rule 43 of the Coroners Rules*, were extracted and examined. These are cumulative reports published twice a year by the Ministry of Justice. We also attempted to trace Coroner’s reports for the following UK disasters and emergencies:

- Ladbroke Grove rail incident
- Potters Bar rail incident
- Lockerbie air bombing
- Piper Alpha oil rig explosion
- Marchioness pleasure boat sinking
- Hillsborough stadium disaster
- Zeebrugge ferry sinking
- Aberfan slag heap disaster
- Ibrox stadium incident
- Summerland fire disaster
- Manchester Airport crash on take-off
- Kegworth (M1) aircraft crash
- July 7 bombings
- Ufton Nervet rail incident

---

*vii* Ministry of Justice Rule 43 publications:
The search for guidance on health emergency planning was conducted using the following strategy:

d) **NHS Evidence Search**
   The starting point used was the NHS Evidence Search section on emergency planning.\(^{viii}\)

e) **Department of Health website**
   The current and archived contents of the Department of Health (DH) Emergency Planning website were interrogated. Only documents containing detailed guidance for health professionals were downloaded. Technical documents, very brief summaries (e.g. short instructions for access to stocks, etc.), glossaries, lists of acronyms, diagrams and guidance for patients were not included in the search results.\(^{ix}\)

f) **Health Protection Agency**
   The Health Protection Agency website was extensively searched for relevant guidance documents. Most notable was the Chemical Incidents and Poisons Reports database for the period 1999-2003. Reports for 2010 and 2011 were examined, as well as a small sample from previous years.

g) **UK Resilience**
   The UK Resilience website\(^{x}\) was also looked at. Key documents concerning the Civil Contingencies Act and the associated consultations were downloaded.

### 3.2.2 Sampling strategy

Every possible effort was made to find and obtain those documents that matched the three main categories identified in section 4.2.1 above. Other documents that were potentially relevant for emergency planning


\(^{x}\) [http://interim.cabinetoffice.gov.uk/ukresilience.aspx](http://interim.cabinetoffice.gov.uk/ukresilience.aspx)

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Project 09/1005/03
that did not fit the 3 categories, were not discarded but examined separately for relevance.

As our study prioritised breadth in scope, no distinction has been made between active and legally-binding documents, and superseded documents or older versions. However, where several versions of the same document were available, only the most recent version was chosen for review.

Inactive links to potentially relevant documents were searched in the Internet Archive by document name, and also using the Google search engine. If they were not available in these two resources, they were not considered.

All forms of major incidents were considered including chemical, biological, radiological and nuclear emergencies as well as natural disasters. With regards specifically to protocols and guidance documents, only guidance for health professionals and those related to health emergency planning in the UK were downloaded.

Purposive sampling was undertaken of two main types of grey literature: incident plans and investigations/reports by various bodies on actual incidents.

A complete list of grey literature reviewed is listed in Appendix 1.

### 3.2.3 Coding and frequency analysis

Records were coded according to pre-defined sets of metadata similar to that used for the published literature scoping review detailed in Chapter 2. Frequency analysis of the data was then conducted using Microsoft Excel 2010. The results are reported in sections 3.3 and 3.4.

### 3.2.4 Qualitative analysis of key issues identified by reviewers

192 documents were selected for coding. After assessment, 95 of these (49.5%) were discarded as irrelevant. The remaining 97 documents were coded for incident type, publication type and emergency phase. Key issues of especial interest to health emergency planning were identified from 93 documents.

For the purpose of this scoping review, we have defined key issues as the “key messages” emerging from a single document. They were expressed using short to medium-length narrative free-text labels such as: “Response to a fire event in London”, “Need to incorporate lockdown procedures for threat” or “Need for better advice and evidence on the use of controlled burn and effect on public health (burn vs. extinguish, air vs. water pollution”).

The 97 documents reviewed yielded a total of 236 key issues (Mean = 2.44, median = 2.00, range 0-9). An attempt was then made to further code and categorise these key issues; and 80 documents were
Free-text comments were manually extracted from single cells in the column “Key issues identified” of the coding sheet, and assigned a unique ID, while maintaining a link with the document to which they referred. An example follows:

Table 8. Example of key issues

<table>
<thead>
<tr>
<th>Record-ID</th>
<th>Key issues identified</th>
<th>SINGLEKY-ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Courtesy calls to EDs</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>Role of expert ED practitioners</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Response to a fire event in London</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>data collection and monitoring on air quality and population symptoms</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>multi-agency collaboration</td>
<td>5</td>
</tr>
</tbody>
</table>

Once extracted each single key issue was checked to ensure that it was understandable and only modified when necessary (e.g. for typographical errors, abbreviations, etc.).

In order to synthesize the results, the principles of thematic analysis were followed, specifically adapted to a context in which short text strings were available instead of whole, lengthy documents\(^1-3\).

Subsequently, each key issue was coded to a maximum of two “Specific issues or deficiencies identified/raised” (see Appendix 2), in order to build a number of macro-categories grouping significant subsets of key issues. Each subset of comments, then, was synthesized under a certain number of general themes, and the main themes were related to the most important topic areas (see section 3.4).

3.2.5 General description of included documents

Coding allowed included documents to be categorised according to a number of different dimensions. Table 9 shows the distribution of documents according to the year of publication. With very few exceptions, included documents were published in the last 5 years.
Table 9. Year of publication of included documents

<table>
<thead>
<tr>
<th>Year</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1966</td>
<td>1</td>
</tr>
<tr>
<td>1999</td>
<td>1</td>
</tr>
<tr>
<td>2000</td>
<td>2</td>
</tr>
<tr>
<td>2005</td>
<td>4</td>
</tr>
<tr>
<td>2006</td>
<td>18</td>
</tr>
<tr>
<td>2007</td>
<td>7</td>
</tr>
<tr>
<td>2008</td>
<td>7</td>
</tr>
<tr>
<td>2009</td>
<td>11</td>
</tr>
<tr>
<td>2010</td>
<td>41</td>
</tr>
<tr>
<td>2011</td>
<td>3</td>
</tr>
<tr>
<td>Not known</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>97</strong></td>
</tr>
</tbody>
</table>

Although the majority of documents were published by HPA, several other organizations contributed to this body of grey literature, including local organizations such as local resilience forums. (Table 10)

Table 10. Organisations attributed to publication of included documents

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Protection Agency</td>
<td>52</td>
</tr>
<tr>
<td>Other document</td>
<td>31</td>
</tr>
<tr>
<td>CHAPD</td>
<td>4</td>
</tr>
<tr>
<td>Department of Health</td>
<td>4</td>
</tr>
<tr>
<td>Other government document</td>
<td>4</td>
</tr>
<tr>
<td>Cabinet Office UK Resilience</td>
<td>2</td>
</tr>
<tr>
<td>Not known</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>97</strong></td>
</tr>
</tbody>
</table>

Documents included in this report focused mainly on chemical incidents; other relevant categories included natural and industrial disasters, terrorism, outbreaks, epidemics and pandemics. (Table 11)
Table 11. Type of incidents described in included documents

<table>
<thead>
<tr>
<th>Incident type</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical</td>
<td>42</td>
</tr>
<tr>
<td>Natural disaster</td>
<td>16</td>
</tr>
<tr>
<td>Industrial</td>
<td>12</td>
</tr>
<tr>
<td>Terrorism</td>
<td>8</td>
</tr>
<tr>
<td>Outbreaks, epidemics, pandemic</td>
<td>7</td>
</tr>
<tr>
<td>Generic</td>
<td>5</td>
</tr>
<tr>
<td>Multiple</td>
<td>3</td>
</tr>
<tr>
<td>Radiological/Nuclear</td>
<td>2</td>
</tr>
<tr>
<td>Transport accidents</td>
<td>2</td>
</tr>
<tr>
<td>Biological</td>
<td>0</td>
</tr>
<tr>
<td>Conflict-related/War</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>97</strong></td>
</tr>
</tbody>
</table>

Table 12 shows that the *response* phase was by far the most frequently described in included documents, sometimes in conjunction with recovery or preparedness.

Table 12. Main emergency phase described in included documents

<table>
<thead>
<tr>
<th>Emergency Phase</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESPONSE</td>
<td>46</td>
</tr>
<tr>
<td>RESPONSE &amp; RECOVERY</td>
<td>17</td>
</tr>
<tr>
<td>PREPAREDNESS &amp; RESPONSE</td>
<td>10</td>
</tr>
<tr>
<td>RECOVERY</td>
<td>8</td>
</tr>
<tr>
<td>MITIGATION</td>
<td>6</td>
</tr>
<tr>
<td>MULTIPLE</td>
<td>5</td>
</tr>
<tr>
<td>PREPAREDNESS &amp; PLANNING</td>
<td>4</td>
</tr>
<tr>
<td>NOT SPECIFIED</td>
<td>1</td>
</tr>
<tr>
<td>MITIGATION &amp; PREPAREDNESS</td>
<td>0</td>
</tr>
<tr>
<td>RECOVERY &amp; MITIGATION</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>97</strong></td>
</tr>
</tbody>
</table>
As might be expected, table 13 clearly shows that more than three out of every four documents were event reports; other relevant publication types include commentaries, other research and expert guidance.

**Table 13. Publication types**

<table>
<thead>
<tr>
<th>Publication type</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event report/review</td>
<td>74</td>
</tr>
<tr>
<td>Commentary</td>
<td>9</td>
</tr>
<tr>
<td>Other research</td>
<td>8</td>
</tr>
<tr>
<td>Expert guidance</td>
<td>3</td>
</tr>
<tr>
<td>Literature review</td>
<td>1</td>
</tr>
<tr>
<td>Education</td>
<td>1</td>
</tr>
<tr>
<td>Guidance doc</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>97</strong></td>
</tr>
</tbody>
</table>

### 3.3 Findings

#### 3.3.1 Risks and mitigation

*Hazard analysis*

Around 1 document in 3 (N = 27, 34%) raised issues concerning hazard and risk analysis. The issues identified were related to the assessment and detection of a wide variety of risks and hazards: from the impact on air quality of fireworks use to carbon monoxide poisoning, the risks from aluminium phosphide when used in unlabelled containers as a fumigant or pesticide, maritime chemical incidents and sulphur mustard incidents.

Many of the documents concerned covered risk assessment during or after the event, or retrospective risk assessment. Examples include secondary contamination in poisonings, the risk of domino effects in hazardous sites adjacent to the location of the disaster, hazards from ethylene venting in proximity of the coast by a ship damaged by heavy seas, or the need for environmental and occupational health analysis of the risks of exposure of rescuers and members of the public to materials released during the July 7 terrorist attacks in London. Hazard analysis and mitigation can be complex (29), and this complexity may not always be fully understood especially by non-emergency responders.

Tools and procedures described in the documents to guide and improve the various stages of the risk assessment process included the use of an existing database of Control of Major Accident Hazards (COMAH) sites,
modelling techniques and a risk assessment matrix. Organizational issues in this phase echo the more general ones, such as the need for multi-agency collaboration.

**Mitigation**

Some of the documents flagged up issues related to hazard or threat mitigation (18 documents, 22.5%). Of the various issues identified, only three issues carried general implications. These were the need for the mitigation of late effects of disasters, for precautionary measures for public health protection and for ways to mitigate the effects of disasters on the most vulnerable populations. Examples include the need for structural evaluation or adaptations of buildings such as schools and hospitals against heat waves, tighter controls on the storage of fireworks to reduce explosion hazard, better mapping of tyre dumps, and the mitigation of risks related to refrigerator leaks in a hospital setting.

**3.3.2 Planning and training**

**Emergency planning**

More than one third of documents (N = 30, 37.5%) covered emergency planning issues. Organisational cultural issues were highlighted by our reviewers and revolved especially around the management of uncertainty as a key element. Worst case planning was identified in two different documents as an issue, particularly in terms of the reluctance by individuals and organisations to adopt such an approach. Also identified was the need to learn from past experiences and best practices. Such learning could be improved if emergency plans were systematically reviewed and debriefed, but this is sometimes hindered by the minimal information contained in post-event reports currently. Similarly, the literature suggests there is value in involving communities, local businesses, clinicians, as well as human resources and finance departments in planning.

One possible barrier identified relates to problems caused by the use of technical language in communication to the public or to non-specialists, especially with regards to assumptions made in planning. Finally, the definition of incidents is sometimes unclear and ambiguous. Several documents also identified the lack of plans or specific procedures (or attempts to provide initial guidance) in specific sectors where these were particularly needed in order to reduce the impact of disasters. Examples include:

- the absence of recovery planning;
- the need to incorporate in plans specific lockdown procedures for health care settings in case of terrorist threats, and to provide guidance for full hospital evacuation; and

- the need to put in place specific protocols or procedures in different sectors or situations, such as radiation monitoring, pre-agreed sampling arrangements for chemicals, prevention and treatment of exposure to aluminium phosphide, management of marine spills, health registers for monitoring the situation following disasters, or specific protocols to convene Scientific and Technical Advice Cells (STACs) or to stockpile personal protective equipment by health care trusts.

Business continuity planning

This was the topic of a minority of documents (N = 13, 16%). The qualitative comments of reviewers mainly concerned the importance of protecting utilities during emergencies and the fact that specific health-related institutions, such as care homes, need their own specific business continuities plans. Note was also made of the fact that emergency departments were likely to be particularly disrupted by emergencies such as chemical incidents and therefore their need for business continuity planning was greater. It may be that this is an operational issue that is of relevance to emergency planners when producing specific institutional plans but it is not a topic that is well addressed in academic publications.

Capability maintenance / training

The issue of capability maintenance, including the training and education of professionals as well as emergency exercises, were addressed in a small number of documents (N =10, 12%). Specific issues emerging from qualitative comments mainly concerned the lack of regular exercises, the importance of inter-agency collaboration in training in specific sectors (for example, the prevention and management of incidents at sea, and the estimation of public health risks arising from such cases) and the need for training to reach better preparedness of search and rescue facilities. Finally, it also emerged that, in some situations, exercises failed to address worst case scenarios.
3.3.3 Response activities, including incident management

The majority of documents (N = 53, 66%) covered post-disaster response activities and incident management. 21 documents (26%) covered in particular the issue of plan activation. This predominance of documents covering the response phase parallels the topic trends noted from our scoping review of the published academic literature reported in Chapter 3.

Incidents and emergency situations for which response activities were described varied considerably in terms of impact and scale. They included for example:

- fire incidents (such as fires in waste management facilities and at adhesives factories) and the public health effects of prolonged fires, asbestos incidents (such as fires, deposits, releases or spills,)
- secondary contamination from poisonings, pandemic flu (with the related issues of sentinel practices and vaccine uptake),
- prolonged extrication of victims of incidents,
- floods,
- terrorist attacks,
- refrigerator leaks,
- contamination from tear gas or unknown chemical agents, and
- the public health implications of contaminated animal feed.

We have categorized the issues identified into 4 main thematic categories that are described further below.

The impact of incidents

The first theme concerns the impact of incidents, either on-site or off-site. Difficulties were noted with regards to assessing the impact of incidents in order to increase the efficacy of response activities. This is the case especially with air quality monitoring and control, but it concerns other response activities as well: for example, the need emerged both for a radiation monitoring protocol and for pre-agreed sampling arrangements for chemicals. Issues were also reported about the lack of familiarity of rescuers with managing the threat posed by bombs and military devices.
Multi-agency response issues

Some of these examples clearly lead to the second main theme: the importance of, and difficulties with, multi-agency response. In incidents with potentially wide public health impact, the importance of early involvement of health advice teams was reported in several documents. Multi-agency collaboration was particularly advocated when dealing with potential contamination from unknown chemical agents. Similarly, it was reported that there was value in combining health and safety (occupational) advice in an advisory cell to ensure consistency in response activities.

However, whilst acknowledging that a rapid public health response can minimise health risks for populations involved in a disaster, the documents also identified several aspects of the multi-agency response to be improved. For example, there was a lack of clarity of roles and responsibilities of some of the agencies involved: in one document the Scientific and Technical Advice Cell (STAC) role was reported as ambiguous, and in another document difficulties were reported with communicating scientific and technical advice during an incident.

Issues related to disaster-affected individuals and populations

Access to and the management of actual or potential victims of disaster was a major theme in response activities. One document observed that social structures vary and not all communities have suitable social structures in place to enable community response and resilience. From experience with past flood incidents, specific challenges were noted such as mortuary issues, the identification of victims, and the reception of survivors and relatives. There were also difficulties with accessing vulnerable people due to the floods. Further issues were identified with regards to the logistics of organising the evacuation of populations. For example one document reported how the evacuation of secure patients at a medium secure facility proved difficult as no alternative shelter was available. There was a need identified for the lead organisation in charge of the emergency response to track patients during an evacuation. In another document, difficulties emerged in dealing with the bodies of chemically contaminated victims. It was also observed that disadvantaged populations tended to live close to the sites of chemical incidents.

Technical and organizational issues

Technical and organizational issues formed the fourth thematic category related to response activities. Various technical issues and uncertainties were identified from the grey literature. These included for example the
need for better advice and evidence on specific technical decisions such as the use of 'controlled burning'\textsuperscript{xi} and its effect on public health; as well as how environmental testing is applied and interpreted as false positives for toxins prove quite common. There were also problems with maintaining power supply to care homes during emergencies; issues related to the use of toxicology information; technical issues related to food testing and animal waste testing; as well as methods to assess for excess deaths which could inform and improve the response to heat waves.

Organizational problems were also reported such as the lack of a protocol for responding to flood warnings and the delay in activating the 'GOLD'-level\textsuperscript{xii} committee. There were also concerns regarding the lack of a functional critical care network, issues with the critical care supply chain, of treating children on adult intensive care units; as well as the importance of physical and virtual "space" in response to terrorist attacks. A related theme was the challenge of organising more surge capacity in the context of pandemics: issues that emerged were around human resource implications and of health professionals working in extended roles.

### 3.3.4 Recovery

Issues related to recovery formed the topic of 27 documents (34%). Several documents underlined the general difficulties in conducting recovery activities, due to the fact that it is often difficult to assess long term consequences of disasters, both for the environment and human activities, and for the victims. The lack of recovery planning was reported as an issue in one case, whilst in another incident difficulties were identified in coordinating the recovery and carrying out monitoring.

A proportion of the documents that discussed recovery issues covered a range of contamination related incidents such as floods, fires and sulphur mustard incidents. The foci of these articles were on recovery problems encountered that were related to the environment and human activities. These included for example, difficulties in the clean-up of products of chemical combustion, the poor outcomes of recovery activities after a fire in a tyre depot, the planning for the clean-up of polonium, difficulties in finding sites for radioactive waste disposal, in decontamination after a sulphur mustard incident and in dealing with water pollution from run-off generated in the event of a fire.

As for recovery activities concerning victims, several important issues emerged. Firstly, there is a need to better understand psychological consequences and post-event anxiety amongst survivors, as well as to

\textsuperscript{xi} Controlled burning, or “hazard reduction burning”, refers to a managed process of burning to reduce a fire risk. For example, it is commonly used in forestry management to reduce the risk of forest and bush fires.

\textsuperscript{xii} GOLD: A multi-agency command and control level pertaining mainly to strategic coordination functions.
identify measures to ameliorate this. Some measures have been reported such as the provision of skilled listeners for people emotionally affected by disasters, or by an aftercare group helpline. However, what is less clear is what measures are sufficient and appropriate. For example, in one case of flooding, it was reported that there was little uptake of support offered by an aftercare group.

More generally, problems were identified with health and well-being of disaster-affected individuals and communities during the recovery phase. For example, the impact of unemployment post-event, and the impact of homelessness and displacement caused by disasters was noted to have been underestimated. Strong social and community support may help overcome health effects of natural disasters. As such, it became apparent that there is a need to provide health and well-being support, better coordination of health and social care, along with a general need to monitor the impact of a disaster on wellbeing in the recovery phase.

### 3.3.5 Organisational issues

**Roles, responsibilities and organizational hierarchy**

Organisational issues to do with structure, roles and responsibilities was identified in 44% of documents (N = 35). Comments by the reviewers grouped around some major themes, the first of which concerns the benefits and challenges of multi-agency collaboration and coordination, already mentioned in other categories (such as response, recovery, etc.). The documents pointed out the importance of knowing and understanding the roles and responsibilities of partner organisations. There were several examples from the documents of problems that arose when this was not the case: problems arose from having multiple health representatives present at ‘Gold’-level meetings; in another, it manifested as a lack of understanding of the role of the Air Quality cell. There were also problems of multi-agency coordination and inter-organizational differences seem to play a role in collaboration difficulties.

Problems about roles, hierarchy, and the related issues of clarity about command functions and flexibility were the second main theme in this area. In the analysed documents, issues arose concerning the roles of different key actors such as the expert emergency department practitioners, volunteers, the Consultant in Communicable Disease Control, and Emergency Planning Officer (EPO). With volunteers, there were specific issues regarding how their credentials could be verified during an incident. As for the EPO, issues arose when there was an absence of a pre-existing EPO. Finally, in one incident the key issue that

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xii A scientific and technical advisory group.

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Project 09/1005/03
emerged were the difficulties identifying the key commanders during an incident.

_Triage_

Only 1 document (1%) was coded under “triage”, and the only two mentions of the topic in the key issues identified by reviewers were the use of Great Ormond Street Hospital in London as a triage centre, and the lack of agreement on triage in the context of critical care during the 2009 Influenza A/H1N1 pandemic.

_Decision-making_

Decision-making was the topic of 35% of documents (N = 28). This theme was often addressed in association with organizational issues and especially to individual roles and organizational hierarchy. The lack of political leadership and inter-agency collaboration were considered key issues, particularly in emergency situations where it proved vital to effectively managing uncertainty. For example, clearly identifying key commanders and coupling clarity with flexibility in command and control was identified as necessary to improving decision-making. Other factors reported as affecting effective decision-making in health emergencies were:

- more abstract elements such as the need to clearly understand influence and behaviour;
- organizational issues, including the need to improve knowledge of roles and responsibilities between partner agencies;
- technical or procedural factors, such as the need to log decision-making and the inconsistent practices of different agencies in maintaining decision logs.

### 3.3.6 Internal communication, information technology and intelligence

_Internal communications_

The issue of communication within organisations was covered in 44% of documents (N = 35), and generated a variety of qualitative comments by reviewers. In addition, documents coded under data protection/confidentiality represented 6.3% of the total set (N =5). The themes in
this topic area overlap with roles, responsibilities and organizational hierarchy issues.

In the response phase of an emergency, issues emerged around the dissemination of information to response providers, and communications (e.g. of technical and scientific advice) to organize and support rescue and response operations. Examples mainly concerned the need for courtesy calls from responders to Emergency Departments, problems arising from inconsistent health and safety advice to responders, the lack of contact information for ambulance service staff, or issues arising from delays in the communication of information from ‘Silver’-level command\textsuperscript{xiv} to the ambulance service. In one incident, flaws were reported in the provision of clinical advice to professionals and especially temporary locums.

Another important theme concerned inter-organizational communication between agencies involved in all phases of emergency planning, response and recovery. Examples include cases in which the primary care trust was not formally informed about an emergency situation; the more general need to improve links between the NHS and the Local Resilience Forum, along with the need to interact with Regional Resilience Forum to assess impact of disasters; difficulties in communicating pandemic outbreak information to GPs or emergency departments and between local authorities. Also reported were the difficulties in obtaining specialist scientific and technical advice, the provision of inadequate information from the casualty bureau or in contacting the local health authorities.

Difficulties in obtaining correct and timely information on the scene of a disaster was also reported. In one case, no information was available on vulnerable people at home, while in other situations it proved difficult to know the ‘bed state’\textsuperscript{xv} at the time of a hospital fire, or inconsistent naming of buildings between staff hindered response operations. Finally, in specific cases, the lack of information sharing and problems encountered in releasing information from hospitals was also reported as being due to data protection concerns.

\textit{Informatics/intelligence}

A third of documents (33\%, N = 26) involved issues concerning information and communication technologies or health intelligence. Three main themes were identifiable in this area.

Firstly, modelling was found helpful in certain contexts such as plume assessment, hazard analysis and the evaluation of the public health impact of an emergency. The modelling however is not infallible as pointed out in one case where limitations of flood modelling were found.

\textsuperscript{xiv} ‘Silver’ refers to the multi-agency tactical level of command and control.

\textsuperscript{xv} ‘Bed state’ or ‘bed status’ refers to the availability of hospital places (or beds) for admission.

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Secondly, several issues emerged with phone communications in an emergency including an over-reliance on mobile phones and the Internet. This may potentially be a problem during an emergency due to issues for example with the availability of AirWave underground, lack of Access Overload Control (ACCOLC)\textsuperscript{xvi} access by responders or simply because mobile phones may run out of charge during a prolonged incident. The London Ambulance Service for example was reported not to be on ACCOLC in one case. In another incident there was a critical loss of internet access at an ambulance service following loss of power.

Finally, data collection and information system issues were reported in a number of documents. One document pointed out the need for more robust data gathering, while another reported on inconsistent data collection about evacuees and survivors, and a third stressed the need for a better integration of the Patient Administration System in response activities. That said, what was also clear was the value of using routinely collected data and existing databases to inform alert and warning systems or to guide risk assessment. Similarly, it was reported that syndromic surveillance could be applied to measure the impact of extreme events or incidents.

3.3.7 Communication with the public

*External communications / mass media*

40% of documents (N = 32) addressed the topic of external communications and mass media in health emergencies. Several documents mentioned the importance of risk communication to the public by the use of the mass media, along with the difficulties and concerns involved in carrying out this activity. Public perception of risks may not be aligned with real risks arising in an emergency. One example mentioned was the ongoing inadequate public perception of carbon monoxide risks, whilst in another document the need emerged for improving the public perception of chemical health threats. However, it was also felt that the mass media can add to the confusion: in one incident, the media exaggerated the number of casualties, in another, problems were caused by the inconsistent use of local media in informing the population.

