The University of Sheffield

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DEVELOPING EVIDENCE-BASED PRACTICE IN EMERGENCY PLANNING AND MANAGEMENT

MD Thesis

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DECLARATION OF CONFLICT OF INTEREST

I have had the following potential conflicts of interest in undertaking this research:

1) From November 2010 – November 2012 I was a co-applicant and project lead for the Emergency Planning in Health study that was funded by the NIHR HS&DR programme (as mentioned above).
2) As of December 2013 I currently work as a Consultant in Communicable Disease Control at Public Health England and in my role am directly involved in emergency planning and management in the UK.

[1] Previously the Service Delivery and Organisation (SDO) programme pre-January 2012.

ETHICS

I applied and received ethics approval for the qualitative study in the UK from the NHS Sheffield Research Ethics Committee on 4.10.10. (REC reference number 10/H1308/67). (Appendix 1)

Likewise, ethics approval for the qualitative study in Nepal was sought and obtained from the ScHARR Research Ethics Committee on 15.10.13. (Appendix 2)

PUBLICATIONS AND PRESENTATIONS

The research carried out as part of this MD has been reported through presentations at academic and professional body meetings, as well as in a report and through publications in peer-reviewed journals:

❖ *REPORT*

Lee ACK, Challen K, Gardois P, Mackway-Jones K, Carley SD Phillips W, Booth A, Walter D, Goodacre S. *Emergency Planning in Health: Scoping study of the international literature, local information resources and key stakeholders. Final report*. NIHR Service Delivery and Organisation programme; 2012.

❖ *PAPERS*

Lee ACK, Booth A, Challen K, Gardois P, Goodacre S. Disaster management in Low- and Middle-Income Countries: Scoping review of the evidence-base. *Emergency Medicine Journal* 2014;0:1-6. Doi:10.1136/emermed-2013-203298

Lee ACK, Phillips W, Challen K, Goodacre SW. Emergency Management in Health: Key Issues and Challenges in the UK. *BMC Public Health* 2012, 12:884.

Challen K, **Lee ACK**, Booth A, Gardois P, Buckley-Woods H, Goodacre SW. Where is the evidence for emergency planning: a scoping review. *BMC Public Health* 2012; 12:542.

❖ *ORAL PRESENTATIONS*

Lee A. '*Addressing the intelligence gaps in emergency planning'*. Research dissemination workshop organised jointly by ScHARR and the UK Emergency Planning Society (EPS), 23rd January 2013.

Lee A, Challen K, Booth A, Gardois P, Goodacre S. '*The evidence for emergency planning in the UK: Finding the gaps*' (Oral presentation), 1st Emergency Management Conference, Nottingham Trent University, Nottingham, November 2012.

Lee A, Challen K, Booth A, Gardois P, Goodacre S. '*The evidence for emergency planning in the UK: Finding the gaps*' (Oral presentation), HPA Conference, September 2012.

Lee A. '*Learning from disasters: Lessons from around the world*'. Bezmialem Vakif University Disaster Congress, Istanbul, October 2014.

❖ *POSTER PRESENTATIONS*

Lee A, Challen K, Booth A, Gardois P, Goodacre S. '*The evidence for emergency planning in the UK: Finding the gaps*' (Poster), Health Services Research Network Conference, June 2012.

Lee A, Challen K, Booth A, Gardois P, Goodacre S. '*Where is the evidence for emergency planning and management*?' (Poster), HPA Conference, September 2011.

Lee A, Challen K, Booth A, Gardois P, Goodacre S. '*Where is the evidence for emergency planning and management*?' (Poster), 5 Nations Health Protection Conference, Conwy, 17 May 2011.