The appropriate use of external communications was perceived to be vital throughout the whole cycle of health emergency management: from the delivery of accurate and timely information to the local community pre-disaster, to the need for providing reliable information to survivors post-event. However, problems have been reported that arise from incorrect communication to the public or the use of overly technical language in

\textsuperscript{xvi} ACCOLC (Access Overload Control) describes a procedure used in the UK for restricting mobile phone usage in the event of a major emergency.
public communication. As such, how the information is targeted, to householders or businesses for example, and communicated is also of relevance.

*Alert and warning*

About a third of articles covered the topic of alert and warning (N = 29, 36%) but there were no clear themes identified by the reviewers. Some of the issues, problems and gaps outlined in the reviewers’ comments include the following:

- alert systems and activities need to be focussed on specific business or social sectors (e.g. schools, incidents at sea) or specific risks or threats (e.g. chemical threats, carbon monoxide, flooding);

- they also need to take into account:
  - the difficulties of communicating risk in the light of changing and/or limited information that is often the case in emergency situations; and
  - the need to produce public information on risks that is tailored to local communities and needs;

- And finally, from an information systems point of view, there are benefits of using routinely collected data to help inform alert and warning systems.

### 3.4 Final remarks

The main themes emerging from the analysis of the grey literature are displayed in Figure 8. Of note, the scoping review of the grey literature sought to uncover the key themes and topics of the articles reviewed. As such the focus was much more on breadth rather than depth. The review is therefore necessarily descriptive and does not intend to explain the relationships and meanings of the themes uncovered. The latter would be more appropriate for a further in-depth analytic review.

We found it difficult to identify a repository of emergency planning literature that was easily and openly accessible. The two main repositories were the HPA’s Chemical Incidents and Poisons Report database and the Emergency Planning College library. The Emergency Planning College at Easingwold did have a library but access to their resources was controlled and not openly accessible to the public. A charge of £30 per day per person was also levied for any use of the library which could thus prove a disincentive.
There were only 4 issues of the *Summary of Reports and Responses under Rule 43 of the Coroners Rules*, as published by the Ministry of Justice. These did not yield any useful information for this study. Attempts to obtain inquiry reports into the various UK incidents and emergencies were also variable and limited, apart from the July 7 bombing reports. The scrutiny of incident reports tended to vary considerably. This ranged from extensively and rigorously written public inquiry or coroner reports as would be expected, to brief event summaries. Whilst the former would likely have been open to scrutiny, other reports were likely to lack any form of peer scrutiny and appraisal. Perhaps of greater relevance was the fact that it was not clear how well any recommendations from these reports had been acted upon.
Figure 8. Main themes emerging from the grey literature

- **Risks and mitigation**
  - Tools & procedures
  - Retrospective, during/post event
  - Different kinds of risks

- **Response**
  - Impact assessment
  - Accessing the victims
  - Technical/organizational issues
  - Multi-agency response

- **Emergency planning**
  - Lack of plans/procedures
  - Cultural issues

- **Recovery**
  - Environment & human activities
  - Individuals, groups & social structures

- **Communicating to the public**
  - Alert warning
  - Risk communication using media
  - Local focus
  - Technical language

- **Decision making**
  - Decision logging
  - Organizing surge
  - Multi-agency communication: + vs -
  - Roles & hierarchy: command & flexibility
  - Multi-agency collaboration

- **Organizational issues**
  - Multi-agency collaboration
  - Data collection & information systems
  - Data protection concerns

- **Internal communication**
  - Informatics/intelligence
  - Data protection concerns
  - Data collection & information systems
4 Key informant interviews

A Lee & W Phillips

4.1 Introduction

The literature scoping elements of the project enabled us to see where much of the research and other work was published, and provided a semi-quantitative guide to where the knowledge and gaps were. However, what it lacked was contextual information to aid deeper interpretation of what was found. It also tended to provide a superficial overview of the emergency planning field.

In order to better understand the current state of emergency planning in health in the UK alternative methodologies were required. It was clear early on during the formulation of the project that a qualitative approach to this was necessary. As such the plan was to adopt key informant interviews, focusing in particular on those individuals who held key positions in the field or who had special expertise and experience, to enable us to gather the insights we sought.

4.2 Methodology

Based on the initial broad findings of the literature scoping exercises, we sought to gather more detailed insight into the state of emergency planning in health in the UK and the research gaps. In order to do so, we chose a qualitative approach, using either face-to-face or direct telephone interviews with key stakeholders and opinion leaders acting as our key informants.

4.2.1 Sampling strategy

The sampling strategy adopted was purposive in order to obtain a breadth of views from all levels of the emergency planning community. Initially, our topic experts identified a list of potential key informants to interview. These individuals were selected predominantly on the basis of their known expertise, recognized experience, or research in the field. They were identified through:
- World Association for Disaster & Emergency Medicine (WADEM) Board of Directors and Task Force on Quality Control of Disaster Management,
- the Department of Health Emergency Planning Clinical Leaders Advisory Group,
- faculty of the Masters course in Health Incident Command at Manchester Metropolitan University,
- senior faculty of the Emergency Planning College and the Health Protection Agency (HPA)

Public representation was also sought through the Sheffield Emergency Care Forum. The SECF is a group of interested members of the public who have been involved in providing a public voice, interest or lay representation in research in Sheffield.

Potential participants were initially contacted either by telephone, e-mail and/or letter with summary information on the project. Those participants who agreed to take part in the project were provided with a participant information leaflet and returned a signed consent form or correspondence agreeing to participate. A mutually agreed date, time and venue were then set for the interviews to be carried out.

### 4.2.2 Interviews

An interview guide was developed by two members of the research team (AL and WP). The guide consisted of several themes to be explored that were generated from the preliminary conceptual mapping process and literature scoping study. Of note, an iterative approach was adopted and the interview guide was modified over the course of the project so as to explore emergent themes that had not been identified *a priori*.

Interviews were carried out initially by AL and WP together in order to standardise the interview process and for familiarisation with the process. In due course, subsequent interviews were conducted by AL and WP individually.

As noted above, most of the interviews were carried out face-to-face although a small proportion was conducted over the telephone as agreed with the interviewees in advance. The interviews were recorded with the participant’s consent using digital audio recorders and were later transcribed. Concurrent notes were also made by the interviewers during the course of the interviews.

### 4.2.3 Data analysis

The data from interviews were then analysed using a grounded approach using framework analysis techniques. After familiarisation with the material, coding was undertaken. This utilised several variants of coding that included descriptive coding, in vivo coding, and versus coding.
approaches (30). The codes were then categorized and amalgamated into higher level thematic categories, and re-iterated as new codes where appropriate. These were then mapped out to display their linkages. The findings are presented below.

4.2.4 Explanation of terminology used

The terminology used in the following section will require some initial explanation as follows:

- **Emergency planning** refers to the planning and preparedness activities undertaken by an organisation in anticipation of an emergency. It also includes the planning for the response and recovery phases, as well as the hazard assessment and risk mitigation activities pre-disaster.

- **Emergency management** is used to describe a higher level function that incorporates emergency planning but also other management functions including emergency management in the response phase.

- The following interviews also pertain to the **health** field although it may not be explicitly stated as such. Interpretation of the interviews therefore is from this perspective.

- Reference to **emergency responders** or responding organisations primarily relates to first-line agencies such the police, fire and rescue, and the ambulance service.

- **Emergency practitioners** is used to describe not just frontline emergency responders such as the ambulance service but also other individuals working at a frontline operational level such as health emergency planners, hospital consultants and health protection specialists.

- **Health organisations** refer to organisations within the National Health Service in the UK including hospital and primary care organisations. It does not include private healthcare providers unless stated.

- **Major incidents** and **emergencies** are used to describe significant events that threaten severe physical damage and human casualties.

- **Disasters** refer to those major incidents and emergencies that exceed the ability of the local community to cope with within existing resources (20).

4.3 Description of key informants interviewed

From 50 potential key informants, twenty seven were approached and invited to interview. Of this number, 17 key informants agreed to be interviewed.
These included a range of participants who in their professional capacities included emergency planners, health managers, policymakers, technical experts and scientific advisors. There was representation from the public, private sector, the military, NHS (both primary care and secondary care), ambulance service, civil service and the Health Protection Agency. Some interviewees operated at the frontline locally, whilst others participated at more senior levels in government as well as internationally.

We are confident that a broad and appropriate range of informants has been included and covered. Also of note, the participant samples for the key informant interviews and the e-Delphi study were not identical.

The profiles of the key informants interviewed are described in Table 14, and further defined below.

- **Practitioners** describe individuals involved operationally in implementing emergency plans and instructions such as frontline primary care trust emergency managers, ambulance team leaders, and hospital-based medical consultants.

- **Technical experts** were individuals with technical expertise or experience such as Health Protection Agency specialists for example.

- **Scientific and academic experts** describe individuals whose role was predominantly that as a scientific advisor or academic researcher in the field.

- **Policymakers** refer to individuals whose role is at a much more strategic level either in the formulation of policy, or interpretation and translation of national policy instructions to more local or regional policy. These include senior civil servants involved in some way in emergency planning and management.

- **Public representatives** here refer to individuals who have no specific emergency planning expertise or experience, and are therefore truly “lay” persons. These include (but not exclusively) members of the Sheffield Emergency Care Forum (SECF).

The initial intention had been to interview around 20 key informants. 17 first choice interviewees eventually agreed to interview. It was not considered necessary to invite the reserve list of secondary informants as the responses from initial participants became very similar and theoretical saturation was reached by the 12th interview. Subsequent interviewees returned redundant information that had already been identified earlier. No new themes were identified in later interviews.

**Table 14. Profile of key informants interviewed**
4.4 Findings: Major thematic categories identified

The following sections relate the key themes and findings from this qualitative study to the current state of emergency planning in health in the UK as well as to gaps and deficiencies where further research is warranted.

From the key informant interviews there were 4 emergent thematic categories relevant to emergency planning in health:

(i) the knowledge (or evidence-) base for emergency planning,
(ii) how individuals and organisations react and behave in emergencies,
(iii) the health care system in which the emergency management occurs, and
(iv) the public the system serves.

Under these 4 thematic categories are yet further related themes. These are covered in further detail in the following section.

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xvii Interviewees are randomly listed and not necessarily in the order that they were interviewed.

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Project 09/1005/03
4.5 The Knowledge Base

The term *evidence-base* had different meanings and connotations for the various stakeholders interviewed who were involved in emergency planning. Interpretations ranged from the legal interpretation to the scientific. For the purpose of clarity, we refer to it as the *knowledge base*.

The knowledge base dimension subsumed a multitude of related themes. Analysis of these themes suggested a natural and narrative progression. We have adopted the knowledge development cycle by Bhatt (31) to illustrate the relationship between the various themes (Figure 9). The themes as such are categorized sequentially; from the stage of acquisition through to valuation, implementation and retention.

**Figure 9. The Knowledge Development Cycle**

```
KNOWLEDGE CREATION
Acquiring knowledge

KNOWLEDGE REVIEW
AND REVISION
Valuing knowledge

KNOWLEDGE DISTRIBUTION
Transfer and transaction of knowledge

KNOWLEDGE ADOPTION
Translating and retaining knowledge
```
4.5.1 Knowledge creation

The first issue is how the knowledge that underpins and informs emergency planning and management is acquired.

In traditional biomedical science, this knowledge base is derived from the accumulation of reported studies and reviews as published in peer-reviewed literature. There is a universally agreed evidence grading hierarchy of the publications with greater credence paid to robust and academically rigorous studies conducted empirically (32).

However, emergencies and disasters do not lend themselves to the same type of study as conventional health research. This is due to the unpredictability, variability in type, scale and speed of onset, and complexity of emergencies. For obvious reasons randomized controlled trials cannot be carried out. There are also inherent challenges in data-gathering in emergencies.

It’s very difficult to, you can’t do a randomised control trial. You can’t compare because every situation is very different.

Emergency Planning Technical Expert 1

Emergency planning is an unusual area ... If you do sort of medical research you test your hypothesis and then you sort of devise the treatment or devise a drug and you test it etc. Emergency planning is nothing like that at all.

Emergency Planning Policymaker 2

The current research environment also introduces further barriers, for example, the existing research commissioning process is too slow. Current funding, ethical and research governance procedures introduce far too much delay that impedes research in this field. Consequently, the ability is lost to gather valuable data from an emergency as close to, if not during, the event. As such, one pressing priority for researchers is for the creation of a more disaster research enabling environment. This exists to an extent for example in the US where researchers are much more integrated into the emergency response framework and more able to access disasters to study and report on them.
Those quick response reports (research in the US) are then published online for people to see, so you can see what is happening and there is this much more "joined up" thinking between government and research and the practitioner in the United States. National Science Foundation funds an awful lot of work in disasters and emergency management, which we do not do here.

Emergency Planning Academic and Technical Expert 1

Due to the inherent difficulties in carrying out research in disasters and conducting evidence synthesis, there is a need for further work to explore ways of compiling the knowledge base. There is clearly a role for academic researchers to establish methods for studying health emergencies in vivo, synthesizing existing knowledge and applying academic rigour to the process.

4.5.2 Knowledge review and revision

Inter-agency differences in knowledge valuation

It was also clear that the different stakeholders “valued” different “evidence” differently. Some for example did not see the value of research or research evidence. These tended to reflect the inter-agency cultural differences in how knowledge is viewed, valued and used. There were also apparent differences in the “appetite” for evidence.

...the difference in cultures and the like and the knowledge and evidence it comes out of the culture aspects of how (the different organisations) do it. Some are sort of disorganised ... This is part of the problem I’ve noticed in the exercises we’ve had as to what each see as the evidence they need and how they approach it.

Public representative 3

You’ve got with a lot of practitioners this brick wall that you have to kick them through so that they can open their eyes you know. It’s very much "Why do I need to know that? What’s that gonna help me? Why should I read a book about the way disasters may happen or about social vulnerability? What will that do for me in terms of helping respond to an emergency?"

Emergency Planning Academic and Technical Expert 1

Well a lot of people (emergency planners and managers) don’t see the relevance (of evidence) or how it can be done.

Emergency Planning Technical Expert 2
Evaluating experience with expertise and evidence

For example, many frontline practitioners, who predominantly come from a military or a "blue-light" emergency services background, experience of dealing with incidents was equated with expertise and as evidence. Academic literature was less well received and valued. In other words, practical "knowledge" derived from experience of previous emergencies rather than academic rigour held precedence. The practitioners wanted knowledge and information that was of a practical nature that could be implemented into direct more visible action in emergency settings.

In contrast, stakeholders from a health background (e.g. medicine and nursing) had a greater affinity and familiarity with the need for an evidence-base. The evidence in this case refers to "knowledge" that has been peer-reviewed and published. This is probably a reflection of the professional bias that has resulted from the evidence-based medicine movement in recent decades.

There is an artificial barrier and you see this very much if you were a member of the Emergency Planning Society. You see that the practitioners ... see the academics as not having that practical experience, therefore not knowing what is going on. And therefore, "You can't tell us how to do our jobs because you're not out in the field doing it with us" ... "It's alright you saying this, that and the other but actually we do the job and when it comes down to having to do it there is nothing you can tell us about it". That's how it's been.

Emergency Planning Academic and Technical Expert 1

I know that sometimes practitioners hear an academic and just switch off because it is an academic. You know and I am sure it is the same the other way for some people who haven't got respect for people who have got real life you know years of experience of practitioner stuff but are only just starting to reflect on it.

Emergency Planning Academic and Technical Expert 2

How the evidence is appraised and graded

Interestingly, there was also a suggestion of an "evidence hierarchy" in emergency planning and management. As noted earlier, experience tended to be valued highly, but it was also clear that national guidance was deemed as having greater "evidential value" than academic literature. At present, emergency planners and managers can be uncritical in what information they choose to accept, whilst discrediting other more academically robust information because, from their perspective, it is not the expert experience of a practitioner.

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I’m not sure that many of the planning individuals actually have the ability to actually read a paper and then decide what its face value actually is. There may be some sources that people will I think will take more notice of. I think, I mean maybe you’re just going to obviously [go] to government directives as well of course.

Health Technical Expert

I wonder how much people have actually the ability to distinguish between ... something like good practice and best practice and what is evidence based and what is anecdote. And in emergency management fields I would definitely say that there are examples where people talk about stuff as if this is the way we did it and therefore it’s right when that is simply anecdotes or based on experience. It hasn’t been evaluated independently and found to be something that is applicable universally in other situations ...

Emergency Planning Academic and Technical Expert 2

The degree to which information is scrutinized also differs in the emergency planning field compared to the mainstream health sector. In the emergency planning field for example, it appeared that practitioners tended to be uncritical of their information sources, accepting them at ‘face value’. Possible explanations proposed for this included the lack of time that practitioners had to do this, or a lack of skills to do so.

I think most people, particularly many of the people involved in the planning side of this, will take ... what they read at face value and there’s no robust review of the quality of any evidence out there really.

Health Technical Expert

They go on the internet and use that as if it is of equal quality and quality assured as stuff that has been peer reviewed and the basis of an academic study ... I think that is partly a reflection of a culture where there is so much information around ironically, that people often haven’t got time to discern or discriminate between them or they just judge all sources to be the same.

Emergency Planning Academic and Technical Expert 2
The question then is whether it is possible to develop something equivalent to the clinical grading system for evidence but tailored to the needs of the emergency planning community so that the practitioners and policymakers could grade the evidence that is available.

**Generating the demand for evidence**

It is important that practitioners and policymakers understand the value of having robust and reliable knowledge to base their decisions on. However, currently there seems to be not very much interest or ‘appetite’ for this in the emergency planning field. There therefore needs to be a culture shift such that the practitioners and policymakers actually demand the evidence in the first place.

It’s a bit like going back to where the NHS was you know 20 odd years ago before evidence-based medicine became the thing to do, when people didn’t feel they needed to grade the evidence ... There’s probably a stage about persuading the emergency planning community that, one, an evidence base is important and would improve their response and then, two, if you want to go down that road you have to have a means of assessing and grading the evidence that is available .... It’s going back to the early days of evidence when you know you could walk into a hospital clinical group and talk about evidence based medicine but most of the people you were talking to assumed that they were the experts and didn’t need to prove it or have it assessed or graded.

Emergency Planning Technical Expert 2

The idea of (an) evidence-base to make your decisions has been such a powerful message ... (but) a lot of these other groups (involved in emergency planning) like architects really aren’t very interested... I am always interested to know if our advice has actually been implemented.

Emergency Planning Technical Expert and Policymaker

### 4.5.3 Knowledge distribution

There are three issues associated with knowledge distribution that were identified from the interviews:

a) how knowledge is transferred between academics and practitioners,
b) how it is cascaded within organisations, and
c) how it is transacted.
**Knowledge transfer**

In the former, this is the “knowledge transfer” agenda that academia encounter as with other fields of study. At present, it appears that there are real problems in how academic knowledge and research is disseminated to practitioners. There does not appear to be a mechanism of doing so.

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*I do believe in this country we don’t share our research with our practitioners in a good way. ... (We need to) develop that mechanism for knowledge exchange ... It’s getting the knowledge out there about what happens, why it happens, making people aware.*

Emergency Planning Academic and Technical Expert 1

*And to me one of the big calls that I have seen ... is a lot of people do research in this area and then are very frustrated that they don’t get their research into policy practice because they actually don’t share it with the people who need to know what’s there because they don’t know how to share it.*

Emergency Planning Technical Expert and Policymaker

There is also an issue as to how academics communicate their findings to practitioners. There are obvious professional differences in how the information is perceived. For knowledge acquired by academics to be useful to practitioners, it has to be communicated in a way that is understandable, relevant and applicable to the intended end-users of that knowledge, i.e. the practitioners.

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*... in wanting to get messages across or work with people, you know when you are working with different kinds of people, like in the academic and the practitioner world, you have to move over to their world. Think of the world through their eyes and communicate in the way that they will hear and if you can’t do that, then no matter how good your research is, it is not relevant to them.*

Emergency Planning Academic and Technical Expert 2

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**Knowledge cascade**

The second issue alludes to the “knowledge cascade”, i.e. how knowledge is disseminated within organisations from individual to individual. There does not appear to be a robust system for transferring knowledge and experience. Some knowledge transfer appears to be on an *ad hoc* basis.
such as “by word of mouth” and has been described as knowledge that “just bounces along”. There is therefore a need for developing mechanisms for spreading knowledge within organisations.

(Lessons sharing) tends to be word of mouth ... you just happen to be at the conference where this is discussed.

Health Technical Expert and Policymaker

... these settings are so far and few between and therefore lessons learnt are often forgotten until the next time it’s the big problem and you see that, from the reports on the transport industry to what’s happening, you know the various train crashes, the messages just bounce along ...

Health Technical Expert

Where the plans broke down was (when) the planning had not extended far enough down to the actual “delivery people”. So in other words a Trust might well have had a very good understanding at the kind of head of emergency planning, at the trust level of what would happen in a pandemic, senior bed manager may well of understood what was needed to sort the beds out and so forth, but I’m not really sure that the average consultant/physician or even worse still the average specialist registrar had any understanding of how things might change.

Scientific and Technical Expert

But perhaps a more crucial issue is how knowledge built up over time is protected and not lost due to potential breakdowns in the knowledge cascade such as when key members of staff leave the organisation. Identifying means of preserving this ‘organisational memory’ is therefore of importance.

Well I suppose at one level you need something at the top that comes down, that cascades down. But so much gets lost at the cascading levels. But then having got something cascading you need somebody reliable at the bottom with a good chain of command, a good chain of information and who stays in the job long enough to do it at a local level.

Public representative 1

I think the thing that worries me most at the moment is having a corporate memory ... a way of capturing knowledge, sharing knowledge ... That is one thing that we are rapidly losing ... knowledge and understanding and people re-inventing wheels. They say we haven’t done this before and you say you have, you just don’t know about it.

Emergency Planning Academic and Technical Expert 2
Knowledge transaction

Knowledge was not simply transferred from one party to another, but there were times when this knowledge transfer took on a much more transactional feel. Neither was knowledge passed on in an immutable form but it tended to be reshaped or repackaged in the process. This was most evident for information transfers between organisations. Examples include how information is communicated to the mass media by emergency practitioners, but also issues to deal with how technical information was communicated from scientific or technical advisors to decision-makers and planners. It seems to suggest that the information from a provider has to be processed and presented in a form that the receiver is able to accept, understand and translate into action. Failure to do so meant that ‘information parcel’ risked not being sufficiently understood let alone utilised.

I've seen other scientific and technical colleagues make what could be a blindingly obvious decision of "which way you need to go" very complex it actually turns off someone like the police commander leading it to the point of going "Now exactly what does this mean?" ... And I think there’s a need to try and understand from the training side how technical people ... can actually give realistic accurate but intelligible advice to people who just need to make a strategic decision so that it's not actually lost within all the science and terminology.

Emergency Planning Policymaker 1

This ‘failure of communication’ is due in part to the apparent lack of common understanding of terminology used by the different agencies involved. This appears to occur both within organisations and between organisations, but also interestingly between different countries. More worryingly, there is a hint that the different agencies seem to presume that each understands what the other means. This stresses the need for universally accepted terminology to be defined and used.
Well one of the things is definition of flooding. Always remains a difficulty. Is it a puddle in the wrong place i.e. water in a puddle, or is it actually swamping you? ... If you can’t define what a disaster is, how on earth can you possibly understand the life cycle and know how to stop it? I think we are very poor at understanding these things. If you can’t define what a disaster is, you can’t get the early warning in easily. Did you know that the World Meteorological Office does not have a definition for heat wave?

Emergency Planning Technical Expert and Policymaker

What is a major incident? It may be a lot of casualties or it may be something else.

Military Technical Expert

There is confusion in understanding or awareness ... mix up between "emergency planning" with "emergency management".

Health Emergency Planning Manager 3

Sometimes it comes down to people don’t talk the same language.

Emergency Planning Academic and Technical Expert 2

Ultimately, the key role of information is to help guide and inform decisions and planning in emergencies. As such there is an issue as to the timeliness for the delivery of the information to information users. In an emergency setting, there is often ‘immediacy’ in the need for such information by decision-makers. The knowledge base therefore has to be accessible and accessible rapidly by those who need it.

Emergency Planning Technical Expert and Policymaker

If you don’t have the evidence base in your back pocket to pull it out, then you can’t do it quickly. You can’t go away and say, “Give me ten minutes, give me a day”. The recovery group want it now!

Emergency Planning Technical Expert and Policymaker

4.5.4 Knowledge adoption

The apparent pre-requisites for knowledge to be adopted are that the knowledge has to be ‘translated’, retained and learned.
**Knowledge translation**

Ultimately knowledge is expected to be used, i.e. translated into action. This may not always occur as there is often considerable difficulty trying to translate what is published and day-to-day learning for practitioners at the front end of emergency planning and response. The determinants, as identified above, include a lack of awareness of the knowledge base by practitioners, the knowledge being discounted as irrelevant by practitioners, breakdown in the knowledge transfer and cascade between and within organisations, or organisational memory loss. There is also an element of organisational cultures influencing the use of evidence.

When dealing with a particular incident, we wondered whether practitioners adopted a particular approach because it seemed intuitively right, was based on previous experience or was based on guidance. Anecdotally it appears that decision-making may at times hinge more on the experience and intuition of the practitioner rather than the evidence-base. A culture shift is thus desirable at the operational end to ensure that plans and decisions are evidence-based as much as practicable, i.e. the evidence is embedded into practice.

> It’s about making sure that the people doing the job for instance have got the knowledge ... It’s about having ... that knowledge base in place within the practical elements of the job ... Yeah, you can’t do without the experience. Experience is great (but) you need the underpinning knowledge that some of (the practitioners) don’t have.

   Emergency Planning Academic and Technical Expert 1

> I have thought of three words that really sum it (the use of evidence in emergency planning) up for me, patchy, personality-driven and impoverished ... It is really patchy in the sense that it all depends on where you go. So some authorities are probably much better than others and much of that depends on personalities, who is involved, who drives it, what their background knowledge and experience is and their interest and what are their other jobs.

   Emergency Planning Academic and Technical Expert 2

An important element of the translation process relates to the ‘contextualisation’ of the knowledge to the local setting. As discussed later there is learning from other sources around the world, but these are not always directly transferable to the UK setting and a degree of local interpretation is required.
**Knowledge retention**

We found further themes related to the issue of how knowledge is retained:

- *Where is the evidence?*

Some of the questions that arose were where do emergency planning practitioners obtain the evidence from and how do they access it? There was no clearly identified publicly accessible repository of such knowledge in the UK.xviii As confirmed by the scoping study of the published literature, there is little literature on emergency management for the UK health context. This paucity of peer-reviewed evidence was also noted by interviewees.

> Often you are looking at stuff that is historical and the only way you can get information is by what's available and that came by internet searches or information that people say they happened to have. It was really difficult to assess reliability ... The ideal is that in every emergency response or plan you had ... research reports around it and all the background ... Depends on what information you have access to and what is around.

  Emergency Planning Academic and Technical Expert 2

> I don’t think there was any body of reference, you know body of knowledge that ... people reached across and said the evidence says we should do this. It was more a plan of intuitive feel from a group of people that this was the right way to go ... I couldn’t say that during the planning processes that I witnessed there was frequent referral to the evidence because the evidence didn’t exist really.

  Scientific and Technical Expert

> I don’t think they use nearly enough evidence base. Partly because the evidence base for at a lot of these events is very poorly accessible and not frequently there.

  Emergency Planning Technical Expert and Policymaker

Some interviewees highlighted the need to develop a UK evidence base that is more contextualised to local situations and circumstances. The availability of such a repository of reliable, quality-assured, user-friendly knowledge for emergency planning is seen as crucial if the intention is to move emergency planning towards a more evidence-based footing.

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xviii Currently, the only known repository is the privately managed Emergency Planning College library at Easingwold.
To improve emergency planning in the UK, we need plans that work with a sound basis for it. ... We need a good, coordinated repository of information ... including national advice, a good library of plans.

Health Emergency Planning Manager 2

We do not really have a body of knowledge in this country about what happens in the UK. We do have all the reports debrief reports and those sort of things but in terms of academic, peer-reviewed good research it’s not readily available, it’s not accessible to people.

Emergency Planning Academic and Technical Expert 1

If there is going to be use of evidence, having a knowledge base, it has to be both stored, assessable, presented and applicable in a way that is useful for practitioners.

Emergency Planning Academic and Technical Expert 2

However, the ‘robustness’ of the available evidence is of particular concern as practitioners tended to uncritically accept some of the available evidence at face value as noted earlier.

• Local versus International Knowledge

There was also an issue as to the extent to which UK practitioners learn from other sources in particular from international sources. Some interviewees discounted international evidence as not relevant to the UK on the basis of contextual differences. Yet others were cautious and guarded with regards to extrapolating international evidence to the local UK context.

I think there are some broad principles of what works well in terms of command of control and what has proven not to work well that can be applied, but I do feel it’s quite system specific a lot of it.

Scientific and Technical Expert

"But it’s New Zealand! It’s nothing to do with us!" It’s those sorts of blockages that you have.

Emergency Planning Academic and Technical Expert 1

There will be some question about how directly transferable (the international evidence is) into the UK environment because the politics and the structure of emergency response and planning is different.
Emergency Planning Technical Expert 2

_I think especially as a country we tend to ignore or tend not to look at or tend to discount (experience from other countries) … I’ve heard this said, "You know United Kingdom it’s different over here!"_

Health Technical Expert and Policymaker

However, others have strongly advocated for the integration of international evidence into the UK evidence base on emergency planning with parallel lessons to be learnt from them.

It’s very important that we’re just not sort of UK centric, see what plans are in available, that are in place elsewhere … I think I’d support that if there is some evidence out there and I appreciate it may not relate to a delivery system that’s similar to ours but I think if there are clear messages to learn then we should absorb that where, whatever the authority that’s produced it.

Health Technical Expert

What we need to do is just keep learning off each other. Pull the generic themes out because they’ll actually help build the response role of a whole variety of incidents, not just the particular flooding or fires or health emergencies. Make it generic. Find out what the common principles are responding to an incident and the scale of that incident and build on it.

Emergency Planning Policymaker 1

We’ve got to be open minded … Let’s hear the best ideas from the other countries because as I say it’s not the British approach, there’s a generic content but you know we can modify the way we do things from others experience.

Military Technical Expert

That the UK socio-political and demographic profile is different, as is the organisation of the emergency management system, is without question. However, generic lessons may likely be gleaned from elsewhere, and the international evidence-base could help fill local knowledge gaps.
When I do stuff around psychosocial recovery I wouldn’t so much look at the UK stuff websites and things. I would go to Australia and New Zealand. Australia did a lot of work first and New Zealand followed and we kind of followed after that. But there is a lot of stuff that is being done there, research around things like community engagement, spontaneous volunteers, recent reports ... But I would say it is a knowledge gap here because I guess most practitioners here wouldn’t be familiar with that sort of stuff.

Emergency Planning Academic and Technical Expert 2

How does the emergency planning community learn from emergencies?

- Lessons are not always learnt

From the interviews, a common and recurrent theme was concern voiced with regards to whether the emergency planning community learnt from emergencies. For example, not all events were reviewed. Where some reviews are conducted following emergency events, some debriefing may occur and lessons are identified. However, these do not always translate into enduring organisational change.

One explanation proposed by informants was the organisational culture of agencies involved in emergency response and management. Reflective learning was not culturally natural for some of these agencies. Possible reasons cited for this include the lack of time, competing organisational pressures, and the backgrounds of the individuals recruited by these organisations. There was also a perception voiced that some of this may be attributable to attempts to avoid ‘blame’. Also, constructive review discussions post-incidents from which learning may occur may not occur, or individuals are disinclined and disempowered to participate for whatever reasons.

There are "can do" organisation that is fantastic at emergency response, but they are not into thinking, reflecting and analysing, because they have got to do critical decision-making, often ones with immediate pressures and so that is mostly reflective learning lessons. It doesn’t come naturally to them.

Emergency Planning Academic and Technical Expert 2

Further work to understand this as well as measures for encouraging organisational and individual learning is warranted.

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• **Variable quality of event reviews**

When events were reviewed, it appears that the usual form of learning from these events tends to occur from the ‘after action’ reviews that occasionally (but not always) occur. These include informal or ad hoc post-incident debriefings to more formal reviews and occasionally legal inquiries. It is thus clear that there is a wide range of possible learning sources and events.

However, the rigour and robustness of these reviews also vary considerably from unobserved internal debriefs to publicly-scrutinised inquiries. There were issues to do with how truly open and complete debriefings were in terms of identifying lessons, and in particular in terms of reporting errors or failures in the response. Also of note, the reviews could be uncritical or not shared more widely thereby minimising their value.

*Until we started debriefing, there wasn’t any realisation of how well they (health practitioners) do.*

Health Emergency Planning Manager 2

*The whole thing was debriefed and the plans were looked at but I’m not sure they went into enough depth to say, “Hang on a minute, how did this happen?”*

Health Technical Expert and Policymaker

*How do you know it’s really good? How do know if it works and who have you asked when you put this response into place? And often emergency response is where people do what they have to do but they don’t, in my view, evaluate it. That is different from having a debrief or a review … the whole process isn’t always evaluated and if it is, it is often evaluated from the point of view of those directly involved with responders, not necessarily those on the receiving end of services delivered, etc. …*

*Whether we do always identify lessons is another question. Often I think it is a political process debriefing and people get protective. I understand that too about whether it is in their interest to acknowledge and be open and have a share in lessons and mistakes and all that. That’s one question and when they do I mean do they share it?*

Emergency Planning Academic and Technical Expert 2
• Lessons not embedded

Following events that were reviewed, commonly “lessons learnt” reports are produced by some responders. It appears that this in itself is a misnomer as a distinction could be made that lessons learnt were not always learnt. Instead they were “lessons identified”, as learning implied that the knowledge gained was somehow embedded more by the individual or organisation. As one interviewee summed it up, “lessons are learnt often, but they aren’t often lessons learnt but they’re just a collection of advice and it’s rarely embedded into practice afterwards.”

We’re not allowed to call them lessons learnt, they are … identified. You can only call them lessons learnt when you can show you’ve done something about them.

Emergency Planning Technical Expert 2

I was once interviewing an emergency planner as part of a panel for a job and he said, “Lessons learned - we’ve dealt with all of them”. So I just looked at him and said, “What do you mean you’ve learned the lesson?”

“Well we had an action plan”.

“But how do you know it was learned?”

“Well because we had an action plan.”

“No, how do you know that learning was embedded? How do you know that meant changed behaviour, changed attitudes, changed culture?”

“Ah well, erm” is what you got from them. So I firmly believe if you talk about lessons learned you embed this feeling that you’ve actually learnt the lesson when actually all you’ve done is identify it.

Emergency Planning Academic and Technical Expert 1

• Differences in how organisations learn

Agencies differed in terms of how they learn, probably reflecting their organisational cultures. The traditional emergency responders like the ambulance service were familiar with debriefing and lessons learnt reports, whereas health professionals were more likely to refer to traditional academic evidence base to help inform their learning.
It’s not built into the culture of the blue light response services in the same way. They have a more formalised system of debriefing and lessons learnt which is more about learning from experience whereas the health services ones tend to be more about that plus going back to the evidence base to see whether the evidence base was right or wrong. So I think there is a culture difference between those.

Emergency Planning Technical Expert 2

**How is the knowledge retained within organisations?**

Linked into developing the knowledge base was the difficulties encountered by most organisations in terms of embedding learning. As mentioned earlier, there are real challenges in maintaining organisational memory owing to staff turnover for example and a lack of internal mechanisms to safeguard experience and knowledge. There is a process involved here in terms of “knowledge capture”, dissemination and retention. In addition, this ‘knowledge’ that is retained as part of organisational memory needs to be readily accessible in the future if called upon (i.e. knowledge “recall”). This process needs to be better understood.

I think the thing that worries me most at the moment is having a corporate memory ... a way of capturing knowledge, sharing knowledge ... That is one thing that we are rapidly losing ... knowledge and understanding and people re-inventing wheels. They say we haven’t done this before and you say you have, you just don’t know about it.

Emergency Planning Academic and Technical Expert 2

### 4.6 Individual and Organisational Behaviour

#### 4.6.1 Social and behavioural science knowledge gaps

Most respondents acknowledge a “social and behavioural science gap” in the knowledge with regards to how individuals and organisations behave in emergencies. Indeed some saw this as the key research priority in this field especially in preference to more traditional forms of biomedical research. For example, one expert identified social research gaps with regards to “issues of power, implied power, command, control and locus of control”.

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I would give (research funding priority) to the social scientists, not to the medics. I would want to engage social scientists who are experts in health emergency response, the sociology of it. Health policy from a sociological perspective, to understand a bit more of why in a crisis individuals and organisations behave as they do. To get under the skin of what goes well and what doesn’t go well in emergency health response. But not, not at a kind of mechanistic you know, way in which you know, doctors see things. Something a bit deeper, something that can you know, tackle issues of power, implied power, command, control and locus of control and kind of, stuff that maybe a kind of a hard, hard nosed physical scientist would say is all a bit woolly. But in actual fact I think it’s probably quite fundamental to this.

Scientific and Technical Expert

The need for research in this field is typified by the current state of emergency planning and management where the interviewees describe a situation of practitioners tending to “muddle through”, often relying on their previous experience and intuition, rather than any robust evidence base or understanding of the wider socio-political or behavioural aspects. This situation is in part caused, and possibly exacerbated, by the fact that in some cases the responsibility for emergency planning appears to have been acquired by individuals not trained for the roles.

[The hospital] emergency plan ... was one page long and it basically said "I, [named person] ... Professor of Medicine will seize control of the hospital. I am being slightly flippant for the sake of effect, but it was extremely rudimentary and it conveyed a sense certainly of somebody taking control but didn’t give any insight or impression that people who were truly trained in emergency response would be the ones taking control. And I think it reflected where we were at the time in the mid to late 1990’s where everything was really rather rudimentary and nobody had thought through what was involved in emergency response or how to do it best and certainly not how to command and co-ordinate it ... [Emergency planning] just kind of doesn’t get addressed properly and what we’re left with is something that has either slipped through the cracks or something that is a bit of a fudge.

Scientific and Technical Expert

The social and behavioural science of disasters and emergencies is however a very diverse and broad field covering very many different aspects and issues. The following section sums up the main related
themes that our key informants identified as possible gaps where further study would be of benefit.

4.6.2 How do individuals behave in emergencies

Interviewees identified a lack of understanding by the practitioners, policymakers or even the technical experts of how individuals (both the public and non-public) behave in emergencies. Often presumptions are made that have no grounding in the existing evidence-base as the planners and responders may never have been trained in this subject. As one technical expert observed, “assumptions are made about how individuals or groups of people will react and there is little evidence whether those assumptions are correct or not”. Other technical experts interviewed have also corroborated this view and certainly highlighted it as the key knowledge gap for health emergency planning.

(£he big gaps are) around behavioural sciences because I think when we do the major exercises there’s often the lack of understanding of how people actually react in emergencies or incidents ... If you stand back and look at it there are issues around say the miscommunication I’ve mentioned with some of the science around behaviours and how people react.

Emergency Planning Technical Expert 2

(Emergency planners and practitioners) don’t think about how the planners and responders behave in emergencies or about (how) the community, the public, the stakeholders respond...

Emergency Planning Academic and Technical Expert 2

... We really don’t understand how the public will react to (a disaster) if it happens.

Emergency Planning Technical Expert 2

As such, there is a crucial need to understand in much greater depth how individuals behave in emergency situations, and for this knowledge to then feedback into emergency planning, preparation and response.

4.6.3 How decisions are made

More research is required to study the individual behaviours of those in key positions of power as the decisions they make often translate into organisational behaviour and responses in emergency settings. As such,
there is a need to investigate how they make decisions, what constitutes good decisions, and how to train or encourage this.

*What constitutes good decision-making*

A central theme in many post-incident reviews and inquiries is how decisions are reached, i.e. the focus is on the decision-making process, the justification for decisions made and the outcomes of those decisions. As noted above, individuals in key positions of power can have considerable influence on how an organisation behaves and their decisions can translate into organisational responses. Individual decisions can therefore have significant repercussions, so ensuring that the best decision is made every time is a sought after objective. However, the interviewees reported that individuals were not always trained or empowered to make decisions.

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**How do we actually get individuals to have the confidence to lead through crisis, lead to the recovery of that crisis and rely on the people around them who are the experts or the people who can then facilitate a response in a ... dynamic environment to get that end result, which is to recover from the incident? ... I think that’s where there’s a need to look at it across the board of the decision-making. I think the decision-making - leadership is the bit that is missing from major incident training.**

Emergency Planning Policymaker 1

**What we found was that there is constantly a gap in (the) evidence base on how to make people feel enabled to make decisions and go ahead and manage events locally and more nationally as required.**

Emergency Planning Technical Expert and Policymaker

**People** don’t like making decisions without information and the one thing they really, really, really don’t like is changing their mind once they’ve made a decision. And the ability to change your mind is probably the most important criteria for being a successful emergency responder. It’s recognising the situation has changed, what I decided 5 minutes ago is no longer correct and I’m going to do something different because the world is now different. Doctors can be very difficult with that I’ve found.

Emergency Planning Technical Expert 2

*Leadership*

Decision-making was also linked to leadership. The interviews revealed contrasting opinions as to what constituted good leadership in crises, and
which competencies would be expected of “good” leaders. It appears that traditionally former emergency services personnel tended to be appointed to the emergency planning roles in health organisations. It was implied that the likely basis for this was the assumption that such persons would have the necessary competencies for the role. However, the relevant competencies for this role are not well-defined or established, and there are conflicting views as to whether emergency planners from an operational background lack the ability to operate strategically.

We do need to train a different cohort of people actually to do this role ... The people who go into the role of emergency planners are very good at operational stuff but they're not necessarily strategic thinkers and consequently we don’t necessarily have strategic thinkers leading this field ... People who think in a different, in a slightly more strategic and lateral thinking and not just problem solving.

As a country we need to focus on some of the sort of business continuity issues but that gives us a bit of a problem because we don't necessarily have the right people in post to lead that new agenda as it were.

Emergency Planning Technical Expert 1

When emergency planners are appointed there (are) different approaches taken in different organisations. Some will go for the automatic and employ an emergency services person because they will have been trained in response etc. and some will take the view of "Well, we’ll try someone with a more broader set of competencies that will do emergency planning but can also do other things as well"

Emergency Planning Policymaker 2

An added complication is that the persons devising policy, the persons developing plans and the persons implementing the plans tend to be different individuals often in different agencies as well. Emergency planning is not a "bolt on" role as the individual skill and knowledge requirements differ. Put simply, the competencies of a “good” planner are significantly different from that of a “good” responder or a “good” policymaker.
So (the competencies required of planners) is different depending on the organisation and what you’re being asked to deliver as well, and those that deliver the response side generally are not those who plan for the response.

Emergency Planning Policymaker 2

Individual competencies need to be developed and not bolt on roles such as a "lead nurse" for emergency planning.

Health Emergency Planning Manager 2

It is likely that the specific competencies required of each role need to be clearly identified and established, as well as the means and method of training key personnel to acquire them.

**Reactive versus Proactive**

From the interviews it became apparent that the current emergency planning stance in the UK is predominantly reactive to incidents as they occur rather than proactive in their mitigation. As one emergency planner put it, the emphasis is much more on operational matters rather than for contingencies. Consequently, the response to incidents seems to be less pre-planned, with decision-makers tending to “muddle through” the situations until their eventual resolution.

We might plan well but whether it’s ever implemented is another matter ... I don’t think there is enough planning really for the future. I think they just wait for something to start to develop.

Public representative 2

In terms of the emergency response ... I don’t think there was a plan and certainly it wasn’t kind of thought through and implemented that systematically. It seemed to me there were plenty of resources thrown at the problem but (the response) happened despite not having a plan rather than because there was a plan.

Scientific and Technical Expert

The emphasis is on operational planning rather than contingency planning.

Health Emergency Planning Manager 2

I get so annoyed when you listen to reports on the television set saying oh this accident happened. Actually it wasn’t a bloody accident. You can lead up, even 9-11 you could lead stuff up to it, they could have stopped it. And it’s about focusing on that proactive bit and not the reactive bit.

Emergency Planning Academic and Technical Expert 1
The value of mitigation and proactive contingency planning is well recognized and accepted. As such it is interesting to note that despite this, the health system and the key individuals responsible tend to be much more reactive in their approach to emergency management. The backgrounds of the individuals concerned, or indeed the prevailing health system culture, may play on this but further inquiry is required to substantiate or repudiate this.

A lot depends on the leadership of that and the extent to which that leadership is focused on the longer term and sees emergency response as being a temporary aberration to be managed while we get back into a steady state or whether the leader tends to come from a background where they see the leadership or the emergency response for themselves as being their main job.

Emergency Planning Technical Expert 2

(There are some emergency planners who) have a very narrow, very focused view of what emergency planning is about, it’s about a response. It isn’t about being proactive. It isn’t about insuring that it doesn’t happen.

Emergency Planning Academic and Technical Expert 1

**Assumption of being right**

Another recurrent problem identified was the fact that within the emergency planning community, there appeared to be a culture where the practitioners tended to assume that they are ‘right’. The assumptions are consequently fed into the emergency planning process that introduces vulnerabilities into the plans, preparations and subsequent responses. It is also interesting that the “over-confidence” of the planners appears to be less well recognized by the individuals themselves.
We make a lot of our planning here based on a lot of assumptions which really haven’t been thought through.

Emergency Planning Academic and Technical Expert 1

We do sometimes tend to say we’re good at this. We’ve done so many but we’re good at all this and I’m not so sure we are ... You’ve got to be very honest with yourself and be very careful that you don’t over-estimate your own knowledge and your own skills. Just because you’ve dealt with this in the past does not necessarily mean that you’ve done the right thing. It may just mean that you’ve got away with it!

Health Technical Expert and Policymaker

We are so cock sure in the UK that we know the business. And we don’t. We don’t even apply what the others have said to learn here. I feel quite grumpy about our excessive confidence, as we don’t understand what the real issues are.

Emergency Planning Technical Expert and Policymaker

The root of this mindset is not clear but again we could postulate that this may arise from the occupational backgrounds of those individuals who were appointed as emergency planners. Most tend to be from a “blue-light” service background such as the police, fire and rescue, ambulance service or the military. Could the bravado associated with what is predominantly a masculine professional group contribute to this? More pertinently, could this have negative consequences or potentially be catastrophic if erroneous decisions are made on faulty assumptions?

Understanding the root cause for this view and the potential vulnerabilities that it entails is important. Indeed, there is an argument to be made here to encourage practitioners to recognize and be mindful of their limitations so that the right resources and skills can be brought to bear appropriately. This may be an education or training issue that needs to be looked at further.
How do you train decision-making and leaders?

As noted above, there is incomplete knowledge of the competencies and characteristics of good health emergency planners and decision-makers. Based on what is known, the next question then is how to train these key persons to fulfil their roles. This is obviously heavily dependent on the “outcome” expected of the training. Interestingly, two opposing views were voiced. Some interviewees seem to suggest that the best way forward to take emergency planning would be to create a cadre of well trained officers able to exercise informed decision-making, i.e. what is hoped for are persons able to make rational decisions systematically under duress in difficult circumstances. Some others felt it was more about having personnel able to implement and adhere to protocols and policies.

There was one (practitioner) ... we couldn’t understand why his head was in his hands for thirty minutes. He said he didn’t know how to ask for help ... It’s getting this balance right because we don’t have endless resources and we would have fewer resources. But we do need to make sure that people recognise that if something is beyond their competency they call quickly. That’s a huge training (need) which is not written into evidence based guidance ... It’s not there. You have got to know where your limits of competence are and be prepared to admit it.

Emergency Planning Technical Expert and Policymaker

You can’t just dive into these things with good intentions. You need to know what you’re doing, what you can and what you can’t do.

Health Technical Expert and Policymaker

Very often there’s a feeling that there’s somebody in at the top who’s been parachuted in and doesn’t really know how everything works below them. So if they’d bothered to come down, they’d have known about it .... The alternative is when somebody is promoted above them, I mean you sometimes got promotions, promotions that were, somebody was promoted beyond their ability. And then we had the repercussions of that.

Public representative 1
"If you’re trying to prepare emergency systems, (it’s) something about preparing individuals as well to have a systematic approach ... and not (just) the technical knowledge”.

Health Emergency Planning Manager

I think what’s missing and where my focus would be probably is having people who are trained in how to make difficult decisions in difficult circumstances and not panic about it and not to over-react. I don’t think that’s in the system as well ... I think the police do a lot of it now. More than probably the health service does.

Emergency Planning Technical Expert 2

Where we probably lag behind in some aspects of other countries is sort of the requirement for certain managers etc to have full qualifications in emergency planning ... I got the impression over there (United States) that certain job roles actually mandatory that you held some form of postgraduate type of qualification or a very specific qualification or course ... I think once you get to Gold then it really has to be specifically trained for that and also be part of your job role...

Health Technical Expert and Policymaker

It’s not [about] training to be an expert. It’s training [emergency planners] to understand the anatomy of the crisis and learn from that scale and flexibility and dynamic [nature of the] response.

Emergency Planning Policymaker 1

4.6.4 Organisational and professional cultures

**Differing cultures**

As alluded to in earlier sections, there are considerable differences between the various organisations involved in health emergency planning and management, be they frontline provider organisations, planners or policymakers. These are not just differences in their understanding of emergency planning and management, but also their organisational set up, as well the professional cultures within them. The cultures could be self-perpetuating as well. For example, one interviewee reported how emergency planners were recruited: "most people that did the job of emergency management were men, between the ages of 45 and 65. Most were ex-military or ex-emergency services and they were bolstering their pension by doing it on a second career. And they were taken on to do the job because of their experience from the emergency services or from the military ... and they were recruiting people in their like.” As a consequence, this created a professional sub-culture within the health services who were markedly different to other health professionals such as doctors and nurses who in turn had their own sub-cultures.
A major issue therefore has been the hitherto presumption of uniformity of composition and response by the different organisations. In reality, what transpires is that there are marked variations in the different agencies’ understanding of risks, the situation, how it communicates, reacts and respond to, as well as reviews and learns from incidents.

*It’s because of the different cultures within organisations that get involved in emergency response ... For example, the HPA, NHS and the “blue light” services like the ambulance and the fire service have different cultures in terms of the response control. That’s partly what contributes to communication failures during events but it also means they have different attitudes to the extent to which the emergency planning should be subject to scientific if you like scrutiny ...*

Emergency Planning Technical Expert 2

*We presume organisations are somehow homogeneous but the actual interaction requires a blending of very different organisational cultures.*

Health Emergency Planning Manager

**Manifestations of culture clashes**

The differences can manifest themselves as relational difficulties experienced by the individuals and agencies involved, and may contribute for example to communication failures. These culture and organisational clashes could lead to misunderstandings that could be catastrophic in critical situations when their staff are under duress.