GLOSSARY OF ABBREVIATIONS

A&E	Accident & Emergency
ACCOLC	Access Overload Control
AQC	Air Quality Cell
CBRN	Chemical, biological, radiological and nuclear hazards and threats
CCDC	Consultant in Communicable Disease Control
CCS	Civil Contingencies Secretariat, UK
CHAPD	Chemical Hazards and Poisons Division, Health Protection Agency
CNDRC	Central Natural Disaster Relief Committee
DfID	Department for International Development, UK
DH	Department of Health, UK
DRR	Disaster Risk Reduction
EBM	Evidence-based medicine
EBP	Evidence-based practice
ECHO	European Commission's Humanitarian Aid and Civil Protection department
ED	Emergency Department
EPC	Emergency Planning College, Easingwold, UK
EPM	Emergency planning and management
EPO	Emergency Planning Officer
EPRR	Emergency planning, preparedness, response and recovery
FEMA	Federal Emergency Management Agency (US)
GIS	Geographical information system
HIC	High-Income Countries
HPA	Health Protection Agency (UK)
IDNDR	International Decade for Natural Disaster Reduction
IEMS	Integrated Emergency Management System
IFRCS	International Federation of Red Cross and Crescent Societies
IGO	Intergovernmental organisation
INGO	International non-governmental organisation
IRDR	Integrated Research on Disaster Risk
JICA	Japan International Cooperation Agency
LMIC	Low- and Middle-Income Countries
LRF	Local Resilience Forum
MERS	Middle-East Respiratory Syndrome

MMU	Manchester Metropolitan University
MOHA	Ministry of Home Affairs, Nepal
MSF	Medecins sans Frontieres
NDRA	National Disaster Relief Act, 1982, Nepal
NDRRMC	National Disaster Risk Reduction and Management Council, Philippines
NGO	Non-governmental organisation
NHS	National Health Service, UK
NIHR	National Institute for Health Research
PCT	Primary Care Trust
PPRR	Prevention, preparedness, response and recovery
SARS	Severe Acute Respiratory Syndrome
SECF	Sheffield Emergency Care Forum
ScHARR	The School of Health and Related Research, the University of Sheffield
SHA	Strategic Health Authority
SOPs	Standard Operating Procedures
STAC	Scientific and Technical Advisory Cell
UN	United Nations
UNDP	United Nations Development Programme
UNHCR	United Nations High Commissioner for Refugees
UNISDR	United Nations International Strategy for Disaster Reduction
USAID	United States Agency for International Development
WADEM	World Association for Disaster & Emergency Medicine

ABSTRACT

BACKGROUND

Emergency planning is essential to mitigate disasters and ensure appropriate emergency responses. However, it is imperfect and rarely 'evidence-based'. The extent of the evidence-base and how it is utilised is also unclear. This thesis scopes the evidence-base from a health perspective, and explores the determinants of evidence-based practice in this field.

METHODS

Three scoping reviews of published literature including British grey literature were conducted to map the evidence-base. Two further studies involving key informant interviews in the UK and Nepal were then conducted to understand how evidence was used and identify determinants of evidence-based practice in this field. A thematic approach was then applied during data analysis for key themes.

FINDINGS

Many publications originate from high income countries, especially North America. Most were observational and unsystematically reported commentaries and event reports. Whilst many addressed emergency planning and response issues, few covered disaster mitigation or recovery. More disaster research especially from LMIC settings is required.

The UK interviews revealed greater practitioner focus on operational aspects. Knowledge gaps included individual and organisational behaviour in emergencies, public engagement and community disaster resilience. There were issues with knowledge acquisition, dissemination and utilisation, and ascertaining the optimal system configuration. Interviews in Nepal uncovered further barriers to evidence-based practice such as contextual factors (e.g. poverty), local custom and culture, weak legislative infrastructure, and limited demand and accessibility of the evidence-base.

CONCLUSIONS

The validity and generalisability of existing disaster literature is unclear and little evidence synthesis has been performed to inform policy and practice. What constitutes "evidence" is also contested. Various knowledge management issues exist. Current knowledge gaps are diverse, including socio-behavioural aspects, operational processes and organisational configuration issues. Barriers to evidence-based practice include political factors especially in settings where governance, legislation

and leadership are weaker. Promoting evidence-based practice will require individual, organisational and system culture change.

‘The issue is not whether emergencies will happen but when and how frequently.’