*The problem is we often assume that they are all the same, the police, ambulance, military, etc...! And this can lead to a lot of friction and problems during disasters when these organisations don’t communicate well with each other!*

Health Emergency Planning Manager

*Some people salute other people or people don’t ... I think there’s a "boots on the ground" type of approach in some organisations and there’s a more sort of "free for all" type in other organisations, and each have their place. You know it’s a different approach (that) will suit different organisations, but you do see the culture clash sometimes in how meetings are run, how work is commissioned, how organisations work together as well.*

Emergency Planning Policymaker 2
Different organisational hierarchy and professional cultures too could blur roles and responsibilities. There is a need to better understand the differences in organisational cultures and professional cultures, and how it affects the functioning of health emergency planning and management. A better understanding of these organisational and professional differences would undoubtedly be useful in improving inter-agency collaborative working.

4.7 Risk

The wider subject of risk was another commonly raised issue by interviewees. This covered various aspects ranging from the understanding of risk, its perception and assessment by various stakeholders, as well as how it is communicated and nullified. The subject of risk is not new being well established in other fields. However, in the specific health emergency planning and management context, it appears to be less well understood. The themes are covered in the following section.

4.7.1 Understanding risk

Risks perceived differently

Just as there is not a consistent understanding of definitions used in emergency planning, similarly there is not a universal understanding of risk with regards to health emergency planning. For example, there is lack of consistency as to what hazards are considered as risks. Some emergency planners, and especially those with a “blue lights” service background, seem to perceive risk as "Big Bang" events, i.e. acute emergency situations with catastrophic damage or loss of life. This contrast with others, especially the technical experts and health managers, who were more concerned about chronic emergency situations such as 'winter surge' or 'summer heat waves'.
I think to that we have possibly focused a little bit on the wrong end of things and very much on the "Big bang" high profile emergencies and less on the less, the sort of "slow burn" or things like winter preparedness, planning for winter...

I think the fact that many emergency planners were recruited from the Forces and they, historically anyway, they came from that end, either the acute end of the health service or often from the Forces. They tended to be driven by "Big bang", what I call "Big bang" events, and therefore they tend to plan for "Big bang" events, whereas the sort of events that might really bring the health service down like a very bad winter or a very bad outbreak ... or a combination of that and IT failure were less likely to be planned for.

If you’re talking about a risk-based approach you are only talking about that which you have identified and what we mustn’t forget is a risk is still a risk even if you haven’t identified it. Whereas if you are talking about a hazard-based approach you are talking about what may possibly cause the risk.

Emergency Planning Academic and Technical Expert 1

I firmly believe in any organisation ... the risk should be everybody’s business. From the cleaner on the ward if you like to the chief executive of the hospital or the PCT ... Everybody should be aware of what risk is and what the consequences of taking risky decisions are. If you’ve got that awareness about risk going through the whole organisation then you’ll be much more aware of stopping things going wrong in the first place. Risk mitigation, risk management, crisis management ... turning it into a higher reliability organisation if you like. To do that you’ve got to have certain processes in place about anticipation as well as it’s about horizon scanning.

Emergency Planning Academic and Technical Expert 1

In essence risks tend to be perceived differently by different individuals but also by different agencies, and some of this risk perception appears to be influenced by the occupational backgrounds of the individuals involved.

Also of interest, the various stakeholders seem to assume there is a common understanding of risk between agencies but when questioned deeper it became apparent that there were considerable differences. This has consequences as the differences in risk perception colours the perceived vulnerabilities to various hazards and threats. The apparent danger as noted by one interviewee is that a “risk-based approach” based on perceived risks could miss or neglect other hazards of comparable if not more severe consequence. This in turn has knock on effects on the priorities attached to them by policymakers. The perception of risk by
policymakers will obviously potentially have more far-reaching consequences.

Well part of it was politics as I said because the risk appetite in the first (CBRN) event in Scotland was much lower than the event in London that happened a couple of years later ... The plans were driven not by the risk assessment but by the political perception of the risk assessment.

   Emergency Planning Technical Expert 2

(Emergency preparedness) seems to hinge on how big a priority somebody thinks it is and how much time they’ve got.

   Public representative 1

The public perception of risk is also different and there are attendant issues that need addressing such as how risk is communicated, and how the public can be informed enough to sufficiently understand risks.

I would like to see a little bit more of an academic wave coming into the work we do. The trouble is around risk assessment, the perception or risks and understanding of risks. There’s a massive role for academia there. There’s language around risk, there’s a language around perception of risk and communication of risk that we need to be able to bring in more to help the general public understand what they’re faced with and how they see risk and how we communicate risk.

   Emergency Planning Policymaker 2

How risks are assessed and prioritized

The differences in risk perception especially by practitioners and policymakers can introduce problems. One question arising from this is how risks are assessed and prioritized. The status quo is less than satisfactory as it appears risk perception can be driven by subjective factors, such as media coverage and interests of certain individuals. As a consequence, it may create potential vulnerabilities for hazards that were overlooked.
I think risk perception is a strange thing because I work to ministers and it's intriguing how quickly ministers become interested in something that makes Sky News because they've got so much else on their plate.

Emergency Planning Policymaker 2

Well I guess the Taliban have been a driver in this haven't they with all the threats, and it has generated some resources ... (But) the catalyst through all this was Mumbai. The Mumbai bombing actually was quite big, and then the perceived threat from that is quite a driving force for change and implementation.

Health Technical Expert

Is there an objective way that a health hazards and their attendant risks be assessed objectively? Is there a common definition of risks in the health emergency setting that can be expressed? Are there possible tools for both policymakers and practitioners that can be developed to aid this?

### 4.7.2 Communicating risk

Implicitly tied in with the issue of understanding risk, there are also problems with how risk is discussed within emergency planning circles and how it is communicated to others, and in particular the policymakers and the public.

One policymaker interviewed summed it up succinctly as follows: "the trouble is around risk assessment, the perception or risks and understanding of risks ... There’s language around risk, there’s a language around perception of risk and communication of risk that we need to be able to bring in more to help the general public understand what they’re faced with and how they see risk and how we communicate risk."

Another technical expert reported that “there are some issues about risk communication that we don’t actually have enough of the science behind it to be sure how we communicate risks is the right way.” What is also not known is how much information should be communicated with the public, or indeed the aims of such communication.

Further research into how risks in the health emergency management context are communicated is seen as a priority but also as one field where there is a clear need and role for academics. Possible questions include:

- How can risks be effectively communicated to policymakers?
- Similarly, how can they be best communicated to the public?
- How much information do policymakers and/or the public need?
4.7.3 Responding to risk

**Different responses to risk**

The identification of risks associated with known hazards in turn implies some form of mitigating action may be necessary. However, different individuals and agencies may be dissimilar in how they respond to these risks, in part due to the differences in risk perception and understanding as noted above. There are also gaps in understanding of how different individuals, stakeholders and agencies will react to different risks.

<table>
<thead>
<tr>
<th>Comment</th>
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<tbody>
<tr>
<td>There’s a reduction in budgets therefore there’s a reduction in what goes on in emergency (planning) although the latest riots in London might again put it back on to the ... political agenda much more.</td>
<td>Emergency Planning Academic and Technical Expert 1</td>
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<tr>
<td>NHS is a risk averse organisation compared to the Police.</td>
<td>Health Emergency Planning Manager 2</td>
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<td>(Emergency planning priorities) tends to focus on the really big terrorism incidents and you forget ... what were the major incidents over the last few years ... They’ve forgotten about the floods. They’ve forgotten really about the two winters and they’ve forgotten about all sorts of other things which actually they really did cause problems for the health economy but for the UK or a large section of the United Kingdom. Often people lose sight of what it is they’re planning for and if they’re not careful you can focus too much on one particular side of this and forget about actually winter’s only a few months away from us</td>
<td>Health Technical Expert and Policymaker</td>
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**Risk sensitivity**

The reaction by different agencies to risks may be due to the differing perceptions as to what each agency considered as a significant risk. From the interviews it was also reported that different agencies have different sensitivities to risk. Compared to the military or police for example, one health emergency planning manager noted that health services tend to be more “risk averse” and less prepared to accept casualties. As a consequence, a variety of responses may be mounted. Some agencies "play safe“ and arguably "over-react” to risks that other agencies may deem less significant.

On the other hand, other agencies may be "unreactive“ to risks and therefore not responding appropriately to it. The NHS paradoxically was cited as both a risk averse yet unreactive organisation when it came to wider health risks and hazards.
So the NHS kept on doing what it does, which is the day to day business of health care but it, for whatever reason, and I suspect it’s a command and control thing, it did not reach across to the bit of the system that was under pressure.

Scientific and Technical Expert

The NHS is the last organisation to "switch on" ... The NHS deals poorly with uncertainty.

Health Emergency Planning Manager 3

The risk sensitivity of organisations also appears to be linked to their awareness of risks and perception of the risks posed by a particular hazard. Those hazards that agencies have greater familiarity with tend to be better mitigated and prepared for. For example, one health emergency planning manager noted that "... for something that’s expected like a pandemic flu we tend to prepare well for. The unexpected we tend to prepare less well and respond less well." The other related issue is that agencies vary in their ability to imagine and identify hazards or their possible scale. UK health emergency planners tend to prepare for small scale incidents rather than large scale ones.

If 9/11 taught us something it taught us to deal with the most unexpected. You know before that happened people would have laughed at that scenario if you were trying to exercise it, but after 9/11 it taught us to say well anything can happen basically.

We’re only going to focus on terrorism, critically infrastructure, flooding, yeah but these things always come out the left field they never come from where you expect them to come from.

Emergency Planning Academic and Technical Expert 1

One of the big gaps is actually knowing what’s possible, what might be a threat and what isn’t.

Health Technical Expert
The possible research questions that stem from this section include:
- Gaining a better understanding of inter-agency variations in risk sensitivity;
- Developing effective methods for identifying and quantifying the risks posed by different hazards;
- Understanding the inertia in NHS organisations in their reactions to wider health hazards, and identifying ways of enhancing their reactivity.

### 4.8 The Health Care System

Several topics raised and discussed related to systems-level issues in which health emergency planning and management takes place. (Figure...)

**Figure 10. Map of health care system related themes from interviews**

![Diagram of health care system related themes from interviews](Diagram.png)
We have chosen to adopt a Donabedian approach (33) to categorising these themes, i.e. by structure process and outcomes, which are discussed as follows:

### 4.8.1 Structural issues

Most interviewees acknowledge that the emergency planning and management scene has improved considerably over the past decade. This has been in part driven by the enactment of the Civil Contingencies Act, 2004 that has also helped delineate the statutory roles and functions of the different agencies involved (4). Recent emergencies and disasters both in the UK and abroad have also heightened the political imperative for better organisation and preparedness to face potential future events.

**Enablers and Barriers**

In general, the emergency services are continually gaining familiarity with joint working with each other from training to live incidents, as well as with planning and debriefing. That said much more can be done to improve the situation. Our military technical expert observed, for example, that military trauma teams are much better organized to deal with multiple trauma situations compared to civilian teams owing to a higher degree of preparation and joint training. Civilian teams tend to form infrequently to deal with major incidents and therefore have less familiarity with handling those situations as well as working with each other. Furthermore the setup of the military medical teams are considerably different and they have a narrower focus on the injured casualty whereas civilian teams tend to have to deal with a variety of patients presenting with a wider range of injury and illness and rarely have to deal with a particular collection of injuries specific to a particular disaster.

> Military are small hospital, staff are much more used to dealing with critical trauma, and large bursts of critical trauma, and therefore, they become self-managed teams. Civilian settings have much bigger institutions; less familiarity with the staff and teams much less well formed, therefore, they need stronger direction to manage the patients and stronger direction to reconfigure the department into a new shape.

**Military Technical Expert**

Lessons from the military health system may therefore benefit the civilian setting. Also further consideration is needed to find the optimal solution with regards to:
- How emergency responders are organized,
- Their hierarchy and command structures, and
- How to improve the effectiveness of organisations at the interface where joint working occurs.

**Organizational and system set up**

As noted earlier, there are marked differences between the various agencies involved in emergency management. They have different organisational cultures. They are set up differently e.g. different command and control structures and hierarchy. They communicate internally with each other differently. They communicate externally with other organisations differently. Frequently, they have their own language, terminology and understanding of different aspects of the emergency management process. These differences can (and do) in turn create considerable friction, misunderstanding and inefficiencies, as illustrated by the following comment made by a public representative who had witnessed an emergency planning exercise run:

> Instead of doing that (following protocol) ... they were being bypassed and going to the major committee and then sometimes it was going to others and not telling the major committees. So there was a confusion about individual roles despite the fact that at the outset of each of these exercises saying now we’ve got this set up to do that, we’ve got this set up to do the other, this is how it’s all going to work. And that’s how it was set up but within an hour it was all not happening that way and communication was, they didn’t use the structure and the communications got chaotic, that was a common scene actually.

Public representative 3

The setup of the emergency management system also varies between countries. This makes it difficult to assess how well the different systems perform relative to each other and neither are there any yardsticks to base such assessments.

> I’ve been to Australia and Holland looking at some of the stuff that they do on emergency planning and the cultures are so different in terms of the expectations of the population, of the public services, the extent to which the public are involved in planning and you know the split of responsibilities between the individuals and the community themselves and the public sector is often so different that it’s quite difficult. The political systems are often so different.

Emergency Planning Technical Expert 1

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In summary, key structural issues that could be further considered include:
- Identifying the right skill mix of practitioners required for emergency planning and management;
- Developing ways of assessing the performance of the UK emergency management system;
- Identifying the “ideal” emergency management system appropriate for the UK setting.

4.8.2 Process issues

The second subcategory examined was how the UK emergency management system works.

**Developing a whole systems approach**

From the interviews, there was a sense that much of the existing emergency planning work seems to have been focused around the emergency responders (ambulance, fire and rescue and police) but not the health system as a whole. Indeed, there is a lack of understanding of the role of the health service by the health service in emergency planning. It is also very much focused on the response phase of the emergency management cycle. This would be counterproductive if the objective is for a more holistic whole systems approach to dealing with emergencies.

(There are some emergency planners who) have a very narrow, very focused view of what emergency planning is about, it’s about a response, it isn’t about being proactive, it isn’t about insuring that it doesn’t happen ... It’s not just on the individual, it’s the societal level as well. It’s about the focus is on "why aren’t we holistic and why aren’t we joined up, why don’t we think about this?"

Emergency Planning Academic and Technical Expert 1

I think there is a real need for instance to get health embedded in a lot of emergency planning. We think in the UK that we are quite good at it, but one of the things we found is that people don’t understand the difference if you are an emergency planner about what health does in emergency planning.

Emergency Planning Technical Expert and Policymaker
However, getting separate organisations that are used to operating independently to work collaboratively and efficiently together can be quite a challenge. In reality, it is clear that the various organisations do respond and have to respond to emergencies in a whole systems manner rather than as individual organisations. This raises additional questions:
- How to measure the response of an emergency management system?
- How to assess how well the emergency management system is performing?
- How to encourage a joined up whole systems approach and response to emergencies and threats?

**Planning process**

- **Generic versus specific planning**

Another issue discussed was the process of emergency planning itself. There were conflicting responses as to how planning is carried out or should be carried out. Some felt that it was important to produce generic, routine, simplified plans, others favoured use of more specific plans. However, during emergencies, plans do not appear to be always used (for whatever reason).

<table>
<thead>
<tr>
<th>We don't tend to adhere to plans, and doubt if anybody does ... (We) need to use our own thought process, and very infrequently looked at plans.</th>
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<tr>
<td>Health Emergency Planning Manager 3</td>
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<table>
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<tr>
<th>My own personal experience of the pandemic are that plans are nothing, planning is everything. So did I once refer to the DH pandemic plan during my roles in the pandemic? No. Did I once ever see that document out on a table during the pandemic itself? No. Do I think that matters? No, I don't because I think the plan was a living embodiment of the fact that the planning had taken place...</th>
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<tbody>
<tr>
<td>Scientific and Technical Expert</td>
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<table>
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<tr>
<th>We might plan well but whether it’s ever implemented is another matter.</th>
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<tbody>
<tr>
<td>Public representative 2</td>
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</table>

- **Process of planning versus output of planning**

Paradoxically there was a stronger consensus view voiced that the process of planning was more important than the actual outputs of the planning process (i.e. the plans themselves). Plans appeared to be less important compared to organisations that had pre-prepared for emergencies as exemplified by their plans. This in turn highlighted a gap in the health
system in that emergency planning does not always occur, and when it does it is not always complete.

*We’ve just evaluated the extent of which pandemic planning assisted the European response ... What mattered was the process of going through the planning together. And in actual fact the thinner the plan the better it was. In other words, I don’t think people at the end of the day found plans terribly useful if they were detailed recipe books. All they wanted was a framework and the existence (of) the framework implied the existence of ... systems and processes that had been rehearsed below it.*

Scientific and Technical Expert

If the process of planning was what was important rather than the plans themselves, this awareness was not always present in organisations. Paradoxically, the agencies may be under duress to produce plans and have adopted a much more tick-box approach to planning as a result. Consequently, the plans themselves may not actually be used or be useful to organisations.

*Everybody is now so risk averse that everything's got to be so detailed in its planning that actually we're moving towards a hiatus. The senior directors of all sorts of companies and organisations are then feeling hamstrung or blinded by "Get me a plan on X, Y and Z" 'cos this is what's happened. But actually it's not X, Y, Z that's happened; it's something that falls in-between.*

Emergency Planning Policymaker 1

*We're under pressure from the SHA\textsuperscript{xix} for plans. (They’re) done under duress, and not always done right.*

Health Emergency Planning Manager 2

- **Planners versus Plan implementers?**

  There was also the question of who had the responsibility for writing plans. As noted earlier, some felt that this was the responsibility of a select group of specific individuals tasked with planning. There is an apparent distinction, whether real or artificial, between those who plan and those who implement plans. Different skill sets and competencies appear to be required. However, one possible adverse consequence is that there may

\textsuperscript{xix} SHA – Strategic Health Authority
There is clearly a difference between what is planned and what is implemented. Those who plan and those who implement may not be the same individuals or agencies. There were therefore issues of how plans and intentions are communicated and cascaded throughout an organisation and between organisations. How emergency planning intentions are applied in reality is therefore an unknown. As one health emergency planning manager observed research into the process of planning does not occur in the NHS. There is therefore a need to better understand how planning occurs, what constitutes proper planning and how the quality of planning is assessed. However, universally agreed and objective methods for studying or assessing this are lacking.

- **Flexible vs. Rigid**

One contentious issue, for which we received polarised feedback, was whether emergency management should employ a flexible or rigid approach. Some preferred a much more flexible approach to emergency planning and response that was more reactive but underpinned by some generic framework or approach. Others however felt that there was need for protocols and guidance to regulate the emergency planning and management activity to ensure standardisation of response that is predictable and dependable. Adherence to the protocols is encouraged and deviation from them discouraged.

There were differences in organisational preference for either flexibility or standardisation. One example cited was how in the military there is a
tradition of “standard operating procedures” (SOPs) for things that are standard but often in the field where they require a lot of flexibility to respond to situations the decision-making is left a lot more to the discretion of well-trained officers or leaders in the field there. The focus of the military organisation is therefore on training these key decision-makers. In contrast, in the health service staff are much more used to following evidence-based protocols so there is a lot less leeway in terms of flexibility but a lot more SOPs in place that are continually being developed.

There is always a degree of flexibility (required) because the incident that arises is never exactly the incident that was planned for... (We have to have) people who are well informed but who are not completely constrained by the SOP approach and I think, I mean I don’t know how well published it is but I certainly have spoken to people in New York after 9-11 and that’s how they survived. They had emergency plans but nothing that related to either the event or the scale of it, but what they had was people who were able to interpret that and the situation as evolved and do the best they could.

We tend to see the science base as evidence base says X therefore X is right. But actually X may not be right in different circumstances because the evidence base was developed in different circumstances. And we need to be a bit more flexible and also to recognise that you know if you make a decision in the absence of information your decision may be different when you get the information

Emergency Planning Technical Expert 2

No plan is set in stone and will have to be amended and updated in light of any information or evidence.

Emergency Planning Policymaker 2

I think the only way to manage a large incident has to be SOPs, protocol-based as to what you were going to do and of course for a lot of this you are going to be doing things that you wouldn’t normally do you know...So I think, I would tend to be in the inflexible group. I think the only way you can manage a big incident is by having very rigid protocols and driving that forward... I think one has to be absolutely rigid to manage this in everyone’s best interest.

Health Technical Expert

An alternative view is that the requirement for flexibility or rigidity in individual and organisational responses is not fixed. Instead it depends on outcomes sought as well as the situation in which the planning or response is occurring in as that is contextually specific. One interviewee voiced concerns of planning becoming overly prescriptive and restrictive which
could be detrimental to the decision-making process during emergency incidents. Conversely whilst a degree of flexibility is required in response, it is not clear how much flexibility again would be optimal.

**... thinking of emergency services I sort of prefer a rigid protocol because that way you know exactly who’s doing what and when, and by whom. I think for my side, the government side, probably a more flexible approach of knowing what the outcome needs to be when we deliver it. So I think there’s a need for both, but I think it depends on the organisation and the circumstances.**

Emergency Planning Policymaker 2

*I’m worried about the guidance. It can be prescriptive... We need a framework but also the flexibility to adapt to changes. The risk is that they plan themselves into a corner.*

Health Emergency Planning Manager 3

*I think you need to have a system that’s flexible, but how flexible?*

Health Technical Expert and Policymaker

- **Top down versus bottom up**

  From the literature scoping review, two contrasting approaches to how emergency management is governed and controlled could be elucidated. The first was the classic “top down” hierarchical approach. This is common in the military as well as emergency responders such as the police, ambulance and fire and rescue service. This form of command and control also translated across into emergency planning in the UK (20) and other nations such as the United States (22).

  In comparison, elsewhere in the world, and in particular Low- and Middle-Income Countries, more “bottom-up” development approaches have been pursued and applied to emergency planning (29). This is best exemplified by the community-based disaster risk reduction programmes developed and encouraged in South Asia.

  Interviews revealed a range of responses. Some were supportive of the top-down model as they saw it as necessary for maintaining clear lines of accountability, coordination and control. Others favoured a more bottom up approach that could harness the energy and capacity of the community, contextualise guidance from the top, and help build community resilience. Yet others promoted a mixed economy approach seeing that both approaches were valid and had to be run in conjunction with each other. One interviewee felt that both approaches were necessary but what mattered was more the timing as to when it was implemented.
The problem with emergency planning ... is that to work well it has to run from top to bottom ... It is perfectly reasonable that some emergency planning decisions should be solved at national level, others at regional and others at local level. And you know there are difficult issues of co-ordination in terms of, the correct advice and the correct approach to the problem versus the implementation and direction of the response at a given local level. So you can see that the emergency planning does cut right through the whole system.

Scientific and Technical Expert

I don’t think it matters as long as whether the top or the bottom know what they’re doing. I think the problem is where you have a top down approach and they aren’t really sure when they go in forward that their troops are behind them and are well briefed and are focused. And so you can have wonderful talking shops where every thing’s going to happen and then nothing does. Or you can get bottom up where you get tremendous discussion and activity and real commitment at the bottom but if the people at the top don’t take it on board and believe it and get excited about it, it won’t happen anyway.

Public representative 3

I think early on it has got to be a top down approach. Particularly when you might be importing, you know emergency service personnel from out with your region in a really big incident and that I think has got to be absolutely regimented as best as it can. I think when you are in the recovery phase then I can well see some roles of sort of a bottom up approach.

Public representative 3

Health Technical Expert

In the first 4 hours after an event then the hierarchy of command and control is a better version. Once you go beyond the initial event itself then a more horizontal approach should be engaged. Community engagement doesn’t work I don’t think in the first couple of hours because you simply haven’t got the information that will allow that to happen. You need a very direct command and control system. You need a top down system. You need somebody who can make sure things happened. But once you start to gather information about what the risk of response is then a horizontal approach that engages people should then be developed. But I think it changes over time and in the first few hours, no, community support won’t work.

Health Technical Expert

Emergency Planning Technical Expert 2

(It is) important for planning to be more bottom up. Some of the SHA stuff is not well grounded ... Not everything that comes out of the Cabinet Office, Civil Contingencies Secretariat fits locally... (It) needs a local fit.

Health Emergency Planning Manager 2

I disagree with the top down approach. There is often "enlightened self-interest" of different agencies and "other personalities".

Health Emergency Planning Manager 2
As can be seen, there was no clear consensus (or indeed evidence) as to which approach would provide the best fit for UK emergency planning objectives. That said a mixed economy approach is intuitively perhaps a closer reflection of the truth owing to the diversity of emergency planning situations, as well as the dynamic nature of emergencies that changes over time. What is less clear with this is whether both the top down and bottom up models run concurrently in parallel or sequentially, and whether there are organisational specificities where one model is preferential to another in an organisation. In addition, there may be differences in the application of these approaches at the whole systems emergency management system level as opposed to the individual agency level.

- **Familiarity**
  As already discussed earlier, there was also a question of how the emergency management system should be set up. Currently, the trend is for an integrated emergency management system but most responding agencies are organised separately.

  Within an organisation, the frontline set up may be fluid and not fixed (e.g. responding medical teams in hospitals rarely comprise the same individuals but are expected to operate together efficiently as a team) leading to a lack of familiarity of the participants in an incident. This is exacerbated by the infrequency of emergency incidents occurring.

  The trouble is that there are always gaps identifiable because people don’t get into response mode very often.

  Emergency Planning Technical Expert and Policymaker

  Sometimes I get asked to wider areas now and I come across crews that have I’ve not met before and clearly you know there is a gaining of confidence factor you know which is relevant. So it’s them trusting the doctor and myself trusting the paramedics.

  Health Technical Expert

  This is in contrast with certain agencies such as the military where the regularity of training for incidents or actual response to incidents breeds familiarity and better integration of the response. Civilian health organisations (e.g. hospitals) on the other hand lack the same level of familiarity and integration as military units and the effectiveness of their frontline units seem dependent on the individuals leading the ad hoc teams at the time.

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... If you go into a military hospital it’s happening on a day by day basis. Firstly, everybody knows each other so you don’t have to go introducing yourself. If someone turns up in a set of scrubs and you’ve no idea who they are, just basically forming your teams can be really difficult in a civilian setting, particularly in big hospitals but the military is less so because you know everybody. As soon as they walk into the department you know who they are and know what their skills are. I think the military setting tends to be a lot more intuitive and ... the whole staff is well trained in it so they actually need very little direction. The team is formed naturally and all you need to say is look we’ve an extra 4 patients so we’re going to need to improvise, get 4 more beds and put them over there, and you know that the team will then self-manage and will find the extra beds, be it trolleys or it will improvise the bed spaces. Whereas I think in the civilian setting you would need a lot more direction because it’s so infrequent, so the teams that turn up are very mixed background, very mixed skill set, not used to working together and they need very clear leadership, so you need a strong team leader for each of those teams and need to make sure they consistently get the right equipment. ...

Military Technical Expert

- Independent versus Integrated operation

At the systems level, the various organisations involved in emergency management tend to operate independently but are required to mount a response in conjunction with each other. In general, the frontline emergency response agencies tend to operate relatively well but when the wider health economy is considered (e.g. hospitals and primary care) the overall system response tends to be less integrated. As the interviewees summed it up, they are not always “in sync” and often operate in “silos”.

The problem with these background cultures they aren’t in harmony, they’re not used to working together ... There is this awkwardness of “We don’t do things that way” which is you know “this is ‘our’ emergency planning”. They’ve all got emergency planning systems of course and then when it comes to an incident and it’s practical they all get together they’re not always in sync. So I think they need to really get together to see the whites of each others’ eyes far more and more regularly.

Public representative 3
So things tend to feel very silo-ed or often more silo-ed than they should be given that we have talked about integrated management for ten or twenty years or so. And that reflects not just the way in which planners and practitioners work but also in terms of the research and the knowledge base ... It is very difficult to get good multi-agencies integrated working really hard.

Emergency Planning Academic and Technical Expert 2

As a consequence of the “silo-ed” nature of the various agencies, whilst they may be working together in a response to an incident, their planning and response may still be not integrated and especially with wider agencies where the inter-organisational links are less well established and integrated. Other stakeholders, such as civil society organisations, whose actions may be an integral part of the emergency response process, may also not be taken into adequate consideration.

A lot of emergencies have highlighted that the organisations of the civil society that actually are involved in emergency planning we have just not recognised them as that ... (It's) about badging of ... what is emergency planning, who is doing what, who is emergency planning. So there may be a lot of organisations and societies that aren’t badged as emergency planning herein the UK but actually are doing it, or could be ... They actually are doing emergency planning but it is just not labelled as such.

Emergency Planning Academic and Technical Expert 2

There is clearly a tension between “independent” organisational set ups and operations that conflicts with the idea of an “integrated” system. If the overall effectiveness of an emergency response is measured in broad terms, its effects will have to be seen holistically as the outputs of the entire emergency management system rather than individual organisational outcomes. One criticism of the status quo is of the segmentation of emergency management and over-focus on the response phase and actions of individual responding agencies in this phase alone.
I think we need to look at the whole emergency response journey in its entirety... It goes back to that point that the public are players in this response... Sometimes I feel that we just compartmentalise that journey or life cycle of responding to an incident because we always focus on what the emergency services did or what an organisation did instead of saying the organisation is just a contributor or a part player in a bigger system from the incident happening to the recovery of the individual, which in health terms can be years and years down the line

Emergency Planning Policymaker 1

If the goal is for a more unified integrated emergency management system, then a holistic view of the “whole emergency response journey in its entirety” needs to be taken. Operational research to explore how better integrated working can be implemented and facilitated is therefore needed.

4.8.3 Implementation challenges

Organisations resistant to change

One challenge is how emergency plans and the emergency management system are applied or translated into action. In part this is dictated by how individuals respond in crisis situations as discussed earlier. Differing organisational cultures and set ups will likely affect how organisations respond. This is also determined by the processes by which decisions are made by the organisations. The NHS for example has been described as being slow and unresponsive. This has been blamed on bureaucratic decision-making processes that exist within its organisations, e.g. decision by committee, and the need for consensus building in decision-making that is inherently slow. This suggests a need for NHS organisations to recognise that in certain situations it will need to function in a different command and control mode, and for the whole organisation to understand that and to make that switch.
Decision-making is by committee and consensus in the NHS. We need to change that to "make a decision"! The worst thing is not to make a decision.

Health Emergency Planning Manager 2

It’s probably difficult to square in a sort of non-military role but how do you get people who are leaders into a job that’s not always dealing with conflict, has to mix between ... You’ve got to crack on and put some form of command and control in for this particular moment in time but actually the majority of your time’s spent cajoling, encouraging and taking on board stakeholder agreement and consensus ... getting there eventually but not quite in the fashion that you want it.

Emergency Planning Policymaker 1

Other influences on decision-making in organisations

It is also worth noting that the decision-making process does not occur in isolation, but in a socio-political context for which there are numerous external and internal influences at play. For example, political involvement and differing priorities can significantly alter existing emergency planning intentions. Understanding the breadth, extent and strength of these influences on the decision-making and emergency planning process is of value as it may help identify the key drivers involved that may hamper or enable the effectiveness of the emergency management system.

In terms of the emergency response ... I don’t think there was a plan and certainly it wasn’t kind of thought through and implemented that systematically. It seemed to me there were plenty of resources thrown at the problem but it (the response) happened despite not having a plan rather than because there was a plan.

Where the plans broke down was (when) the planning had not extended far enough down to the actual “delivery people”. So in other words a Trust might well have had a very good understanding at the kind of head of emergency planning, at the trust level of what would happen in a pandemic, senior bed manager may well of understood what was needed to sort the beds out and so forth, but I’m not really sure that the average consultant/physician or even worse still the average specialist registrar had any understanding of how things might change.

Scientific and Technical Expert
... You go up the chain from local to regional to national which then to which politics interference with emergency plans becomes greater and one of the lessons from the pandemic response was the extent to which previously prepared and agreed plans that had been tested with politicians were not what the politician literally wanted when the real event happened and therefore were implemented in a different way.

Emergency Planning Technical Expert 2

The other issue is that of the implementation of change within organisations and at the systems level. Change management is not a new topic and there is considerable literature on this including for health organisations. But in terms of the health emergency management system, it remains an issue. So whilst the “science of change management” may be known, there are likely to be contextual influences in the UK setting at play such as competing demands and resource constraints that affect if and how it is put into practice. A better understanding of the drivers and barriers to change is warranted.

It’s so embedded that people revert back all the time to what they know, to what’s gone on, what they’re comfortable with, what they feel safe within you know. Change is very difficult for a lot of people to take on board and it’s also very difficult ... to have these discussions, what’s the word I am looking for, not conflict but to have these debates because if you have these, the debates within organisations then the learning comes out of debates, things change in that way. You’ve got to empower the people as well; people have got to be able to feel that they are taking part in something. So it’s quite difficult organisational learning.

Emergency Planning Academic and Technical Expert 1

When people are asked what went wrong they tend to, they’d focus on things that they think went wrong but whether correctly knows whether actually that had any impact on the way the incident that’s happened I thinks a very (key) point. ... I see reports that come in from exercises and I think people list up and down things that could be improved and I think "Would it make any difference?".... There’s always a balance to be struck between the investments required either in terms of equipment or training or time in putting in place some of those changes and the likely impact should be that it’d never happen again any way, and the likely impact on how they should future manage it. So there’s always a balance there I think.

Emergency Planning Technical Expert 1
**Strategic versus operational**

Tensions were noted between practitioners whose role was predominantly frontline (e.g. Bronze level) and those operating at the tactical or strategic levels. In an idealized system, there would be mutually supportive and complementary working between all levels. However, this does not always occur. There appeared for example to be cultural issues within organisations that led to one level of practitioners not fully appreciating or understanding the role of the next level. For example, one interviewee reported frontline staff being not interested in higher level functions and roles as they did not see it as relevant to them in their current roles. Conversely another interviewee reported how tactical plans written by emergency planners did not always make sense or address the informational and guidance requirements of frontline operational staff.

*"I taught management to the (paramedics) and they all came along "what do we need to know management for? ... I’m a paramedic!"

Emergency Planning Academic and Technical Expert 1*

*"Plans are built on highly trained silver level managers who can link in with others. We operate at bronze level daily. We are trying to get them (emergency managers) out of that mind-set to think more tactically."

Health Emergency Planning Manager 2

*"Very often the exec summaries are written obviously by the people who wrote the plan etc... Maybe it might be good to go outside and say, "Okay, fine, let’s bring someone else in to look at it"."

Health Technical Expert and Policymaker

It is likely that the different levels of practitioners within organisations have specific roles to fulfil, and they are focussed on the task at hand. The lack of understanding of how a different part of the organisation and hierarchy operate however could affect how intentions are communicated (or mis-communicated) between the different parties. In turn this could lead to differences in “understanding” of the plan or directions issued, and therefore how the plans/directions are translated into action at the frontline. There is a need to assess how well directions, information, and guidance are communicated between these different parties, especially in terms of how it is translated into action, and to explore ways of carrying out this assessment.
Business continuity issues

A further gap relates to the extent to which emergency management and response did not always address key elements such as business continuity. Much of the response following major incidents tended to be focussed on the response itself with little regard to logistical considerations, human resources, and business continuity. One interviewee noted that the military were much better at planning in considerable breadth and depth for major casualties for example, including aspects of logistical and human resource considerations, whereas the civilian health organisations were considerably poorer at this.

The one thing I learnt most in terms of working with the military and how they plan for things, they have rigorous planning. I think the military are superb at making sure that they scope out the scale of a requirement or resource and they know that they can’t just keep using people x amount of time before they replace them. It’s having a plan to say, “Right, this people will do this for x amount of days and then there’ll be someone else coming in to do that”. In the civilian setting we tend to say, "Well it’s all hands on deck now" and don’t think so much beyond the second and third day. And I think that’s something I’ve learnt; to make sure that you pace your own resources.

Emergency Planning Policymaker 2

We don’t do it in the NHS. We don’t run business continuity professionally.

Health Emergency Planning Manager 2

As a country we need to focus on some of the sort of business continuity issues but that gives us a bit of a problem because we don’t necessarily have the right people in post to lead that new agenda as it were.

Emergency Planning Technical Expert 1

There was also a sense that business continuity was considered only in tokenistic terms within the health service. This in turn could be due to the fact that it has not been perceived as a priority or there is a human resource/skill mix issue in that there is a lack of suitably qualified persons with the skills required. Business continuity is well understood in the business context, but perhaps more health-related examples is required to help guide the roll out of business continuity planning and management in the health services.
Changing cultures, challenging conventions

Another challenge is that of changing cultures within organisations involved in health emergency planning. This is particularly relevant in the light of strong “traditions” and firmly entrenched ways of doing things. In particular, the NHS has been cited by several interviewees for its unresponsiveness and how it can be disempowering for its individual staff. Its ability for forecast and horizon scan for health hazards appear also to be less adequate. Again change management is well documented and researched in other non-health fields but is less well known within the health emergency planning field.

It’s so embedded that people revert back all the time to what they know, to what’s gone on, what they’re comfortable with, what they feel safe within you know. Change is very difficult for a lot of people to take on board and (it’s) also very difficult ... to have these discussions, what’s the word I am looking for, not conflict but to have these debates because if you have these, the debates within organisations then the learning comes out of debates, things change in that way, you’ve got to empower the people as well, people have got to be able to feel that they are taking part in something. So it’s quite difficult organisational learning.

Emergency Planning Academic and Technical Expert 1

It was instructive to hear how the military set up again differed from the civilian. It appeared that the implementation of change was much more encouraged and easier to adopt rapidly. The civilian health sector on the other hand had much more inertia inherent in it that made change more difficult to implement. The implementation of change is a necessary requirement for any service improvement or learning. Consequently, devising ways of delivering this in the emergency management sphere is therefore of value.

... We (the military health services) actively, on a day by day basis, hunt for the lessons and we immediately action them and it can be a very short period indeed in terms of changing clinical practice, changing a course. You know we don’t have to wait 3 years for the next version of a course to come along. If something needs changing we’ll change it ...

Military Technical Expert
4.8.4 Outcomes

How is an emergency managed

The outcome of any emergency incident is the product of both the underlying event as well as the manner in which it is managed. Similar incidents can have markedly differing outcomes even if tackled by emergency services that are similarly set up. It would therefore be useful to study how emergencies are managed, measure the outcomes and understand the drivers that account for the different outcomes. Key to this, are 2 questions:

- What constitutes effective management or response?
- What does an effective team or organisation look like?

What is effective management or response?

From our interviews, there was no clear picture as to what constitutes effective management or response. Linked into this was the issue then of how would it be assessed or measured. One idea that did emerge was that community empowerment as part of building community resilience was a key part of this. The quality of the communication within and between stakeholders would also be a part of this, but this in turn introduced issue of how the “quality” of communication is measured. The husbanding of resources and efficient deployment is also an element. Other measures need to be identified.

There are ways of empowering the public to be able to make a more effective response ... Where is your little flash card in the sun visor which tells you what to do in a road accident? ... I think there would be ways, particular thinking in remote rural communities that you should be empowering the first responders, your members of the public to be able to do something more than just stand and look at the injured patient.

Communication is a common failing, but how do we quantify that? If there is a way someone can think quantifying how effective communication is during a major incident and therefore, how that communication can be improved and that it can be improved, then fine yes an area to research.

System failure and communications for example, came up repeatedly in all of those incidents. It’s failure to communicate effectively between the emergency services or from the services to the hospitals.

Military Technical Expert

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The one thing I learnt most in terms of working with the military and how they plan for things, they have rigorous planning. I think the military are superb at making sure that they scope out the scale of a requirement or resource and they know that they can’t just keep using people x amount of time before they replace them. It’s having a plan to say, “Right, this people will do this for x amount of days and then there’ll be someone else coming in to do that”. In the civilian setting we tend to say, “Well it’s all hands on deck now” and don’t think so much beyond the second and third day. And I think that’s something I’ve learnt, to make sure that you pace your own resources.

Emergency Planning Policymaker 2

Linked to the idea of an “effective response” is the concept of the “effective organisation”. Again this has not been defined. Core components were hinted at; for example risk awareness as well as mitigation and risk management that is embedded throughout all levels in the organisation. It should be a “high reliability organisation”, and also one that is proactive in its approach and “horizon scans”. It would also have some element of internal communication systems that are efficient and effective. Business continuity would be addressed. Organisational learning is promoted, and there is organisational memory. The organisation has standard protocols for routine issues, but yet retains the ability to respond flexibly as the situation dictates. Its key personnel and leaders are trained and empowered to make decisions, and the organisation is able to integrate and work collaboratively with other agencies. The relative contribution of these various factors could be elucidated further.

I firmly believe in any organisation ... the risk should be everybody's business. From the cleaner on the ward if you like to the chief executive of the hospital or the PCT ... Everybody should be aware of what risk is and what the consequences of taking risky decisions are. If you’ve got that awareness about risk going through the whole organisation then you’ll be much more aware of stopping things going wrong in the first place. Risk mitigation, risk management, crisis management ... turning it into a higher reliability organisation if you like. To do that you’ve got to have certain processes in place about anticipation as well as it’s about horizon scanning.

Emergency Planning Academic and Technical Expert 1
• **Response prioritized, Recovery neglected**

A major finding as noted earlier was the prominence of emergency response issues with markedly less consideration paid to the other phases of the emergency management cycle. In particular, recovery was often neglected. This was particularly true of more frontline emergency planners who at times tended to have a narrower “focused view of what emergency planning is about”.

(There are some emergency planners who) have a very narrow, very focused view of what emergency planning is about, it’s about a response, it isn’t about being proactive, it isn’t about insuring that it doesn’t happen.

Emergency Planning Academic and Technical Expert 1

All the UK plans as far as I can recall have a little, pay lip service to recovery. But I don’t think they’ve really thought through the implications of that … I don’t think erm recovery was thought about properly.

Scientific and Technical Expert

I think probably we still have too much focus on the response and not enough on the preparedness. I think there is a major gap I think in this country totally. We tend to think, and also on the recovery, we don’t do recovery well. We tend to think when the cordon is taken away that the disaster is over.

Emergency Planning Academic and Technical Expert 1

We have a lot more plans for what to do immediately after something goes bang or whatever than we have what to do the day after … In the CBRN planning … we have more about what we’ll do, countermeasures for a chemical or biological event, than we have about how we’ll clean the place up afterwards.

Emergency Planning Technical Expert 2

Various reasons could account for this. It may be that emergency planners from an emergency services background, such as the police or ambulance service, consequently reverted to the role and tasks with which they were familiar related to the emergency response. Another possibility is the fact that interest in an incident after the initial acute phase tends to drop off. In the UK, there is also a transfer of responsibilities with regards to the incident as well at this stage from the emergency services to the local authorities and other agencies such as the NHS. Whether it is because there is insufficient planning and activity afterwards due to low prioritisation, lack of resources, organisational indifference or other reason is not clear.
Very little (is done on recovery) because that just goes back straight into (local) authorities ... It’s the fact that at some point of the acute ... the interest drops off, but also then becomes the resume of normal business eventually. For example, before 2007 you had that initial stage of getting money out to affected areas, but eventually this becomes a management process within the affected areas. And then it’s less exciting for the emergency services, they’re less interested.

Emergency Planning Policymaker 2

As a consequence of the over focus on response, much emergency planning and management fails to take into account the other phases and the wider ramifications of doing so. It is also then limited to the short term peri-disaster period, and inadequately addresses the impacts that present much later. There is certainly recognition of the “long tail” of the disaster with delayed effects presenting later. Further study of the longer term effects after an emergency incident or disaster is warranted.

I think we need to look at the whole emergency response journey in its entirety... It goes back to that point that the public are players in this response... Sometimes I feel that we just compartmentalise that journey or life cycle of responding to an incident because we always focus on what the emergency services did or what an organisation did instead of saying the organisation is just a contributor or a part player in a bigger system from the incident happening to the recovery of the individual, which in health terms can be years and years down the line.

Emergency Planning Policymaker 1

After the Torin floods there was a phrase coined as the "long tail” of the disaster, and it goes on for years ... So it’s not just the health impacts in that sense. It’s about how we deal with people after(wards). There are lots of lessons we can learn from say the NGO world you know where they put up a refugee camp and make a, put up a permanent refugee camp very quickly. They did that in Toll Bar and it worked wonderfully. They asked the community in Toll Bar “what do you want?”, "Well we want to stay together” and they built a caravan park and they put names of streets on in. It may have been caravans and that’s not ideal situation for a year but they were all together. That makes a big difference. And that then is a big difference to health ... There is someone to share stuff with. If you’re isolated there’s no-one to share stuff is there so the stresses become more and you actually suffer more as a result of that. And there are all those issues that need to be looked at in terms of the recovery or what happens to people in terms, the health issues in that side...

Emergency Planning Academic and Technical Expert 1
The response by the “system” as a whole needs to address the emergency management cycle in its entirety. In planning terms, the neglected phases such as recovery and mitigation need to be considered more fully and with greater care. There are various needs for example that are specific to the recovery phase, such as psychosocial trauma, community cohesion and rebuilding, that are also poorly understood or addressed (34). The health impacts of poorly managed incidents are also poorly documented and studied. Finally, it is not clear what would constitute “a good recovery” and there are conflicting views as to whether recovery efforts post-incident should strive to restore the status quo pre-disaster or seek to develop and improve the local situation further.

Debriefing is often thought of in terms of operational debriefing. There is a whole load of stuff around psychological debriefing. All the debates around that. The other areas that I am interested in, there’s debriefing, psychological impact trauma, that kind of side. I wouldn’t say it is necessarily knowledge gaps, but again it is another area that sometimes gets missed out. Recovery in terms of the medium and longer term impact of emergencies from the point of view of the psychosocial for example.

Emergency Planning Academic and Technical Expert 2

- **Ethical issues in emergencies**

  By their very nature, emergencies tend to be rare but also unusual events either in terms of severity or character. As such they are not routine, and consequently routine measures or ways of operating may not be appropriate. As a consequence, the agencies involved can and do encounter dilemmas. Frequently, such dilemmas have an ethical dimension. For example, there is the idea that in any disaster there will be civilian deaths. However, acknowledgement of this is taboo for health organisations whose role is to preserve life. As a consequence, this issue is not really discussed openly with the public which means that many related dilemmas are not resolved. These include how patients are triaged and what criteria are used to decide who would be left to die and who would receive maximum effort to keep alive. Similarly, there could be issues arising from how priorities are set in emergency settings.

  Another example given was that the differing medical traditions or practices meant variations in what medical care was given. The ethical issues here relate to what regulation and accountability mechanisms are put in place to safeguard the public. Whilst the example given was that for Haiti, parallels can be drawn with the UK setting where individual agency practice is not always scrutinized.
We need to accept that people will die. For a care organisation however we are not allowed to say that!

Health Emergency Planning Manager 2

Haiti was a disaster. You know why did the Israelis chop off more people’s arms, legs whatever. And then the Swiss, the Swiss only chopped off one person’s. Does it tell you how they have been trained? Finally, I went to a meeting where they started looking at the ethics of disaster medicine, so one of the things I have been doing is try to work … on priority setting for disaster.

Emergency Planning Technical Expert and Policymaker

... We could reassure the public that plans are in existence without telling them you know that we’re only going to do, that we are truly doing the most for the most and many of you’ll die when you wouldn’t normally die. I think you can actually just reassure people that, that there are robust plans in place to deal with such incidents.

Health Technical Expert

There is value indeed in having a more open dialogue with key stakeholders such as the public who are paradoxically excluded from the very discussions that they would want to have. The issue here is how are ethical dilemmas identified, discussed and resolved. Does such a forum exist in the UK?

4.9 The Public Dimension

The fourth category of themes shared much in common being issues related to the public at large.(Figure 9) These included issues with understanding public attitudes and expectations, how the emergency management organisations communicate with the public, how the public is engaged, and finally issues to do with how community resilience could be built.
4.9.1 Understanding public attitudes and expectations

First and foremost, the need to better understand public attitudes and expectations in emergencies was deemed a priority. Part of the contextual specificity of the UK setting indeed lies with the fact that its population profile, attitudes and behaviour would likely differ from that in other countries.

From the interviews, there was a sense that the public in the UK did not understand about emergency planning or preparedness. Indeed from our interviews of the public representatives, it was clear that opportunities for the public to become educated about and engage with this agenda were limited. Like many of the frontline emergency planners and managers, their interpretation of emergency planning was very much about the “response” phase and did not appreciate the full breadth of emergency planning and management.
I think with pandemic flu it’s a really difficult concept to teach to lay people. You could have had a lay person present but I’m not sure the extent to which they would have fully followed it. Or if they were intellectually capable of following it all, they would have been such a kind of special senior kind of lay person, that they wouldn’t really be a representative. So what I’m saying is yes you could have certainly found, plucked, plucked up a lay person who was you know a retired scientist or something who is now just you know a pensioner, but really they would have been so specialised, the extent to which they were truly lay, I’m not sure it would have worked.

Scientific and Technical Expert

There was a perception amongst respondents that many of the public expected an external agency to protect them from, and provide for them in, emergencies. Some interviewees described this as a “culture of dependency” or an “I’m a victim” mentality. If genuinely widely present in the population this has serious implications for both individual and community resilience.

... What am I supposed to do? Am I supposed to stay in the house? Am I supposed to go to meet other people or keep on my own or whatever in these various things? The public I don’t think to that extent want even to get involved that much but they do want to know that whoever is asking or telling them to do things is well considered and well based in the practice .... The public really want to be sure that things are happening and they are going to be sorted out and looked after and made safe if anything goes wrong.

Public representative 3

The difference between living in a nanny state and a state where you are expected to look after yourself like after the Second World War are so enormous. They assume that somebody else will do it for them.

Emergency Planning Technical Expert and Policymaker

We’ve molly coddled them into some sort of cotton wool sort of, they don’t experience risk. But we then move into this “risk averse” society that then makes everybody sort of suddenly become disassociated with helping themselves ... We have an incident, and we’ll never manage every incident effectively we need people to contribute, ... people suddenly become into that “I’m a victim and I need to be looked after by the organisations”. I think we’re storing up trouble for the future if we don’t get a grip of that.

Emergency Planning Policymaker 1
The perceived “culture of dependency” in the UK public therefore raises many questions:
- What do the public expect?
- What would people have expected to have happened in an emergency situation?
- When an emergency incident does occur, do what people expect occur?
- And is it reasonable to expect that it should have happened?
- More importantly, how has this “culture of dependency” come about, and how to build community resilience?
- What are the likely impacts of this “culture of dependency” on individual and community resilience?

4.9.2 Communicating with the public

There was a shared concern that there are unrealistic public expectations of what the emergency services can and will do in an emergency.