Chapter 1: Background and rationale for the study

1.1 Introduction

As a phenomenon, nothing quite captures the imagination and interest of the media, public and politicians alike as a disaster. It is an emotive and visceral event that generates morbid fascination for outsiders looking in and occasionally for the individuals caught up in the disaster as well. It is not uncommon following a natural disaster in a faraway country for there to be considerable public interest generated that is in turn fed by the ensuing media coverage. Substantial sums of public donations to disaster response charities are often raised, and there is also often a mass influx of volunteers to disaster zones in an attempt to "help" the survivors of the disaster. Some of the help may indeed be beneficial but not uncommonly it can at best be of little use, and at worst, harmful to the recipient beneficiaries.(Lee, 2005)

Just as quickly as the global public interest to a disaster event arises, like many acute disasters, this interest can just as quickly be supplanted by the next media interest story. The survivors are left amidst the hubris from the disaster and the initial response to clean up as best as they can to restore some semblance of normality back to their lives.

The media stories surrounding each disaster often follow what appears to be a fairly formulaic pattern. There is the initial coverage of the disaster and its "calamitous" consequences where human stories of individual loss predominate.(Barnes et al., 2008) This is then followed by the reporting of the heroic efforts by aid workers (and particularly the foreign agencies) responding as best as they can against the backdrop of considerable difficulties and challenges. And finally, there is the post mortem where the response of the various government agencies of the affected state are inquisitorially criticised, perhaps unfairly one could argue, for their lack of adequate preparedness and planning, suboptimal response and lacklustre recovery. The media seeks out a compelling story, reporting not only on the loss of lives and property, but also attempting to ascertain if the damage was preventable, and if so, who is to blame.(Vasterman et al., 2005)

This thesis is an exploration of the field of disaster management, looking particularly at the latter, i.e. responses by agencies to disasters including emergency planning, preparedness, response and recovery (EPRR).

1.2 Disasters, emergencies and major incidents

1.2.1 Definitions

The term '*disaster*' is often used (and misused) in common parlance, and is frequently used interchangeably with other synonymous terms such as '*emergencies*' and '*major incidents*'. Another term commonly conflated with disasters and emergencies is '*hazards*'. These terms hold subtle different meanings in different contexts with the terms 'emergencies' and 'major incidents' more commonly used in the UK, Australia and New Zealand, and 'disaster' in the United States and the international humanitarian aid sector. It is therefore important from the outset that we clarify the definitions of these terms as will be used in this thesis.

Hazard

A hazard is the inherent property of a material or a situation to cause harm.(FEMA, 1997) Hazards can be natural or manmade (anthropogenic) phenomena that can threaten lives or property. Natural phenomena include for example heavy rainfall, storm surges, cyclonic storms, and earthquakes. Manmade phenomena can be technological or intentional in nature. Examples include industries that handle toxic chemicals, accident prone motorways, transportation of nuclear waste products from nuclear power plants, overcrowded slum housing, and so forth. A hazard carries the threat of harm, and only becomes a disaster when this threat is realized resulting in lives lost and property damaged and destroyed.

A more detailed categorisation of hazards has been published in 2014 by the Integrated Research on Disaster Risk (IRDR): the *Perils Classification and Hazards Glossary*.((IRDR), 2014) The IRDR was set up by the International Council for Science (ICSU) together with the International Social Science Council (ISSC) and the United Nations International Strategy for Disaster Reduction (UNISDR) in 2010. The Peril Classification and Hazard Glossary is one means of promoting congruence in definitions used worldwide. In this document, families of hazards are described e.g. geophysical, hydrological, meteorological, climatological, biological and extra-terrestrial. Within each family of hazards are related generic hazards (also known as 'main events') for example volcanic activity and earthquakes within the geophysical hazards family. In turn, there are specific events ('perils') associated with each generic hazard that may result in some human or physical consequence or loss, e.g. rockfall or fires triggered by earthquakes.