**I think it’s a problem for several reasons: One, because it pushes the expectations on to a shrinking public sector and secondly it creates unrealistic expectations that they should have done something and they should have done more... The idea that there’s an unlimited pot of money with which we/they can do this is something the public need to understand is not the case.**

Emergency Planning Technical Expert 1

As such, there is a need for a discussion between the public and the emergency planning community as to what can reasonably be expected in an emergency. This in turn highlights a need for better public communication, awareness raising and education especially with respect to building community resilience. Indeed, the “failure to communicate” with the public has been identified as a recurrent issue from emergencies and exercises. It would be useful both to better understand why this failure to communicate occurs and how it might be rectified.

**I think the most consistent lessons learned from all these things is about failure to communicate both between responding agencies and with the public, and one would have to assume that if that keeps recurring as a regular theme in lessons learnt then there is probably a question in there that hasn’t been properly answered.**

Emergency Planning Technical Expert 2
Also linked to the issue of public communication is how the issue of risk is dealt with. In particular, this is with regards to the communication of the more technical aspects of risk with members of the public who lack technical understanding but also policymakers such as politicians who may also lack this technical understanding. Communication in itself is not a simple two party linear process but is far more complicated. For example, technical aspects may be communicated by the scientific or technical experts to policymakers who in turn re-interpret, “filter” and communicate this information to the public.

There’s language around risk, there’s a language around perception of risk and communication of risk that we need to be able to bring in more to help the general public understand what they’re faced with and how they see risk and how we communicate risk.

Emergency Planning Policymaker 2

I think we are moving towards a culture of more of an understanding of human behaviour and trusting the public and all of that. But that’s filtered through political priorities and you know the facilities around sharing information and sharing decision-making and the political interpretation...

Emergency Planning Academic and Technical Expert 2

This then begs the question as to what information should the experts communicate to policymakers, how does that impact on political priorities and decision-making. The other question it raises is what information should be communicated by emergency planners and policymakers to the public. How much information should be communicated with the public? And, how should this information be communicated?

Public communication in part appears to reflect the organisational cultures and stereotypes that exist in the UK. As noted earlier, there is a preponderance of the top-down approach to the command and control aspects of emergency planning and management. In turn, it seems that this top-down approach is also translated into a paternalistic approach to public communication. Emergency planning and preparedness, as one respondent described it, has also been “mystified” and treated as “secret”. The public as such are more likely to be informed on a “need-to-know” basis only.
Well I think we could reassure the public that plans are in existence without telling them, you know, that we’re only going to do, that we are truly doing the most for the most and many of you’ll die when you wouldn’t normally die. I think you can actually just reassure people that, that there are robust plans in place to deal with such incidents. You know every time there is a big incident abroad it does worry a lot of people here and they just raise the question of when’s that going to happen in the UK.

Health Technical Expert

We’d got the messaging wrong and I think sometimes we hide behind “Oooh! We can’t tell the public too much ‘cos they’ll be worried”. Let’s make them more resilient … a bit like community first aid … Demystify it, it’s not rocket science and I think that’s the key. You know it’s how do we inject a good dose of common sense back into Joe Public … It does make it more difficult for community involvement when everything is secret.

Emergency Planning Policymaker 1

4.9.3 Engaging with the public

Why engage with the public?

Intuitively, it would seem that public involvement and engagement in emergency planning is a necessity. Whilst it may be vocalised as such, it does not appear to be a universally held belief amongst practitioners. In fact, public involvement appears to be minimal if not non-existent.

(Public involvement in exercises is) minimal. In fact I think none that I’ve been on. Not the public as the public. I mean there are observers but they’re all linked in as far as I know.

Public representative 3

As far as I am aware we’ve never involved the public in drawing up a plan. No one has actually gone to Joe Blogg in the street ... Who would you go to? Who would you ask to represent the public?

Health Technical Expert and Policymaker

I still think Joe Public has to take some responsibility (for emergency preparedness)... (but) they really don’t make enough effort to get ordinary people involved.

Public representative 2

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Project 09/1005/03
What is the value of engaging the public?

Whilst the assumption that public involvement is a good thing, the justification for this is not clear. Do emergency planners really need to involve the public? And if so, how do they do this and to what extent should the public be involved?

One compelling argument for public involvement made by one technical expert was that in the absence of a robust evidence base on how people behave in emergencies, the involvement of the public would at the very least inform the planning process rather than solely relying on “the assumptions made by experts and planners”.

I think if you go back to my concerns about our understanding of how people behave and respond and perceive risks that would suggest that getting the public involved with some of these processes would be a good thing to do. In the absence of a science base ... at least we would have a different perspective on the problem rather than the assumptions made by experts and planners.

Emergency Planning Technical Expert 2

I think public involvement consultation is important in both changing health care policy and delivery. A good example of that might be the current major trauma network. I think in the planning phase, I think it’s important to have public on side, or at least some public representation in planning ... And I dare say we should be more open with what our plans are you know ... You can give the public too much information and for some that is very alarming, say if you tell them what’s going on. But I think having some lay representation on your planning is quite important to get a balanced approach and sometimes they actually do raise issues which are not obvious to everyone else.

Health Technical Expert

There is also a presumption that the public want to be engaged. This does not appear to be always the case. Paradoxically, this suggests either a cyclical argument or reverse causality relationship here (Figure 12): does the lack of public engagement disempower the public who then do not want to engage, or is it that the public are not interested in engaging in the first place so there is a lack of an attempt by the services to engage the public?
Also of value to understand better are reasons why the public may not want to engage in emergency management activities. Could this be in part due to the level of risk perceived by individuals? If there are factors that dissuade public engagement, conversely are there key triggers that incentivise public engagement?

*I imagine they had (their own) lives, and they thought it would never happen again and at one level what was the point of investing in it (volunteering) ... Usually something has to be the catalyst ... You know if there was an accident in the park, that would be the catalyst for parents to get together to see that the swings ... are well kept and well maintained and that sort of thing. But I think you’d need, and I think you’d need having had your catalyst, your event, you need somebody who leads and drives and motivates.*

Public representative 1

*I think a lot of people have been invited but I don’t think many people have taken it up really. I think there is a lack of "the Big Society" volunteers. Well I think they’re probably frightened of things going wrong and becoming I supposed physically attacked themselves or physically hurt themselves, in case of you know rescuing somebody from an upstairs window or whatever it might be in a fire or that sort of thing.*

Public representative 2
How to engage the public

It is also not clear how the public can be engaged in emergency management. Even if public engagement is then achieved, this then leads on to the subsequent question of how it is maintained. As one public representative put it, maintaining interest in emergency preparedness wanes after an incident as “the drama was over”.

There was a big move within the social work department to say what we should do is to get a group, a group of us who are interested so that if anything like this ever happens again we can be, erm, got together and we can go, and we can help. That never happened. The spirit was willing but, but it never happened. It, you know the event was over, the drama was over.

Public representative 1

Several interviewees felt that where there is some public involvement in planning, that involvement has to be meaningful rather than a tokenistic. As one technical expert related, the contribution from the community into emergency response and recovery after a disaster is often underestimated or even ignored to the extent that it is not “being embedded into the thinking about the emergency response”.

We’re still trying to get our heads round this in this country is the work done by Enrico Quarantelli and Russell Dynes’ work on emergent citizen groups in disasters, I mean that’s a very old piece of work about those people that will come together and volunteer and work to do something. Yet we are still very much ”No, no that doesn’t happen and we can’t have that going on here” and that we don’t recognise it as a phenomenon of emergencies for instance.

Emergency Planning Academic and Technical Expert 1

(After the flooding incidents) more response in the end came from community support than came from emergency services in parts of the country, and that hadn’t been properly anticipated and built into the plans. And that probably reflects a relative lack of public involvement even though there has been public involvement in flood planning for some time in this country. But it wasn’t being embedded into the thinking about the emergency response for that.

Emergency Planning Technical Expert 2

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Linked in with the question of “how” services engage the public is also the “where” and “when”. Is public engagement necessary and vital for all types of emergency planning? Is it needed in all phases of the emergency management cycle? If not, at what phase is their input most beneficial? Are there certain “kinds of emergencies where one would like to involve the public” and are there others where no public involvement is wanted? And finally, if the public are to be involved what kind of involvement should be sought, i.e. “what aspect of the emergency planning or response is relevant”?

So I think the whole question of public involvement in emergency planning, you could also approach that question in terms of what kind of emergency so there are some kinds of emergencies where we would like to involve the public ... Public involvement in what particular type of emergency and what aspect of the emergency planning or response is relevant there too.

Emergency Planning Academic and Technical Expert 2

**Barriers to engagement**

There are also clearly barriers to public engagement. These include the prevailing culture that is more individualistic and less community-oriented, perhaps a lack of public awareness of their role in emergencies, but also non-meaningful involvement of the public that discourages their involvement. Other reasons cited include a lack of time and resources by the agencies involved to facilitate public engagement, but also perhaps a lack of trust in the community to participate and make worthwhile contributions. More work is needed to identify and understand these barriers.

People are not thinking about a community you know. They’re thinking about their own individual needs, So that is a way of thinking, but that’s very much a cultural issue I think as well.

Engagement is difficult. (If) there is no obvious way how you can influence (things), you don’t get involved and because we don’t get involved you know it’s kind of a vicious circle and by changing that and making it into a virtuous circle potentially you could begin to help change that.

People began themselves to understand how they also are party to causing some of these things as well as should be able (to be part of) the response and I think that would move us to a different place, but that’s a bit theoretical at the moment

Emergency Planning Technical Expert 1

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Public engagement is poor as we lack time, resources and effort. (We) need to trust them more. We need to engage the local community for example in table top exercises. We need to get people involved.

Health Emergency Planning Manager 2

It was also suggested that there is a degree of public disengagement and dependency that is not easy to change. There are also clearly differences internationally where public engagement is considerably greater, for example in Australia or Holland. It would be useful to understand why this is the case and what lessons could be translated into the UK context.

When I’ve been to Australia and Holland and I was struck by the real difference in the culture where the population take much more of an ownership and responsibility for these things than they do traditionally in this country ... In Holland where local democracy is much more important and the local people are involved in much more in a much more realistic manner in deciding are they willing to have this chemical plant sitting in a middle of a populated area given the risks and if so what they want to do about it and how do, so there’s a much more community ownership of the, of the issues and problems.

Emergency Planning Technical Expert 1

You’re asked to do something and there is a group of people who do and a bigger group of people who have it done to them. There is a group of people who turn up and think all that is necessary is to turn up and it will happen ... You know it’s that attitude and if your attitude is always to want everything done, the government is not going to change that very easily.

Public representative 1

**What is meaningful engagement**

Meaningful public engagement has been identified as a key factor for encouraging public involvement but also for building community ownership of emergency management as well as resilience. Defining what meaningful engagement is on the other hand is less clear. One dimension of it may be to do with the balance of power between the emergency management agencies and the public. In other words, the issue of public engagement is that of who has power over the decision-making process. For example,
there is the question of who leads emergency management. Meaningful engagement also suggests enabling the public to make informed decisions.

Well given that the services have got the equipment and obviously have a specialised skill base, I think it has to be led by them, but not exclusively. I do think people (the public) should be able to help and should be able to come together ... I think you have to take people with you.

Public representative 1

I think we do depend on the people at the top with all the know-how, with all the technology to move very quickly. But it would be very good then if there were people on the ground, the public if you like, who are ready to respond to something.

Public representative 2

That warning and informing bit of the public ... making people, giving them the information to be able to make a choice but equally you've got to have an understanding of risk and appreciation of risk to allow them to make those choices effectively.

Emergency Planning Policymaker 1

What research has shown is that how people behave in emergencies, they don't panic. And if you give information they are more likely to make responsible decisions.

Emergency Planning Academic and Technical Expert 2

However, in the acute phase of a response, the “power” hierarchy tends to be very much top-down and led by the emergency services. The power relationship in the post-disaster phase however is much vaguer and as noted earlier the community does make a far greater contribution to the recovery than is often acknowledged by the agencies. It seems reasonable that “a blended approach” is adopted, “depending on the phase that you are in at the time, to community involvement”. This introduces challenges with regards to how the balance of decision-making “power” is transferred from the emergency services to the local community.

... People realising when it’s time to step back and handover the problem to somebody else which actually can be quite difficult. People don’t like to hand things over...

Emergency Planning Technical Expert 2
Research on the power-transfer interface may prove useful in establishing how to transit “from the formal command control at the front end to what is the more community-orientated recovery”. The other key research question here is how to define meaningful public engagement in emergency management.

### 4.9.4 Building community resilience

The clearest justification given for public engagement appears to be the argument that it is a key ingredient for building community resilience to emergencies (29,34). Engagement of the community fosters community “ownership” of the emergency preparedness agenda. However, this does not appear to be always fully appreciated by the emergency management organisations where the focus may be predominantly on the planning process, and not actually on the sought after goal of a “disaster-resilient” community.

> We need to get people much more involved but they need to own these things.
> 
> Emergency Planning Technical Expert and Policymaker

> I think we miss a trick really with the public ... We’re not trying to make the plan resilient to respond to the incident. What we’re actually trying to do is make the population resilient to an emergency ... For me there is an element of making the public more resilient as part of our overall aim and that goes back to being able to train them in something equivalent to basic community first aid, basic community resilience or whatever.
> 
> Emergency Planning Policymaker 1

From our interviews, what constitutes as a ‘disaster-resilient’ community is not clear. Neither was it clear how community resilience would be developed. As stated above, we can surmise that their involvement is critical for various reasons, such as the local knowledge held by the community. However, the actual process of building resilience is not apparent.

> The community is its own expert in terms of resilience. Local knowledge, the basis of emergency planning and the long term response and recovery of any community from an emergency. The resilience is there within its people. Emergency response by definition is temporary so the involvement of the public is crucial.
> 
> Emergency Planning Academic and Technical Expert 2
4.10 Discussion

From the key informant interviews, many insights were drawn and yet more possible research questions identified (see Table 15). Four main thematic categories relevant to emergency planning in health were identified: the knowledge (or evidence-) base for emergency planning, how individuals and organisations react and behave in emergencies, the health care system in which the emergency management occurs, and the public served by the system (Figure 13).

![Figure 13. Key dimensions](image)

The 4 thematic categories domains were inter-connected and influenced one another. For example, decision-making by emergency managers was to some extent based on the available evidence-base, but heavily influenced by the individuals’ experiences and professional backgrounds. This in turn was affected by the organisational cultures in which the individuals worked in and the set up of the healthcare system. The decisions would then impact on the intended beneficiary, the public. However, the public is not a static entity but a dynamic living community of individuals who themselves perceive and react to the socio-political environment in which they inhabit. Emergency planning therefore cannot and should not be seen in isolation in its individual components, but would be best addressed holistically at the systems level. An extensive list of themes was found and these are more fully discussed in Chapter 6.
Table 15. Potential research questions identified from the interviews

**Building the evidence-base**
- Evidence synthesis of existing knowledge
- Devising new research methodologies to study disasters and emergencies in vivo.
- Developing a systematic way of grading the strength, reliability and rigour of emergency planning “evidence”.

**Knowledge transfer**
- Developing effective means of communicating research and knowledge from academia to the practitioner sphere.
- Developing mechanisms for spreading knowledge within organisations, and safeguarding organisational memory.
- Devising mechanisms for obtaining and communicating the evidence-base rapidly.
- Identifying effective means of communicating technical information to planners and practitioners in a usable form.
- Research into ways of embedding evidence into practice.
- Study ways of using information technology to maximise the utility of the evidence base.

**Individual and organisational behaviour in emergencies**
- Explore and understand how individuals behave in emergency situations.
- Identify the specific competencies required for the different emergency management roles (policymaking, planning, operational response) as well as the means and method of training key personnel to acquire them.
- Understand why the health system and planners are more reactive in their approach to emergency management.
- Explore means of engendering a more proactive stance to potential emergencies in health organisations.
- Understand the root causes why practitioners assume they are right, and the vulnerabilities that this may create.
- Identify optimal means of training health emergency planners.

**Public**
- What are existing public expectations and attitudes to emergency preparedness, planning and response?
- How can the public be engaged meaningfully in emergency management?
- How to build community resilience to disasters?
- How to communicate with the public?
Table 15 - continued

Dealing with risk
• Establishing a common definition of risks in the health emergency setting
• How can health hazards and their attendant risks be assessed objectively?
• Develop tools for policymakers and practitioners to aid hazard and risk assessments
• How can risks be effectively communicated to policymakers? Similarly, how can they be best communicated to the public? How much information do policymakers and/or the public need?

Organisational and System Issues
• Explore differences in organisational cultures and professional cultures, and how it affects the functioning of health emergency planning and management.
• Mapping lessons that can be learnt from the military health system that may benefit the civilian setting
• What is the optimal set up with regards to how emergency responders are organized, their hierarchy and command structures, and how can we improve the effectiveness of organisations at the interface where joint working occurs (i.e. identifying the “ideal” emergency management system appropriate for the UK setting).
• Identifying the right skill mix of practitioners required for emergency planning and management
• Develop ways of assessing the performance of the UK emergency management system
• Understanding reasons for inertia in the health system in reacting to emergencies
• What constitutes optimal planning?
• How do we assess how well a plan is implemented?
• Is the process of planning more important than actual adherence to plans?
• Should emergency planning and management be focused on flexibility or adherence to protocols?
• What degree of flexibility should emergency planners and responders have to deviate away from plans?
• Should emergency planning be top down or bottom up or both or is it a question of timing?
• How do we facilitate better integrated working?
• Developing universally agreed and objective methods for studying or assessing how emergency planning intentions are applied.
• How is change implemented in the health emergency management setting?
• What are the drivers and barriers to change?
• What constitutes an effective management or response? How would you assess this?
5 E-Delphi Study

An international expert Delphi study to determine research needs in major incident management

K Mackway-Jones & S Carley

5.1 Introduction

A Delphi study is a structured process that uses a panel of experts to investigate a complex or imprecise issue using a series of structured statements. It was originally designed for use by futurologists at the RAND Corporation during the 1960s. It has since been used in many other areas, most recently in the health care sciences (35). The process occurs in three stages:

Stage 1. A panel of experts formulates a series of ideas pertaining to the subject in question. This is done individually and anonymously.

Stage 2. The statements from stage 1 are collated and sent to all members of the panel. They indicate their level of agreement with each statement using a Likert scale (36).

Stage 3. Each statement is fed back to the panel with their own and the rest of the panel's previous opinions. All feedback is anonymous. Numerous iterations may be carried through.

The aim of this study is to achieve expert consensus regarding research priorities in major incident management.

5.2 Methodology

A three round Delphi study was conducted using a panel of 26 experts, identified from two key stakeholder groups

Expertise was ascribed using two criteria. First, evidence of active research involvement as identified by the literature analysis previously described; second, evidence of current engagement with major incident education and training. This was to ensure that decisions were made by experts with domain knowledge, so that subsequent recommendations and their implementation would be eased.
Round 1 of the Delphi study asked participants to consider major incident research requirements broadly in 9 areas identified in the literature analysis. Participants were also asked to identify areas where the research base was adequate and also areas of research requirement that lay outside the 9 areas identified. The questions posed are shown in Table 16:

Table 16. Round One general questions

1. What areas of major incident management do you currently believe are well researched and understood?
2. What further topics of research do you think are required in the field of Business Continuity?
3. What further topics of research do you think are required in the field of Hazards Analysis?
4. What further topics of research do you think are required in the field of Capability assessment and maintenance?
5. What further topics of research do you think are required in the field of Communications?
6. What further topics of research do you think are required in the field of Response?
7. What further topics of research do you think are required in the field of Recovery?
8. What further topics of research do you think are required in the field of Organisational behaviour?
9. What further topics of research do you think are required in the field of Informatics?
10. What further topics of research do you think are required in the field of Human resources?
11. Do you think there are any other priorities for research?

Replies to Round One general questions were thematically reviewed and collated into a series of statements. Round Two comprised an iteration of these statements to the expert panel. Panel members were required to express their level of agreement with each statement using a 7 point Likert scale (36). Panel members were also asked to add any comments that they felt were appropriate and to mention any areas that they felt were important that had not already been identified. Statements that reached positive or negative consensus (defined \textit{a priori} as $\geq 80\%$ of respondents) were removed at this stage. The third and final round of the Delphi study represented the statements that had not reached consensus at the end of Round Two. The experts were re-presented with their own round two score together with a summary of the rest of the panel's score (expressed as the median score). In this round panel members could change their opinions in light of those of the rest of the panel. Consensus was defined \textit{a priori} to be $\geq 85\%$ at the end of round 3.
### 5.3 Findings

83 individuals were approached, of whom 32 agreed to participate. 23 participants (88%) completed Round One; 21 participants (81%) completed Round Two and 22 (85%) completed Round Three. In total 26 experts contributed to the study (Table 17). Also of note, the participant samples for the e-Delphi study and the key informant interviews are non-identical, i.e. none of the e-Delphi experts were interviewed.

#### Table 17. E-Delphi panel members

<table>
<thead>
<tr>
<th>Expert</th>
<th>Field of work</th>
<th>Country</th>
<th>Relevant appointments</th>
<th>Expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof Paul Arbon</td>
<td>Research</td>
<td>Australia</td>
<td>President, WADEM</td>
<td>Major incident planning and response.</td>
</tr>
<tr>
<td>Prof Jonathan Bisson</td>
<td>Research</td>
<td>UK</td>
<td>Professor of Psychiatry, Cardiff University</td>
<td>Research into psychological aspects of major incidents and war.</td>
</tr>
<tr>
<td>Dr Basil Bonner</td>
<td>Training/ Education</td>
<td>South Africa</td>
<td>Consultant Emergency Physician, Milnerton Medi-Clinic</td>
<td>Involved in major incident preparedness for FIFA World Cup.</td>
</tr>
<tr>
<td>Prof Karim Brohi</td>
<td>Research</td>
<td>UK</td>
<td>Professor of Trauma surgery, University of London</td>
<td>Extensive publication record in trauma care and management of UK major incidents.</td>
</tr>
<tr>
<td>Brian Carlin</td>
<td>Training/ Education</td>
<td>Ireland</td>
<td>Director, Centre for Emergency Medical Sciences, University College Dublin</td>
<td>Extensive experience in the management and planning for major incidents in UK, Scotland and Ireland.</td>
</tr>
<tr>
<td>Dr Evan Cherniack</td>
<td>Research</td>
<td>USA</td>
<td>Director, Geriatrics Clinic, Miami VA Medical Center</td>
<td>Published author on the management of geriatric patients in disaster scenarios.</td>
</tr>
<tr>
<td>Prof Mark Cicero</td>
<td>Research</td>
<td>USA</td>
<td>Assistant Professor, Pediatric Emergency Medicine (PEM), Yale School of Medicine</td>
<td>Designed experiential and didactic curricula in pediatric disaster medicine, and has published original research about disaster medicine educational strategies.</td>
</tr>
</tbody>
</table>
### Table 17 – continued

<table>
<thead>
<tr>
<th>Expert</th>
<th>Field of work</th>
<th>Country</th>
<th>Relevant appointments</th>
<th>Expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Tony Gleeson</td>
<td>Training/Education</td>
<td>UK</td>
<td>Consultant in Emergency Medicine</td>
<td>Educator in major incident medical management and support.</td>
</tr>
<tr>
<td>Jack Herrmann</td>
<td>Research</td>
<td>USA</td>
<td>Senior Advisor for Public Health Preparedness, National Association of County and City Health Officials (NACCHO)</td>
<td>Published on psychological aspects of disaster management.</td>
</tr>
<tr>
<td>Dr Ian Higginson</td>
<td>Training/Education</td>
<td>UK</td>
<td>Consultant in Emergency Medicine, Plymouth Hospitals NHS Trust</td>
<td>Educator in major incident medical management and support.</td>
</tr>
<tr>
<td>Prof Edbert Hsu</td>
<td>Research</td>
<td>USA</td>
<td>Associate Professor, Department of Emergency Medicine and Director of Training, Office of Critical Event Preparedness and Response (CEPAR), Johns Hopkins University</td>
<td>Associate Editor for the AMA Journal of Disaster Medicine and Public Health Preparedness. Serves on the leadership board of CEPAR and is a co-investigator with the Center for the Study of Preparedness and Catastrophic Event Response (PACER) at Johns Hopkins.</td>
</tr>
</tbody>
</table>
Table 17 – continued

<table>
<thead>
<tr>
<th>Expert</th>
<th>Field of work</th>
<th>Country</th>
<th>Relevant appointments</th>
<th>Expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof Lars Lundberg</td>
<td>Research</td>
<td>Sweden</td>
<td>Professor in Prehospital Emergency Medicine, Boras University, Sweden</td>
<td>Expert in disaster care. Published on civilian and military disaster planning and links between the two.</td>
</tr>
<tr>
<td>Dr Julie Milstien</td>
<td>Research</td>
<td>USA</td>
<td>Adjunct Professor of Medicine, Center for Vaccine Development, University of Maryland School of Medicine, USA</td>
<td>Previously worked for the World Health Organisation with expertise in global immunization programmes.</td>
</tr>
<tr>
<td>Prof Terri Rebmann</td>
<td>Research</td>
<td>USA</td>
<td>Associate Professor, Institute for Biosecurity</td>
<td>Knowledge of biosecurity risks and responses. Educator in disaster response and communicable diseases.</td>
</tr>
<tr>
<td>Dr Andrew Robertson</td>
<td>Training/Education</td>
<td>UK</td>
<td>Director, Disaster Management, Regulation and Planning, Public Health Division, Western Australian Department of Health</td>
<td>Educator in major incident medical management and support.</td>
</tr>
<tr>
<td>Dr Andy Ronald</td>
<td>Training/Education</td>
<td>UK</td>
<td>Consultant Anaesthetist, Aberdeen Royal Infirmary</td>
<td>Director, Major incident courses in Aberdeen.</td>
</tr>
<tr>
<td>Dr James Rubin</td>
<td>Research</td>
<td>UK</td>
<td>NIHR Career Development Fellow</td>
<td>Published in psychiatric aspects of disaster.</td>
</tr>
<tr>
<td>Lt Col Rob Russell</td>
<td>Training/Education</td>
<td>UK</td>
<td>Head, Academic Department of Military Emergency Medicine, British Army</td>
<td>War fighting, educator major incident medical management and support.</td>
</tr>
</tbody>
</table>
Table 17 – continued

<table>
<thead>
<tr>
<th>Expert</th>
<th>Field of work</th>
<th>Country</th>
<th>Relevant appointments</th>
<th>Expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof Takeshi Shimazu</td>
<td>Training/Education</td>
<td>Japan</td>
<td>Professor of Emergency Medicine, Osaka University</td>
<td>Director of major incident medical training in Osaka, Japan.</td>
</tr>
<tr>
<td>Dr Peter Shirley</td>
<td>Research</td>
<td>UK</td>
<td>Consultant Anaesthetist, Royal London Hospital</td>
<td>Published on response and planning of UK major incidents from an intensive care perspective.</td>
</tr>
<tr>
<td>Dr Andy Smith</td>
<td>Training/Education</td>
<td>UK</td>
<td>Major Incident &amp; HAZMED/CBRNE Clinical Lead</td>
<td>Educator in major incident medical management and support.</td>
</tr>
<tr>
<td>Dr Graeme Spencer</td>
<td>Training/Education</td>
<td>UK</td>
<td>Principal in General Practice, Earnswood Medical Centre, Crewe</td>
<td>Educator in major incident medical management and support.</td>
</tr>
<tr>
<td>Prof Charles Sprung</td>
<td>Research</td>
<td>Israel</td>
<td>Professor of Medicine, The Hebrew University of Jerusalem</td>
<td>Critical care physician and published expert in critical care response to disasters.</td>
</tr>
<tr>
<td>Prof Lee Wallis</td>
<td>Training/Education</td>
<td>South Africa</td>
<td>Professor of Emergency Medicine, Provincial Government Western Cape</td>
<td>Lead medical planner, Emergency Preparedness, FIFA World Cup.</td>
</tr>
<tr>
<td>Dr Sarah Wheatly</td>
<td>Training/Education</td>
<td>UK</td>
<td>Consultant Anaesthetist, Wythenshawe Hospital</td>
<td>Educator in major incident medical management and support.</td>
</tr>
</tbody>
</table>

The participation flow is illustrated in Figure 12.
Figure 14. Participation summary

83 experts identified as either active researchers or current educators and sent details of the study and consent request.

47 did not reply to invitation

32 consented to take part in Round One

3 do not accept the electronic invitation

6 accept the electronic invitation but do not submit comments

23 complete Round One

21 complete Round Two

5 fail to complete round two

22 complete Round Three

4 declined to participate

Two request entry at round two

One requests entry at round two

One requests re-entry at round three

6 accept the electronic invitation but do not submit comments

3 do not accept the electronic invitation

47 did not reply to invitation

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Round One generated 221 unique statements about priority research areas in major incident management. A total of 51 out of the 221 statements had reached consensus on completion of Round Two. A further 23 statements reached consensus at the end of Round Three. No additional statements were constructed and added in Round Three as no panel members identified new areas of research priority in Round Two. The flow of statements is illustrated in Figure 13.

**Figure 15. Statement flow**

11 broad questions posed in round one

221 statements derived by thematic review and presented in round two

170 statement represented with group median score in round three

51 statements reach consensus in round two

23 statements reach consensus in round three

147 statement fail to reach consensus
The 51 consensus statements that arose from Round Two are shown in Table 18 and the additional 23 consensus statements that came from Round Three are shown in Table 19.

<table>
<thead>
<tr>
<th>Statement</th>
<th>% consensus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comparing the capability achieved with specific training interventions</td>
<td>95</td>
</tr>
<tr>
<td>The long term impact on acute services</td>
<td>95</td>
</tr>
<tr>
<td>The ability of hospitals to deal with high numbers of P1 casualties</td>
<td>95</td>
</tr>
<tr>
<td>How do crowds flow and move during mass gathering incidents</td>
<td>90</td>
</tr>
<tr>
<td>The use of alternative destinations to the hospital emergency department</td>
<td>90</td>
</tr>
<tr>
<td>How to analyse exercises to assess capability</td>
<td>90</td>
</tr>
<tr>
<td>Inter-service communication</td>
<td>90</td>
</tr>
<tr>
<td>Which organisational factors affect the speed of recovery</td>
<td>90</td>
</tr>
<tr>
<td>The size of supplies stockpiles needed</td>
<td>89</td>
</tr>
<tr>
<td>Establishing the effectiveness of specific messaging and modes of communication</td>
<td>86</td>
</tr>
<tr>
<td>The effectiveness of communication exercises at testing communications</td>
<td>86</td>
</tr>
<tr>
<td>How well do plans reflect changing resources (health facilities, beds, etc.)</td>
<td>86</td>
</tr>
<tr>
<td>Public health response in the recovery phase</td>
<td>86</td>
</tr>
<tr>
<td>Preparedness of emergency services for nuclear and radiation exposure</td>
<td>86</td>
</tr>
<tr>
<td>Do drills effectively test capability</td>
<td>86</td>
</tr>
<tr>
<td>Integrating management of non incident patients into incident response</td>
<td>86</td>
</tr>
<tr>
<td>The response to protracted incidents (e.g. infection outbreaks)</td>
<td>86</td>
</tr>
<tr>
<td>Methods to determine the need for advanced medical skills on scene</td>
<td>86</td>
</tr>
<tr>
<td>Assessing the cost effectiveness of major incident training interventions</td>
<td>86</td>
</tr>
<tr>
<td>Determining the generic competencies for incident responders</td>
<td>86</td>
</tr>
<tr>
<td>Communicating recommendations to the public</td>
<td>86</td>
</tr>
<tr>
<td>The long term effects (economic, health, psychological) on affected populations</td>
<td>86</td>
</tr>
<tr>
<td>The response to biological incidents</td>
<td>86</td>
</tr>
<tr>
<td>The importance and integration of locally relevant knowledge</td>
<td>85</td>
</tr>
<tr>
<td>The effectiveness of rapid debriefing</td>
<td>85</td>
</tr>
</tbody>
</table>
Table 18 - continued

<table>
<thead>
<tr>
<th>Statement</th>
<th>% consensus</th>
</tr>
</thead>
<tbody>
<tr>
<td>How to plan for new and emerging threats</td>
<td>85</td>
</tr>
<tr>
<td>How to plan for rural as well as urban incidents</td>
<td>85</td>
</tr>
<tr>
<td>What are the harmful consequences of hazards on vulnerable / capable populations</td>
<td>85</td>
</tr>
<tr>
<td>Simulation methodologies in major incident training</td>
<td>85</td>
</tr>
<tr>
<td>Defusing, debriefing etc: what really works</td>
<td>85</td>
</tr>
<tr>
<td>The impact of pre-hospital response on the hospital sector</td>
<td>84</td>
</tr>
<tr>
<td>The follow up / rehabilitation rates for patients (return to active work, depression, divorce etc)</td>
<td>81</td>
</tr>
<tr>
<td>Effective communication after a “near miss”</td>
<td>81</td>
</tr>
<tr>
<td>Decision-making about levels of care</td>
<td>81</td>
</tr>
<tr>
<td>The concordance between clinicians and emergency planner’s perceptions of capability</td>
<td>81</td>
</tr>
<tr>
<td>The usefulness of forward medical assessment teams</td>
<td>81</td>
</tr>
<tr>
<td>The capability of current computer systems to deal with major incidents</td>
<td>81</td>
</tr>
<tr>
<td>How to determine the hazards potentially affecting health facilities</td>
<td>81</td>
</tr>
<tr>
<td>The usefulness of disaster medical assistance teams</td>
<td>81</td>
</tr>
<tr>
<td>An international comparison of disaster response systems</td>
<td>81</td>
</tr>
<tr>
<td>The degree of preparedness of local health providers to local risk</td>
<td>81</td>
</tr>
<tr>
<td>The post-incident follow up / rehabilitation rates for staff</td>
<td>81</td>
</tr>
<tr>
<td>Determining the most effective way of measuring effectiveness of disaster exercises / drills</td>
<td>81</td>
</tr>
<tr>
<td>Who should perform pre-hospital triage</td>
<td>81</td>
</tr>
<tr>
<td>The role of pre-education about risks</td>
<td>81</td>
</tr>
<tr>
<td>The sustainability of response over long time periods</td>
<td>81</td>
</tr>
<tr>
<td>The accuracy of self-assessments by providers of capability</td>
<td>80</td>
</tr>
<tr>
<td>Are staff at mass gatherings trained appropriately</td>
<td>80</td>
</tr>
<tr>
<td>Determining whether standardisation of disaster education and training might be effective</td>
<td>80</td>
</tr>
<tr>
<td>The impact of pre-determined attendance for health providers</td>
<td>80</td>
</tr>
<tr>
<td>The validation of major incident triage systems</td>
<td>80</td>
</tr>
</tbody>
</table>
Table 19. The 23 statements that reached consensus in Round Three

<table>
<thead>
<tr>
<th>Statement</th>
<th>% consensus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population warning systems</td>
<td>100</td>
</tr>
<tr>
<td>Investigating novel ways for planning for major incidents including civil society and other non-governmental organisations</td>
<td>95</td>
</tr>
<tr>
<td>The extent of community preparedness</td>
<td>95</td>
</tr>
<tr>
<td>Determining the most effective way of measuring preparedness of hospitals</td>
<td>91</td>
</tr>
<tr>
<td>The role of volunteers and volunteering</td>
<td>91</td>
</tr>
<tr>
<td>How to retrieve information when electricity is unavailable</td>
<td>91</td>
</tr>
<tr>
<td>Communication of on scene hazards</td>
<td>90</td>
</tr>
<tr>
<td>Casualty tracking systems</td>
<td>90</td>
</tr>
<tr>
<td>Mapping and public access</td>
<td>90</td>
</tr>
<tr>
<td>The use of RFID(^\text{xx}) to track patients</td>
<td>86</td>
</tr>
<tr>
<td>The ability to deliver surge capacity</td>
<td>86</td>
</tr>
<tr>
<td>Generation of scene maps</td>
<td>86</td>
</tr>
<tr>
<td>How to marshal the skills and staff needed for response</td>
<td>86</td>
</tr>
<tr>
<td>The role of post operational audit</td>
<td>86</td>
</tr>
<tr>
<td>The incorporation of lessons learnt into future plans</td>
<td>86</td>
</tr>
<tr>
<td>Establishing if there is a common international language of disaster</td>
<td>86</td>
</tr>
<tr>
<td>What incidents have influenced the evolution of risk and resilience and major incident planning and why</td>
<td>86</td>
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<tr>
<td>Impact of mandatory vaccination policies related to influenza</td>
<td>86</td>
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<tr>
<td>The development of real-time, international mechanisms for data gathering</td>
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<tr>
<td>Developing a “Triage Sort” for children of different ages</td>
<td>86</td>
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<tr>
<td>Determining the optimal most cost-effective distribution of resources</td>
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<tr>
<td>The long term financial impact of disaster</td>
<td>86</td>
</tr>
<tr>
<td>The assessment of baseline capability in specialists and generalists</td>
<td>86</td>
</tr>
</tbody>
</table>

The statements that did not reach consensus are shown in full in Appendix 3.

\(^{xx}\) Radio-frequency identification

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5.4 Discussion

Conducting research into major incidents is difficult because the events are rare and expertise difficult to define (3). As carrying out research studies are challenging, practice has traditionally been based upon case reports and the opinions of experts. The opinions of single authorities are susceptible to bias, as are committees and expert working groups through confounding by interpersonal relationships. The Delphi method was used as a multidisciplinary approach in an attempt to reduce bias (37,38).

The Delphi methodology has gained in popularity in health services research and has previously been used in the context of emergency planning to explore issues around the care of children involved in major incidents (39,40), major incident burns victims (41,42) and victims of chemical (43,44) and biological (45) incidents as well as to investigate issues around role nomenclature (46).

5.4.1 Statement of principal findings

This expert Delphi has identified 74 topics for research in the field of health service management of major incidents. There are a number of clear themes within these topics. The largest of these (with ten topics - see Figure 16) is education and training.

Figure 16. Topics identified in education and training

- Comparing the capability achieved with specific training interventions
- How to analyse exercises to assess capability
- The effectiveness of communication exercises at testing communications
- Do drills effectively test capability
- Assessing the cost effectiveness of major incident training interventions
- Determining the generic competencies for incident responders
- Simulation methodologies in major incident training
- Determining the most effective way of measuring effectiveness of disaster exercises / drills
- Are staff at mass gatherings trained appropriately
- Determining whether standardisation of disaster education and training might be effective
The next most significant themes were planning and communications (Figure 17 and 18).

**Figure 17. Topics identified in planning**

- The size of supplies stockpiles needed
- How well do plans reflect changing resources (health facilities, beds etc)
- The importance and integration of locally relevant knowledge
- How to plan for new and emerging threats
- How to plan for rural as well as urban incidents
- The impact of pre-determined attendance for health providers
- Population warning systems
- Investigating novel ways for planning for major incidents including civil society and other non-governmental organisations
- The incorporation of lessons learnt into future plans

**Figure 18. Topics identified in communication**

- Inter-service communication
- Establishing the effectiveness of specific messaging and modes of communication
- The effectiveness of communication exercises at testing communications
- Communicating recommendations to the public
- Effective communication after a “near miss”
- Population warning systems
- Communication of on scene hazards
- Establishing if there is a common international language of disaster

Other themes included recovery, acute response, and pre-hospital care. It is of note that the expert panel only identified one area (triage) that they agreed was well researched and understood; despite this consensus they also agreed a further area of research (the validation of major incident triage systems) around this topic.

The Delphi study also produced 147 statements which the panel of experts did not agree as being important. Despite the failure to reach agreement these statements undoubtedly include areas worthy of further study and the list will be valuable to future researchers.
5.4.2 Strengths and weaknesses of the study

As with all Delphi studies the findings must be interpreted with some caution for a number of reasons. First, the definition of expertise is a subjective one and relies upon the researchers identifying who the potential experts in the field are. In this study it was possible to identify active researchers through the linked literature analysis and to identify active educators through a database of major incident course providers. However the criteria for invitation will always be a proxy for true expertise. Second, the Delphi method can only explore those areas of potential research raised by panel members and therefore important areas may have been overlooked. Third, although consensus was reached on 74 statements this does not necessarily mean true agreement as some panel members may have altered their views in order to draw the process to a close.

5.4.3 Unanswered questions

This Delphi study has identified a number of topics for research, however it has not sought to prioritise them nor has it investigated the feasibility of researching each area. Ranking and further assessment of feasibility will be necessary before the topics can be rated as realistic research projects.
6 Discussion and Recommendations

6.1 Summary

This report presents four separate but linked work streams in the field of emergency planning for health: scoping studies of the published academic literature and the grey literature, as well as multi-disciplinary and multi-agency key informant interviews, and an e-Delphi expert panel study addressing research priorities.

The two literature scoping reviews identified a preponderance of commentaries and event reports, mostly relating to the response phase and with little published addressing mitigation, hazard analysis or development planning. Within the literature we found little evidence of synthesis of individual reports into more generalisable principles, and the grey literature search found only two repositories of evidence, one of which was not publicly accessible.

The key informant interviews identified four major themes: the knowledge base, its acquisition and translation; individual and organisational behaviour; health care systems issues and public engagement. The e-Delphi respondents considered that education and training, planning and communications were major areas where research was required.

6.1.1 Integration of findings

A mix of methods was deliberately employed by the four work streams in order to explore the topic broadly and holistically. The findings from each work stream iteratively assisted the design of subsequent work, and facilitated the interpretation of the data. The initial scoping study helped to verify the conceptual framework used (emergency management cycle phases) that was applied to the other work streams. The identified paucity of material on mitigation and recovery issues from both the published and grey literature helped inform the development of the key informant interview schedules to ensure that these topics were addressed.

The sampling strategies adopted by both the key informant interviews and e-Delphi study sought to ensure that a breadth of views were obtained. The former had representation from those with a technical expertise or strategic role whilst the e-Delphi study included respondents who had predominantly either an operational, research or training and educational responsibility.
The later qualitative elements of the study yielded considerably more insights and contribute proportionately more to the final analysis and interpretation of the study as a whole. A thematic approach was applied to examine data from across the various work streams for key themes. In essence, the various work streams served to help triangulate the themes identified. The key informant interviews were particularly valuable as the statements made by the key informants helped to contextualise and explain many of the findings and gaps noted from the published and grey literature scoping studies. A number of these unifying themes and issues were identified, and are discussed below, together with recommendations arising from them.

6.1.2 Caveats

In interpreting the data, the terms disaster, emergency and major incident have been used interchangeably in this study and taken to be synonymous. However, it is important to note that internationally, there are ongoing debates around the definitions used for these terms.(20) For the purpose of this study, such distinctions were not made as the emergency services sector in the UK is relatively undifferentiated. In addition, the UK tends not to encounter the extremes of severity and complexity that define certain disasters elsewhere globally.

Also of note, much of the data collection and analysis has been focused on a predominantly UK-centric perspective. Missing from this discourse is the considerable body of disaster planning and management knowledge that exists: as noted in the published literature scoping study, 11.5% pertained to low- and middle-income countries. In addition, there are extensive grey literature repositories, such as Reliefweb\textsuperscript{xxi}, AlertNet\textsuperscript{xxii} and ALNAP\textsuperscript{xxiii}, where material potentially relevant to emergency planning in the UK may be found. Similarly, there may be positive local benefits to involvement of UK health professionals and agencies in overseas disasters. Learning from these contexts has not been looked at in this report and could provide another rich vein of enquiry.

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{xxi} Reliefweb: Accessible at http://www.reliefweb.int
\item \textsuperscript{xxii} AlertNet: Accessible at http://www.trust.org/alertnet
\item \textsuperscript{xxiii} Active Learning Network for Accountability and Performance (ALNAP): Accessible at http://www.alnap.org
\end{itemize}
\end{footnotesize}
6.2 The Knowledge base

6.2.1 Knowledge creation: Acquiring the evidence

There is a lack of published evidence on emergency planning and management specific to health in peer-reviewed journals. What evidence is available is not always robust or peer reviewed and tends to be difficult to find (3). We found that the published literature in health emergency planning tends to be descriptive rather than analytical. We identified only 11 systematic reviews (under 1% of published papers), while over a third of papers were editorials, commentaries or consensus-based expert guidance and nearly a quarter were descriptive event reports. Key informants drew attention to the unsuitability of “traditional” medical research methods of hypothesis testing (often by means of a randomised controlled trial) in the field of emergency planning, and e-Delphi respondents identified a need for more research on methods of data-gathering, measurement of preparedness and resource distribution.

That said there is a body of relevant knowledge in existence in the UK that could constitute the evidence-base. This is a growing collection of “grey literature” as well as post event reports, after event/exercise debriefings, lessons learnt documents, and public inquiries into various emergencies. This ‘evidence base’ however requires collation and appraisal. In addition, the predominance of observational studies raises problems for meta-analysis as questions of validity and reliability of data persist; these may be remedied by adoption of standardised reporting templates such as those proposed by WADEM (6) and CONFIDE (3). Alternative methods of meta-synthesis may also facilitate more productive examination of this data set (28).

There is also a sizeable body of knowledge internationally but there are marked differences with regards to how the international literature is viewed by UK practitioners. Some discount it completely on the basis that emergency planning and response is contextually bound by the national policy context, priorities and circumstances. Others argue for the need to draw on whatever exists, synthesize what evidence is available, and then adapt the evidence and contextualise it locally. However, this is not an easy task owing to the heterogeneity of the literature. Once again the predominance of observational studies makes it difficult if not impossible to conduct meaningful meta-analyses as questions of validity and reliability of the international literature persist.

Carrying out research in disasters and emergencies is challenging due to their complexity and unpredictability in timing, scale and location. Furthermore, conventional research study designs cannot be easily applied in disasters and emergencies. Research methods tailored to studying disasters need to be developed. Linked to this is the issue of how research
is commissioned. Traditionally, this tends to be reactive and the ethical and governance approval process at present may hamper research in the field as it is too slow to react. The accelerated process undertaken during the 2009 H1N1 pandemic may provide a suitable paradigm for broader emergency planning research (47). Alternatively, proactive anticipatory funding and ethical approval of emergency planning research could be undertaken pre-disaster so that it can be rapidly deployed at short notice.

**Key implications for practice and research**

- Develop and/or refine international disaster reporting templates for the reporting of health major incidents in the UK.
- Develop methods of evidence meta-synthesis for the aggregation of health emergency planning data.
- Consider anticipatory funding and ethical approval of emergency planning research to be prepared and ready to activate when appropriate at short notice.

### 6.2.2 Knowledge review: Valuing the evidence

The literature review identified little published work that would be regarded as high quality if a traditional hierarchy of evidence were to be applied (48). However it appears from the key informant interviews that the users of the evidence value the evidence-base differently, depending on their individual background and organisational cultures. Based upon the key informant interview data, it is apparent that an alternative evidence hierarchy may exist (as illustrated in Figure 17) with more credence paid to experience-based knowledge and guidance, particularly amongst those from the “blue lights” services who viewed experts as those with “experience”. However, appraisal of the evidence by practitioners may be limited, and some tend to accept information at face value. This suggests a model of care practice based upon ‘reflective practice’ or ‘professional consensus’ rather than critical appraisal or scientific-bureaucratic practice as described by Harrison (49).
During the interviews, it was suggested that practitioners may lack either the time or skills for appraising information. Some tended to be uncritical with information, accepting it at face value. Others often perceived the evidence in a very concrete way, as black and white, right or wrong, relevant or not. As a consequence, information such as material from other countries may be discarded or discounted. A more considered approach to information may be more appropriate. Whilst the concerns with regards to the contextual specificity of knowledge are valid, a body of evidence exists internationally and in other settings. This may not always be directly transferable to the UK health context but may nonetheless be of value, especially if contextualised to the local situation. The international evidence base might help address knowledge gaps in the UK.

There may also be different organisational appetites for evidence. Our key informant interviewees reported health practitioners as tending to be open towards looking for and using evidence, potentially reflecting the culture of evidence-based medicine that has evolved in recent years. This may also explain the more concrete interpretation of “knowledge” demonstrated by e-Delphi participants who were primarily from health backgrounds. On the other hand, non-health practitioners, such as those from the police and fire services did not place as much emphasis on an empirical “evidence base”. As such there may be different perspectives towards the concept of evidence. This in turn may reflect the different heuristics used by the different practitioners for assessing the validity and reliability of “evidence”.

The practical difficulties of undertaking experimental research and theoretical limitations of being able to generalise highly context-specific findings mean that the traditional hierarchy of evidence is likely to be inappropriate for evaluating emergency planning literature. However, some means of determining the value of individual studies would be helpful. Ideally this would involve developing methods to assess the
validity and reliability of emergency planning data. Meanwhile, from a practical perspective, researchers might find it helpful to know what types of evidence are most likely to influence emergency planning practitioners and policymakers.

**Key implications for practice and research**

- Explore the perceptions of emergency planning practitioners and policymakers towards different types of evidence and how these inform health emergency planning.
- Develop methods for assessing validity and reliability in emergency planning research.

### 6.2.3 Knowledge distribution

A commonly cited issue in emergencies is that of ‘communication failures’. This may simply be a ‘catch all’ term for many related but distinct issues to do with the exchange of information such as technical, human and organisational failures. This includes how knowledge is transferred, transacted and disseminated within organisations, between organisations, and with the wider public as well as policymakers. The transaction of knowledge is particularly significant as the information transferred is not an immutable entity but is modified in the process. A more comprehensive understanding of the receiver-transmitter relationship and the process of transmission, particularly in emergency settings, is therefore important (50). There are also issues with the dissemination of research knowledge to practitioners. Currently, it appears that there is no effective mechanism for this in the UK.

A related topic is that of training and education in health emergency planning. Around 1 in 20 published papers (76) addressed various issues related to this topic. However, given the unpredictability of disasters or major incidents the majority of these were forced to use a proxy outcome (usually a knowledge-based examination or a simulation) to assess the efficacy of the educational process. A few papers relate actual behaviour in an incident to prior training but these are rare (51). This issue was reflected in the high frequency of e-Delphi responses relating to training methods and their relative efficacy, measurement of training efficacy and identification of competencies required in responders.

Key informants reported multiple barriers to the transfer and translation of knowledge into action, such as a lack of awareness of the evidence base by practitioners, the knowledge being discounted as irrelevant by practitioners, breakdown in the transfer or knowledge between and within
organisations, and organisational memory loss. It was also felt to be
influenced by organisational cultures. From the key informant interviews,
it was also significant to note that there is a lack of universally agreed
terminology and understanding of definitions used in emergency planning
both within and between organisations, but also between countries. This is
a hindrance to knowledge transfer and raises a very real possibility of
misunderstanding and miscommunication happening in this field.