Major Incident

The term 'major incident' refers to a complex event that requires the coordinated emergency responses of several different agencies such as fire and rescue services, police, ambulance service and local authorities. In this regard, all emergencies therefore are major incidents as they will require a multi-agency response. In the UK context, a major incident is defined as

> "…any emergency that requires the implementation of special arrangements by one or more of the emergency services, the NHS or the local authority for:
>
> - initial treatment, rescue and transport of a large number of casualties
> - the involvement either directly or indirectly of large numbers of people
> - the handling of a large number of enquiries likely to be generated both from the public and the news media, usually to the police
> - the need for the large-scale combined resources of two or more of the emergency services
> - the mobilisation and organisation of the emergency services and supporting organisations to cater for the threat of death, serious injury or homelessness to a large number of people."(Stuart-Black et al., 2008)

Specifically, for the NHS, it has been defined as:

> "Any occurrence that present serious threat to the health of the community, disruption to the service or causes (or is likely to cause) such numbers or types of casualties as to require special arrangements to be implemented by hospitals, ambulance trusts or primary care organisations." (Stuart-Black et al., 2008, Department of Health, 2005)

The NHS Guidance(Department of Health, 2005) makes further distinctions as to the scale of the incidents, as ***major***, ***mass*** or ***catastrophic***, as described in the table below.

Table 1. Types of Major Incidents (Stuart-Black et al., 2008)

Major – These are incidents where there are likely to be multiple casualties (numbering in the tens), requiring urgent response with fewer resources available. These are incidents that are out of the ordinary but the responding organisations are able to maintain normal levels of service. **Mass** – These are considerably larger-scale events that affect potentially hundreds of people and cause significant disruption for several days. **Catastrophic** – These are events of potentially catastrophic proportions that cause severe disruption of health, social care and other functions that exceed even the collective local capability within the health system.

Disaster

To define 'disasters', there is a significant distinction in terms of magnitude, duration of impact and extent of the damage and loss resulting from the event. Also referred to occasionally as '*catastrophes*', disasters are often associated with having calamitous consequences and of catastrophic proportions. (Alexander, 2002) They are non-routine events that often occur with little warning. Using the typology stated earlier, disasters could alternatively be termed as catastrophic major incidents.

In the UK civil protection context, a disaster is defined by the Cabinet Office as:

> "… any event (happening with or without warning) causing or threatening death or injury, damage to property or the environment or disruption to the community, which because of the scale of its effects cannot be dealt with by the emergency services and local authorities as part of their day-to-day activities".(Cabinet Office, 2006)

It is perhaps noteworthy that the UK definition is very much from a service provider perspective and ignores the role that the local population and communities may play in the response. It is also notable that there is potentially a degree of subjectivity in this definition of disaster.

Internationally, the definition put forward by the UNISDR for a disaster is:

> "A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources."

The UNISDR definition also often describes disasters as the result of a combination of:

> "… the exposure to a hazard; the conditions of vulnerability that are present; and insufficient capacity or measures to reduce or cope with the potential negative consequences."

Another definition used by the Centre for Research into the Epidemiology of Disasters (CRED), a World Health Organisation Collaborating Centre focused on disaster research, defines a disaster as an event where at least one of the following criteria must be fulfilled:[2]

- Ten (10) or more people are reported to have been killed.
- Hundred (100) or more people are reported to have been affected.
- Declaration of a state of emergency.
- Call for international assistance.

This definition uses a more objective criteria based approach to help define when a state of disaster exists. This definition has also been incorporated into the *Peril Classification and Hazard Glossary* as described earlier. That said, one potential criticism of the CRED definition for a disaster is that an event could result in for example ten or more casualties, and yet remain well within the response capabilities of local emergency services. Such an event may not necessarily meet the qualitative criterion (situation exceeding the local capacity to cope) as used in the UK or the UNISDR definition for a disaster.

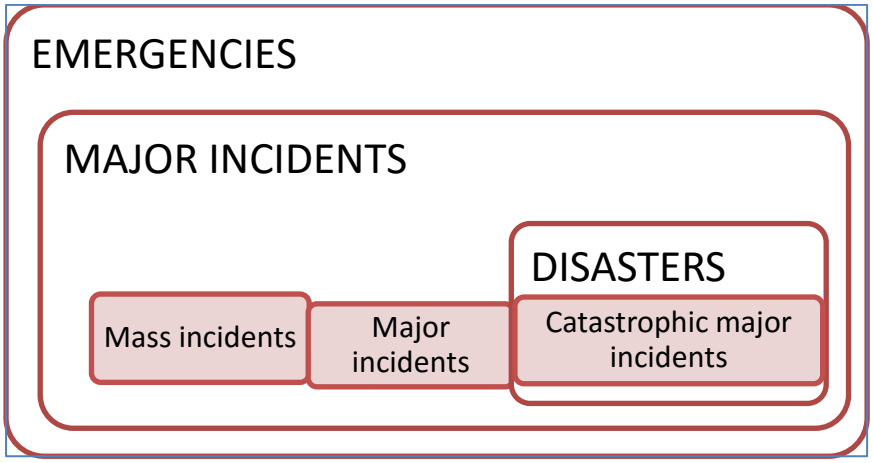
Emergency

The term 'emergency' has been defined as 'an exceptional event that exceeds the capacity of normal resources and organisation to cope with'.(Alexander, 2002) In the UK context specifically, it has been defined by the *Civil Contingencies Act 2004* as 'an event or situation which threatens serious damage to human welfare; serious damage to the environment; or war, or terrorism, which threatens serious damage to the security of the United Kingdom'.(Cabinet Office, 2004)

[2] The definitions and criteria are available from the following CRED website: http://www.emdat.be/criteria-and-definition

It is apparent that there is considerable overlap in the definitions used for the various terms. This overlap can be graphically illustrated as in Figure 1 below. For the purposes of this thesis, the term 'emergencies' will be used to collectively describe all such serious events ranging from major incidents to full-blown disasters. Where the term 'disaster' is used, this will specifically refer to those incidents of catastrophic proportions that exceed the collective capacity of local organisations and communities to respond to.(Alexander, 2002)

Figure 1. Graphical depiction of definition used



1.2.2 Types of disasters and major incidents

Disasters can be categorized by their precipitating origin as '***natural disasters'***, '***social disasters***' and '***technological disasters***'.(Alexander, 2002) (Table 2) The former includes geological events such as earthquakes and tsunamis as well as extreme climatic and weather events such as droughts, hurricanes, tornadoes and floods. It also includes biological events such as outbreaks of infectious disease, insect infestations and crop blights. Social disasters include wars, civil unrest, riots, crowd crushes (e.g. Hillsborough stadium incident), and terrorist attacks. Technological disasters include accidental chemical releases, toxic spills, nuclear power plant meltdowns, and transport accidents.

Perhaps of note, not all of the precipitating events (or hazards) has a human population consequence and do not constitute a disaster. For example, in 2010 at around the time of the Haiti earthquake disaster, a similar strength earthquake occurred in a remote Guatemalan region where there was minimal loss of human life or property.

Table 2. Classes of hazards (Alexander, 2002)

Class of hazard	Examples	Recent disasters
Natural (geophysical)	Earthquakes	Beichuan (2008), Haiti (2010)
	Tsunamis	Indian Ocean Tsunami Disaster(2004)
	Droughts	East Africa drought (2011)
	Hurricanes/Cyclones	Cyclone Nargis (2008)
	Floods	Thailand (2011), England (2013-14)
	Storm surge	England storm surge (2013)
	Infectious disease outbreaks	West Africa Ebola outbreak (2014), Swine flu epidemic (2009), SARS (2003), Zimbabwe Cholera epidemic (2008)
Technological	Industrial accidents	Bhopal disaster (1984)
	Mining incidents	Soma mine disaster, Turkey (2014)
	Toxic oil spills	Exxon Valdez incident (1989), Deepwater Horizon oil spill in the Gulf of Mexico (2006)
	Nuclear plant meltdown	Chernobyl (1986)
	Transport accidents	Air France flight 447 (2012)
Social	Terrorist attacks	7/7 London bombing (2005), 9/11 attacks (2001)
	Riots	London riots (2013)
	Crowd crushes	Hillsborough disaster (1989)
	Wars	Second Sudan civil war (1983-2005), Syrian uprising/civil war (2013-present)
Combination/ Compound disaster	Natech disaster[3]	Fukushima disaster(2011)

Similarly, a chain of adverse events could transform smaller events into a much larger disaster. One classic example is the Fukushima disaster in 2011 where an initial earthquake off the Pacific coast of Tohoku, Japan triggered a massive tsunami which in turn caused significant damage to the Fukushima Daiichi nuclear power plant that led to a nuclear meltdown of three of its reactors. This ***combination*** or ***compound disaster*** is also known as a '***Natech disaster***' (Natural-Technological). Combination (compound) disasters are not limited to a single hazard, can occur sequentially or simultaneously, and when they do, tend to worsen consequences.