Key implications for practice and research

- Identification of educational techniques that affect behaviour during a
disaster or major incident.
- Identify resources that can facilitate learning by practitioners.
- Develop a consensus standardised emergency planning lexicon

6.2.4 Knowledge adoption: Organisational learning

The utility of knowledge ultimately depends on how it is used (i.e.
translated into action) but also on whether it is used. The available
knowledge is not always utilised and there are multiple barriers to
translating it into action such as a lack of awareness of the evidence base
by practitioners, the knowledge being discounted as irrelevant by
practitioners, breakdown in the transfer or knowledge between and within
organisations, and organisational memory loss. It is also influenced by the
organisational cultures. Currently, it appears that practitioners tend to act
on intuition and past experience and rely less on the evidence base. This
then raises the question of how can we embed the evidence into practice.
For this purpose, there could be a role for information technology and how
it is used to maximise available information in emergencies.

Little was found in the published literature review relating to development
plans i.e. the mechanism for improving an emergency planning system
based on past experience. Although the grey literature review identified
repeated “lessons learnt” there was little evidence of these lessons being
revisited later to confirm changes in organisational or individual behaviour.
Similarly, key informants reported that organisational learning was poor
amongst health organisations involved in emergency planning and
management and that lessons tended to be ‘identified’ rather than ‘learnt’.
This is of concern because organisational learning can reduce the
recurrence of adverse events and assist preparation for potential threats
and hazards. Prevailing organisational and professional cultures were felt
to be partly responsible for this but other reasons have been proposed.
This needs further confirmatory work and it would also be useful to
establish ways of improving organisational learning. The e-Delphi
respondents also identified a need for research into post-incident
debriefing and audit, and the mechanisms by which some incidents influence major incident planning.

There are also questions as to how the experience and knowledge acquired by organisations over time can be retained and, when required, re-called and communicated in a timely fashion. This may partly be an information technology issue, but it does require organisations to have a culture that promotes organisational learning. The organisations also need to actively encourage their staff to assimilate “old” information (i.e. the evidence-base) and apply them to “new” contexts and situations. Whilst this appears to be happening to a certain degree in the health emergency planning and management sphere, it is unclear how effective these efforts are at retaining and applying the evidence.

Both the published literature and grey literature reviews identified significant numbers of event reports, debriefings and public enquiries relevant to health emergency planning. However, as key informants identified, this information is not collated, standardised or publicly accessible. There is a need to collate and retain these documents in an easily accessible repository.

Key implications for practice and research

• Explore barriers and enablers to organisational learning in the health emergency planning field.
• Identifying mechanisms for embedding evidence into practice.
• Collate and standardise event reports, debriefings and relevant public enquiries in a repository accessible to public, practitioners and policy-makers.

6.3 Social and behavioural science gaps

It was interesting to note that most of the key informant interviewees, unlike the e-Delphi respondents, were less concerned about research into “technical issues” of emergency planning and management but were more interested in the wider system issues and psycho-sociological elements of individual, population and organisational behaviour in emergencies. This perhaps highlights the differing operational difficulties that they were more likely to encounter in their daily practice.
6.3.1 Individual and organisational behaviour in emergencies

The key research priority identified as such was clearly the “social and behavioural science gap” in the knowledge with regards to how individuals and organisations behave in emergencies. This applied both to responders as well as policymakers and the public. Certainly in the business sector research into crisis management is not new. However, in the health setting, it appears much more rudimentary and at an earlier developmental stage. Where there is existing evidence from the non-health sectors into crisis management, it is also clear that not much of this knowledge has crossed the divide into health emergency planning. The multitude of agencies involved in emergency settings also adds to the complexity.

6.3.2 Decision-making in crises

We need to understand better how individuals and populations behave in emergencies, but also how organisations behave. One crucial group of individuals for whom much more study is required is those individuals in key positions of power whose decisions ultimately translate into organisational behaviour and responses in such settings. The key informants interviewed identified decision-making as a key aspect of effective crisis response, and noted problems with empowering individuals with the confidence to make (and change) decisions in a situation of incomplete information; as one informant commented, “the NHS deals poorly with uncertainty”. As such, we need to find out how decision-makers make decisions and what constitute good decisions.

Decision-making is a key aspect of leadership. Again, the key questions are what embodies good leadership and what are the key competencies of good leaders? Related to this is how do we train individuals to become good leaders, planners and responders? We did not find any peer-reviewed references to competencies for these roles during our published and grey literature. In addition, although some literature exists regarding educational interventions in health emergency planning, we did not identify any formal iteration of competencies required in health emergency planners and responders. We identified a number of educational programmes delivered at various higher education institutions (from continuing professional development through to Masters level courses) and by organisations such as the Emergency Planning College.

Irrespective of the intended outcome, pedagogic issues nonetheless remain as to how training objectives for health emergency planners are realized. Nationally, emergency planning is taught by various higher education institutions as well as emergency planning training organisations such as the Emergency Planning College. Differing curricula, training
methodologies and duration exist. Some are delivered as continuing professional development events, others as postgraduate certificate courses, and yet others as Masters courses. Whether this is even necessary could be challenged. What is therefore unclear is the optimal training solution for the UK health context and this needs further exploration.

**Key implications for practice and research**

- Explore the decision-making process of key individuals whose decisions translate into organisational behaviour.
- Explore the decision-making processes of practitioners at the operational level.
- Develop educational techniques to support empowerment of individuals in decision-making.

### 6.3.3 Approaches to risk

**Risk assessment**

Some literature (124 papers) exists regarding hazard analysis; there is an increasing use of modelling in this field. Within the grey literature there is a significant body of technical expertise, mostly around chemical incidents and plume modelling, relating to event-specific hazard analysis.

However, key informants noted that UK health emergency planning is predominantly reactive to incidents as they occur rather than proactive in their mitigation. This may be due to the professional backgrounds of the individuals involved and the organisational cultures in which they operate. It was felt also that emergency planning and management practitioners based their practice on a number of assumptions, which may not always be justified. These assumptions are fed into the emergency planning process and introduce potential vulnerabilities and risks into the system.

We note that there is no universal understanding of risks, and similar risks are perceived differently by different individuals, be they a member of the public or a policymaker. The latter however has potentially serious consequences. This raises several key questions: Is there a common definition of risks in the health emergency setting that can be expressed? How can health hazards and their attendant risks be assessed objectively? Are there possible tools for both policymakers and practitioners that can be developed to aid this?
The communication of risks in the health emergency management context is also of value and it is a subject that presents other potentially fruitful avenues of research; e.g. how can risks be effectively communicated to policymakers? How can they be best communicated to the public? And, how much information do policymakers and/or the public need?

Risk sensitivity

Despite the literature referred to above, our key informants highlighted inconsistencies in sensitivity to various risks, with a perceived over-emphasis on “big bang” single incidents, and a relative neglect of other issues such as heat waves. We note that there is no universal understanding of risks, and similar risks are perceived differently by different individuals, be they a member of the public or a policymaker. Interestingly, although e-Delphi respondents referred to this tangentially in their prioritisation of “the concordance between clinicians’ and emergency planners’ perceptions of capability” they did not consider further research a priority in the fields of risk science, algorithms for risk determination or communication of uncertainties in risk.

The various emergency planning and management organisations may have differing levels of risk sensitivity. This in turn governs their reaction (or lack of) to various hazards. It is also in part influenced by the awareness of the risk itself, and the perceived risk of the hazard. It would be beneficial to gain a better understanding of inter-agency variations in risk sensitivity as well as develop effective methods for identifying and quantifying the risks posed by different hazards. This may help us also to understand why inertia may exist in certain organisations such as the NHS and help identify ways of enhancing their ability to react.

Key implications for practice and research

• Quantify and detail organisational differences in risk perception and why these occur.
• Develop standardised interagency tools for risk assessment.

6.4 Organisational issues

There is often a presumption of uniformity of composition and response by the different emergency management organisations. However, in reality there are marked variations in the different agencies’ understanding of risks, the situation, how they communicate, react and respond to, as well as review and learn from incidents. Even within organisations there may be differing professional cultures and subcultures. A better understanding of
these professional and organisational cultures would be indispensable in understanding how they function and relate to one another, and their impacts on culture clashes.

One in 3 published papers addressed some aspect of organisational behaviour (9.8% communications, 11.5% informatics and intelligence and 11.5% other organisational issues). Inter-agency issues or problems were commonly cited in the thematic analysis of grey literature, and key informants repeatedly identified a need to more fully understand the process of information transfer within and between organisations. Also of interest is the contextual specificity of how the various agencies involved in emergency planning and response are organized and how they relate and work with other agencies.

Although organisational issues were frequently raised in the published literature, this was usually in a descriptive manner in event reports. There appears to be little analysis of organisational factors or behaviours that might facilitate or hinder effective emergency planning. It was interesting to note that most of the key informant interviewees were less concerned about research into “technical issues” of emergency planning and management but were more interested in individual, population and organisational behaviour in emergencies. The e-Delphi respondents, whilst generally more focussed on operational issues, also identified research gaps in organisational factors affecting recovery and crowd behaviour during mass gatherings for example.

6.4.1 Planning versus Plans

We identified an incomplete understanding of the process of emergency planning. Several questions remain unanswered. For example, is the process of planning, the output of planning (i.e. plans) or the actual adherence to plans the key to a successful emergency response? If the latter, how is it possible to actually assess how well a plan is implemented? We also noted that those who write plans are not necessarily the persons who would implement the plan. This raises the risk of a ‘disconnect’ between planning intentions and actual action. We therefore need a better understanding of the process of planning and how quality of planning is assessed.

6.4.2 Top-down versus Bottom-up approaches

There was also a conflict in approaches. In the UK a predominantly top-down model reflects the command and control structures in place for responding to emergencies. This contrasts with practice elsewhere in the world that favours a more community-based approach to disasters. The balance may be that in an acute setting, a top down structure is required, whereas in the recovery phase, the community based approach is
preferable. Managing the transition from one to the other is a challenge for numerous reasons. For example, there is a lack of clarity as to whose responsibility it is, who should be involved, how the roles and tasks are transferred across. In a similar vein, there was also an issue as to how emergency responders and planner should function in an emergency. Some favour a more rigid "standard operating procedure" approach where everything is done in a standard manner. Others favour a more flexible response, whereby the key is to having trained key individuals able to make appropriate decisions.

6.4.3 Reactive versus proactive

The current emergency planning stance in the UK is predominantly reactive to incidents as they occur rather than proactive in their mitigation. This likely reflects the professional backgrounds of the individuals involved and the organisational cultures in which they operate. At the system level, the health service appears much more geared up towards response rather than proactive longer term approaches to hazard mitigation. Emergency planning and management practitioners were also noted to make a number of assumptions, some of which may not always be right. These assumptions are fed into the emergency planning process and introduce potential vulnerabilities and risks into the system. Indeed, one of the blind spots identified was that mundane issues such as business continuity planning and management tended to be ignored by the health system.

6.4.4 Generic versus specific planning

Although nearly 1 in 4 published papers related to emergency planning, most were reports or narrative reviews which provided little evidence to support either generic or specific planning strategies. The key informants interviewed were also divided in terms of favouring "all risk" generic plans versus those specific to particular situations. This was echoed by the e-Delphi respondents who felt preparation for nuclear/radiation and biological incidents and new/emerging threats, as well as the integration of local knowledge and flexibility of plans to reflect changing resources, should be researched.

Key implications for practice and research

- Clarify which of the following operational approaches work best for handling emergencies: flexible versus rigid; top-down versus bottom-up; reactive versus proactive.
- Relative efficacy of generic and specific emergency plans.
- Likelihood of adherence to generic or specific plans by practitioners.
6.5 Emergency management system issues

6.5.1 The organisation of the emergency management system

The Civil Contingencies Act 2004 requires responding organisations to work collaboratively in major incidents and disasters (4). There is therefore clearly a demand for a more ‘joined up’ and ‘whole systems’ approach. In practice, the various organisations respond to emergencies in a multi-agency manner rather than as individual organisations, but what is less clear is the degree of integration and how effective the organisations function as a system. There is therefore a question as to how the emergency management system is configured to deliver not just on the emergency response but across the whole emergency management cycle.

Our study suggested that the emergency management system in the UK is focused on the emergency response element at the expense of other aspects. There was a sense that the UK health community has a very narrow view of emergency planning. There may be a prevailing view within the NHS that this is the responsibility of the emergency services and the few emergency planners within their organisations. As such the broader ramifications of emergency planning and management for the wider health community tend to be ignored. It is also worth looking into how a joined up whole systems approach to emergencies and threats can be encouraged.

One framework currently in use that may be helpful in ensuring a broader approach to emergency planning and management is the US Integrated Emergency Management System (IEMS) model (22). However, we found that the IEMS model does not include all relevant themes, notably omitting cross-cutting issues such as business continuity, organisational behaviour, communications, surge capacity and bio-security. We therefore propose an alternative model adapted from the IEMS model (see Figure 20).

The disaster cycles (Figures 1 and 2) favoured in the UK (20) are considerably simpler than the IEMS model and use considerably broader phase categories. This may not be as useful as a conceptual framework for emergency planners. The alternative model proposed incorporates the key phases from models used in the UK, and in addition expands each of these phases to delineate key elements within each. A more detailed framework may help facilitate emergency planning and ensure all elements are addressed.

Further afield, emergency management is organized differently in other countries. The differences in how the various national emergency management systems are organized are probably the result of how they have developed over time to meet local threats and priorities. These factors make it difficult to assess how well the different systems perform relative to each other. Means of comparing the different systems could be developed. It should not be assumed that the existing UK system is the
ideal and optimal system solution and further work (such as operational research) is required.

**Key implications for practice and research**

- Identify organisation factors contributing to or hampering organisational resilience.
- Develop methodologies for comparing national emergency management systems for health.

**Figure 20. Modified IEMS model proposed**

**Preparation**

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6.5.2 Silos

There is often a presumption of uniformity of composition and response by the different emergency management organisations. However, we identified variations in the different agencies’ understanding of risks, the situation, how they communicate, react and respond to, as well as review and learn from incidents. Issues arising from interagency working and problems with roles and hierarchy were frequent in the grey literature review, occurring in 44% of documents. This is supported by our own previous research amongst PCTs (12).

From the key informant interviews it appears that there are barriers to implementing a truly integrated system, not least because many of the formal agencies operate independently. The hierarchical top-down command and control systems in place as well as rigid protocols and guidance reinforce this situation. Other barriers identified include bureaucratic decision-making processes. Organisations too tend to be resistant to change, and it can be difficult to challenge existing conventions and change cultures within organisations. This was echoed by the e-Delphi respondents who identified “inter-service communication” as an area in need of further research.

**Key implications for practice and research**

- Analysis of organisational cultural differences and how these affect organisational and individual behaviour.
- Analysis of relative efficacy of different interagency structures.
- Practices to encourage effective interagency working.

6.5.3 Engaging the public

Although nearly 10% of published papers addressed the topic of communications and the mass media, these were largely narrative event reports. Problems with accuracy of public information were highlighted in the grey literature review.

Our key informant interviewees were largely concerned that the public had unrealistic expectations of what could be provided and guaranteed by health emergency planning. However, the lay interviewees clearly regarded themselves as having some personal responsibility for their behaviour in response to a crisis, with comments such as “What am I supposed to do? Am I supposed to stay in the house?” They also felt under-engaged by the emergency planning professionals. Equally, the e-Delphi participants prioritised “communicating recommendations to the
public”, “investigating novel ways for planning for major incidents including civil society and other non-governmental organisations”, “the role of volunteers and volunteering” and “the extent of community preparedness” as areas for future research.

A truly integrated emergency management system would consist not only of the formal emergency responders such as the ambulance service, but also the wider health economy including hospitals and primary care. The wider civil society should also be included in this. Ideally, there should be greater inclusivity in the system, as well as flexibility in its response.

Currently the relationship between practitioners, the emergency management system and the public in the UK appears to be less than ideal. Public involvement appears to be minimal and tokenistic. This could be due to public attitudes and expectations, but the status quo is also likely to be reinforced by an emergency management system and culture that is disempowering. As evidence from elsewhere indicates, community resilience and community-based disaster risk reduction can only be achieved through meaningful engagement and empowerment of the community (29,34).

A ‘Cinderella’ topic that was identified was the ethical dimension of issues that occur and how these are resolved. These tended to be unspoken and there does not appear to be much work done on this aspect, and even less credence paid to it.

**Key implications for practice and research**
- What constitutes a resilient community? What factors facilitate and hinder this?
- Which techniques best communicate risk to the public?
- How can public involvement in emergency planning be enhanced?
- What are public views of the ethical issues in emergency planning and are these concordant with those of planners and policymakers?

**6.5.4 What is quality in emergency planning in health?**

Perhaps the ultimate value of any system is the output of that system and the outcomes it achieves. However, we do not appear to know what the ideal system setup for health emergency management in the UK should be and the current system appears to have evolved through chance rather than design. It is not known what constitutes an effective organisation or team, and neither do we know what an ‘effective’ response is or how it can be assessed objectively.
Key implications for practice and research

- Devise validated means of assessing the effectiveness of emergency management systems in responding to major incidents.
- Develop a deeper understanding of the process of emergency planning and how it translates into outcomes.

6.6 Conclusion

In conclusion, numerous issues have been identified where there is value in exploring further. There is a need to build a UK evidence base founded on robust research of individual, organisational and system-level themes in emergency planning. This evidence needs to be translated into action and embedded into organisations with the ultimate aim of developing a health system and community that is resilient to disasters.
References


Appendix 1

Bibliography of grey literature scoped and reviewed

Note: Only the name of the first author is included. All documents produced by organizations other than the HPA, Department of Health or Cabinet Office are included with the label “other organization”.

1. *Framework strategy for dealing with radioactive contamination*, Other organization.
| 23. | Basher, D., Fire in a Southampton University research laboratory. 2006, Other organization. |
| 24. | Bell, S., Summer flooding in the Yorkshire and the Humber case study, Department of Health. |
| 27. | Briggs, R., Anatomy of a terrorist attack. 2011, Other organization. |
| 34. | Coates, T., How can local communities cope with flooding? Understanding local social structures and how these shape collective flood responses. 2010, Health Protection Agency. |
| 36. | Cowen, L., Carlisle storm and flood recovery phase debrief. 2005, Other organization. |
| 39. | Cullen, W., Ladbroke Grove. 1999, Other organization. |

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Project 09/1005/03
42. Fisher, P., Regional impacts of climate change. 2010, Health Protection Agency.
44. Flooding Taskforce, Report on Fermanagh floods 2009. 2010, Other organization.
46. Gale, D., Symposium on Healthy and Sustainable Homes and Communities at the HPA 2009 conference. 2010, Health Protection Agency.
47. Galea, A., A review of firework legislation and acute health effects. 2010, Health Protection Agency.
50. Gurney, I., “Don’t shoot the messenger…” – Lessons identified in communicating with emergency departments during chemical incidents. 2011, Health Protection Agency.
53. Head, S., Overview of sources of information on health and social effects of flooding. 2010, Health Protection Agency.
58. Kettle, N., The concept of a Joint Safety and Health Advisory Cell. 2010, Other organization.

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64. Leadbetter, S., *The new CHEMET service from the Met Office.* 2010, Other organization.


70. Mortimer, D., "*The Irish dioxin incident, December 2008*". 2010, Other organization.


76. Pennington, H., *Public enquiry into Wales E coli O157.* 2009, Other organization.


79. Reid, J., *Lessons from the 7/7 bombings.* 2006, Other organization.


87. Stewart-Evans, J., *"Fire at WasteCare, Garforth, West Yorkshire"*. 2010, Health Protection Agency.


94. Webster, H., *Modelling the plume from the Buncefield Oil depot fire*. 2006, Other organization.


# Appendix 2

## Grey literature coding sheet

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Appendix 3

e-Delphi study: Statements not reaching consensus

Planning for burns incidents is well researched and understood
Planning for incidents involving children is well researched and understood
Hazard vulnerability analysis is well researched and understood
Surge capacity is well researched and understood
Team training is well researched and understood
Command and control is well researched and understood
Span of control is well researched and understood
Management systems is well researched and understood
Protocols for major incident response is well researched and understood
Scene management is well researched and understood
Early phase response is well researched and understood
Response to a traditional big bang (e.g. train/bus crash) incident is well researched and understood
Safety is well researched and understood
Prolonged incidents is well researched and understood
Communications is well researched and understood
Triage sieve in children is well researched and understood
Recognition of chemical syndromes is well researched and understood
Mechanism of injury is well researched and understood
Effects of disasters is well researched and understood
No areas are adequately researched is well researched and understood
Effectiveness of major incident plans (post activation analysis) is well researched and understood
How staff should be rostered during protracted incidents
The impact on morbidity and mortality of all patients during a major incident
The impact on waiting times and length of stay
How to reschedule of cancelled patients
The impact of health service targets
How to build resilience into plans prior to impact
The willingness of staff to work and respond during an incident
What drives for staff to work during an incident
The identification of critical industry sectors by community
The usefulness of business participation in syndromic surveillance
The role of work-related quarantine
The extent of use of personal disaster plans
How to achieve mutual support by ambulance services
The long term financial impact of disasters
The usefulness of a LEAN approach during the major incident response
The efficacy of offsite “cloud” backup for patient and business information
The empowerment of survivors to assume senior roles
The role of business continuity templates

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e-Delphi study: Statements not reaching consensus - continued

The importance of the maintenance of worker travel routes
The degree to which staff understand business continuity planning
Internet security during a major incident
Financial security during and following a major incident
The security of essential services (e.g. electricity and water)
The application of bedside testing in the acute environment
The possibility of real-time risk assessments during response and recovery
The science of risk determination
The role of risk matrices in risk determination
The role of algorithms in risk determination
The methods of effective chemical decontamination
The degree of contamination in the event of unrecognised chemical or biological incidents
The likelihood of school shootings on a per school basis
Earthquake prediction
Is CSCATT truly an all hazards approach
Hazard prediction based on current threat
Understanding the differences between hazard, risk and vulnerability
The response to Heatwave conditions.
The feasibility and effectiveness of “just in time” exercises
Extending capability assessment to include absorbing, buffering and response capacity
The assessment of baseline capability in specialists and generalists
The effectiveness of a comprehensive database of capabilities
Are stadia and mass gathering plans fit for purpose
The capability to handle major burns incidents
The capability to handle CBRN incidents
Simulation methodologies in major incident training
Capability to manage unexpected scenarios
The capability of systems for welfare and child protection
The capability of industrial relations and human resource management systems
The necessary frequency of capability reviews
The use of cell phones
The resilience of cell phone systems
The effectiveness of briefing formats (e.g. SMEAC, SBAR)
The use of social networks and web-based platforms
Communicating the uncertainties of risk assessment
How to effectively combat rumour
Language and cultural issues in CBRN incidents
The prevalence of pre-created, vetted communications ready for use
The effectiveness of runners
The effectiveness of loudspeakers
How much communication training is needed to be effective during a major incident
e-Delphi study: Statements not reaching consensus - continued

How to build and integrate the capacity of lay responder systems
Determining the need for decontamination
Interagency / governmental / private sector co-ordination
The impact of guideline compliance on outcome
The development of performance indicators for pre-hospital command and control
The adequacy of current first on scene roles
Should triage be the goal of the first on scene team
Response to the aged and vulnerable populations
Validity of using second life for preparation
The safety of wearing respiratory protection for long periods
The psychological impact on responders and patients
The importance of cultural sensitivity
Communication and social inclusion strategies
How to persuade people to return to previously contaminated areas
What are the effective strategies for the transition from typical receiving facilities to surge capacity venues and back
Backup mechanisms for healthcare records
Are all levels of healthcare committed to ensuring recovery
Establishing who should pay for recovery
Recovery in the aged and vulnerable populations
The optimum time needed to fully establish and learn lessons
Understanding resilience – especially for small businesses
The impact and contribution of informal networks in organisational response
The optimum civilian-military co-operation
Operationalising civilian-military teams
The role of followership
Understanding the response of different organisations based on perception
The empowerment of middle managers and workers to make decisions
Why people just get on with things and don’t complain
Assessment of the organisational development ad support for emergency planning
The role of collaborative working between health care trusts (hospitals and ambulance services)
The use of non-technical skills during an incident
The process of decision-making and responsibility
Responses in different sectors (psychiatric hostels, homeless, handicapped)
The use of on scene IT to facilitate better gold command
The use and accuracy of technology based triage and treatment aids
The use of an IT based bed bureau system
The usefulness of computer modelling for planning active management
The potential usefulness of bar coding casualties

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e-Delphi study: Statements not reaching consensus - continued

The use of augmented surveillance networks
The use of technology to log verbal communications
The use of telemedicine to facilitate triage and treatment for children, geriatrics and those with special healthcare needs
The problems of interacting with a computer when under stress
The usefulness of IT in the acute phase
Use of tablet computers
The use of pool data and skill set databases
The management of staff sickness during pandemics
The impact of not having policies that allow healthcare workers to expand their roles during a disaster
The likelihood of compliance with protocols during CBRN incidents
The best way of reducing staff distress, absenteeism and burn-out during CBRN incidents
The social and behavioural response of healthcare workers
On the day shift/support / rotation systems analysis
The effectiveness of cross-training initiatives in managing the staff resource challenge
How well trained do staff feel and how well trained are they
The healthcare manager response
Is training for very rare disasters (nuclear, radiation) necessary
Surge planning for scarce skills
Do you think there are any other priorities for research?
The extent to which a facility / business / agency’s administrative leader is involved in /interested in disaster preparedness and the impact of this
Determining the most effective way of decontaminating respirators
How to prevent the worried well / low risk from overwhelming resources
What data can behavioural scientists provide to modellers to assist their work during a disaster
The role of centrally procured and stored equipment
How to Triage sort for children of different ages
Prevention research (for major incidents)
Should major incident planning form a greater part of curricula