[3] Natech disaster – A disaster that has natural and technological roots.

Disasters can also be categorized by their speed of onset (Table 3).(Stuart-Black et al., 2008) Some disasters are acute 'big bang' events that occur rapidly within hours, days and weeks, e.g. cyclones and flooding. Other disasters manifest themselves gradually over months and years, also known as 'rising tide' or 'creeping disasters',(Alexander, 2002) such as the effects of drought and famine.

A ***humanitarian crisis*** is described as an event or series of events that critically threatens the safety, security, health or wellbeing of a community, usually involving a wide geographical area.(Humanitarian Coalition, n.d.)

Table 3. Examples of major incident/disaster types categorised by speed of onset.(Stuart-Black et al., 2008)

Big bang – sudden onset, rapid development with the bulk of damage and casualties occurring early on. Examples include major transport accidents or industrial incidents (e.g. explosions and fires)
Rising tide – slow creeping onset that builds up over time. Examples include epidemics of infectious diseases and droughts.
Cloud on the horizon – an incident occurring elsewhere that may have local consequences, e.g. nuclear accident elsewhere, epidemic of infectious diseases, war and terrorism.
Headline news – incidents that have considerable public, political and media alarm, e.g. Ebola outbreak in West Africa (2014)

The United Nations has also described a ***complex humanitarian emergency*** (CHE) as a humanitarian crisis in a country or region where considerable breakdown of civil authority has occurred as a result of external or internal conflict. This necessitates an international response that extends beyond the mandate or capacity of any single and/or ongoing UN country program.(Burkle Jr, 1999) They are often characterized by marked insecurity, mass population displacement, which in itself creates hazardous conditions for a secondary disaster such as infectious disease outbreaks, as well as severe economic effects such as hyperinflation, unemployment, and market collapse. Food security may decline.

1.2.3 Consequences of disasters

Disasters can cause widespread death, damage and destruction. The consequences tend to also be varied in scope,(Coppola, 2006) including the

- The loss of life and casualties with multiple injuries
- Displacement of people, separation of families and communities
- Damage to transport infrastructure

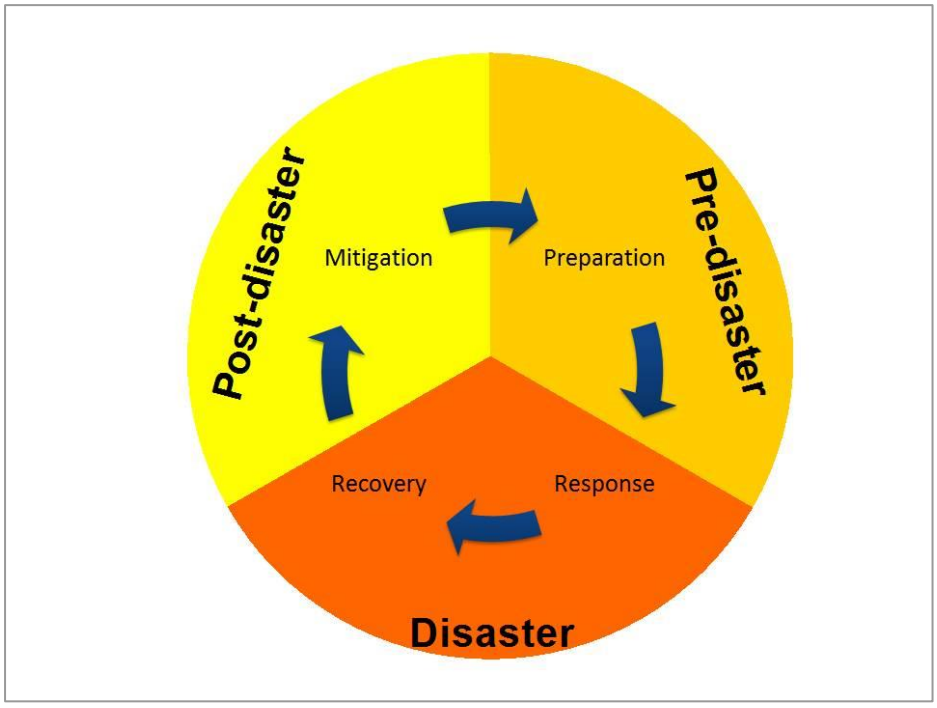
- Damage to communication infrastructure
- Loss of housing and shelter
- Damage to utilities
- Economic damage
- Degradation of health service functions

1.3 Managing disasters and emergencies

1.3.1 The Disaster Cycle

The different phases of the disaster can be illustrated graphically in chronological order: pre-disaster, disaster and post-disaster. (See Figure 2) Each of these chronological phases in turn has associated activities undertaken by those agencies involved in emergency management. There are a multitude of such activities ranging from hazard analysis and assessment, disaster informatics and intelligence, emergency planning, business continuity planning and management, incident management, establishing command and control mechanisms, assessing emergency needs, sourcing funding and resources to dealing with an incident, governance issues including monitoring and accountability of programmes, organisational learning and so forth.

Figure 2. Disaster cycle with four phase emergency management cycle overlaid.

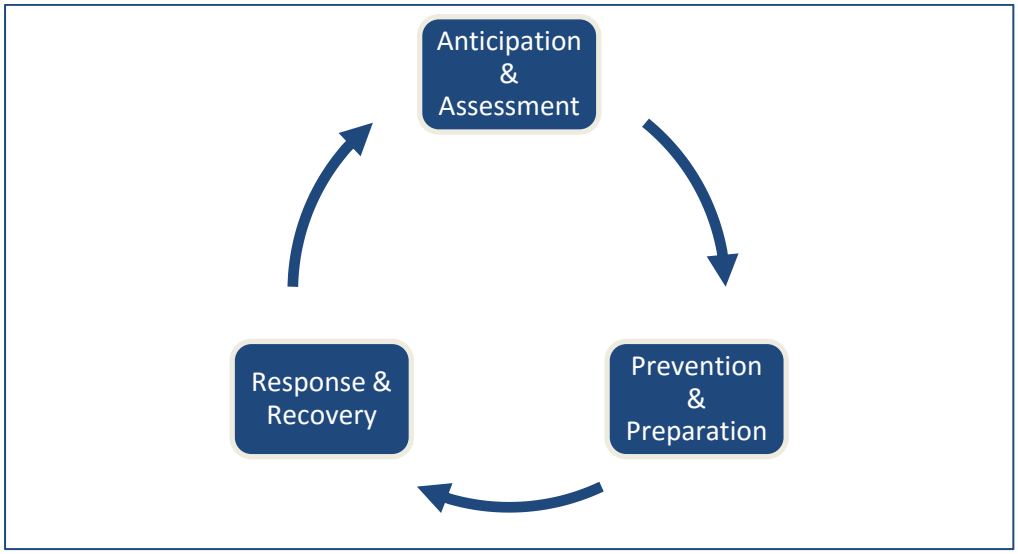


The various emergency management activities can be further categorized into different categories as part of a disaster- or emergency management cycle. There are several similar emergency

management frameworks that have been used over the years such as the *PPRR* approach[4] as well as three- and four-phase disaster management cycles (Figures 2 & 3), that are in current use.(Alcock, 2006, Andrews et al., 2010, Asgari, 2006a, Coppola, 2006, Stuart-Black et al., 2008) Unsurprisingly all the models exhibit considerable similarities.

The ***Mitigation*** and/or ***Prevention*** category refers to those activities undertaken to minimize if not nullify the hazard or threats posed by the hazard. The ***Preparedness*** or ***Preparation*** phase pertain to activities such as the planning and training for an emergency, as well as emergency exercises undertaken to test the system and to maintain operational readiness to respond to an emergency. The ***Response*** phase covers all activities provided (usually) by the statutory emergency services to an emergency. This takes place in the initial acute phase of the incident that is usually short lived but could be prolonged in some cases. Finally, the ***Recovery*** phase refers to remediation activities undertaken in the aftermath of an emergency that seeks to rebuild, restore and rehabilitate the affected population and services back to its original pre-disaster state. It has been more formally described as 'the coordinated efforts and processes to effect the immediate, medium- and long-term holistic regeneration of a community following a disaster'. (Stuart-Black et al., 2008, Alexander, 2002)

Figure 3. Three phase emergency management cycle



Of note, the terms *Mitigation* and *Prevention* have often been used synonymously. The UNISDR defines mitigation as "the lessening or limitation of the adverse impacts of hazards and related disasters".[5] This is based on the understanding that the adverse consequences of hazards often cannot be fully prevented. However, the scale or severity of the adverse consequences can be

[4] PPRR – Prevention, preparedness, response & recovery.
[5] UNISDR terminology section is available on its website at: http://www.unisdr.org/we/inform/terminology

considerably reduced through various interventions. Examples of mitigation measures include better building engineering and construction in earthquake zones to “earthquake-proof” such buildings. These interventions could make the building significantly less prone to collapse in an earthquake, but cannot fully guard against this.

The UNISDR definition for prevention is “the outright avoidance of adverse impacts of hazards and related disasters”. The concept of disaster prevention used in this context refers to action taken pre-emptively with the goal of avoiding completely any potential adverse impacts of a hazard. Examples include the building of dams to eliminate flood risks. However, the complete avoidance of adverse impacts is not always possible. As a consequence, disaster prevention activities are more accurately mitigation activities. It is partly for this reason that the terms ‘prevention’ and ‘mitigation’ are used interchangeably.

In medical parlance, prevention is subdivided into primary, secondary and tertiary prevention. Primary prevention aims to stop diseases (the adverse event) from occurring in the first place. Secondary prevention seeks to detect and treat disease that is as yet asymptomatic, whilst tertiary prevention aims to prevent further deterioration or adverse consequences in those already affected with the disease. This medical understanding of prevention shares some complementarity with disaster prevention. Disaster mitigation could be seen as a form of secondary or tertiary prevention. However in the disaster prevention field, primary prevention is rare as it not always possible to prevent naturally occurring hazards from happening for example, e.g. rainfall, cold weather spells, or earthquakes. Consequently, disaster prevention tends to be primarily mitigation, i.e. preventing the adverse consequences of the initial hazard (secondary prevention) or the knock on effects of the initial adverse consequence (tertiary prevention). For the purpose of this study, I will use the terms mitigation and prevention interchangeably.

1.3.2 Emergency planning and management

Emergency planning is defined as

> ‘A coordinated, cyclical process of planning, implementation, evaluation and learning which aims to increase the capability of society to prevent, protect against, respond to, and recover from any occurrence which presents a serious threat to the health of the community, or disrupts the health care system, or causes (or is likely to cause) such numbers or types of casualties as to require special arrangements to be implemented by one or more health care organisations’.(Department of Health, 2005)

Emergency planning includes a range of activities such as business continuity planning, emergency planning, training and exercises, as well as the planned response to emergencies, and disaster recovery.(Stuart-Black et al., 2008) Emergency planning attempts to anticipate the consequences of disasters, and make plans and preparations to minimize or prevent the adverse consequences from happening. As such, the output of emergency planning is the development of planned responses to cope with a variety of situations. As disasters have wide ranging effects, a multi-sectoral approach is often needed.

The rationale for emergency planning is that it leads to more effective management of an emergency when it occurs that in turn minimizes loss of life and damage to property, helps restore communities back to its pre-disaster state more quickly, and ensures that future disasters are less likely to occur. Whilst not all disasters are avoidable, their worst consequences can be mitigated and minimized through adequate disaster preparedness and planning.(Quarantelli, 1999) Indeed, the cost of responding to a disaster could far exceed the cost of preparing for them.(Anderson, 1991)

However, this interpretation of emergency planning defines it as planning activities carried out from the perspective of emergency preparedness. It is seen as distinct from ***major incident management*** which refers to activities carried out as part of the emergency response phase. There are further qualifying distinctions for major incident management where in some fields it is used from a medical perspective to describe the clinical management of casualties and their injuries and excludes the non-medical operational aspects of the emergency response.

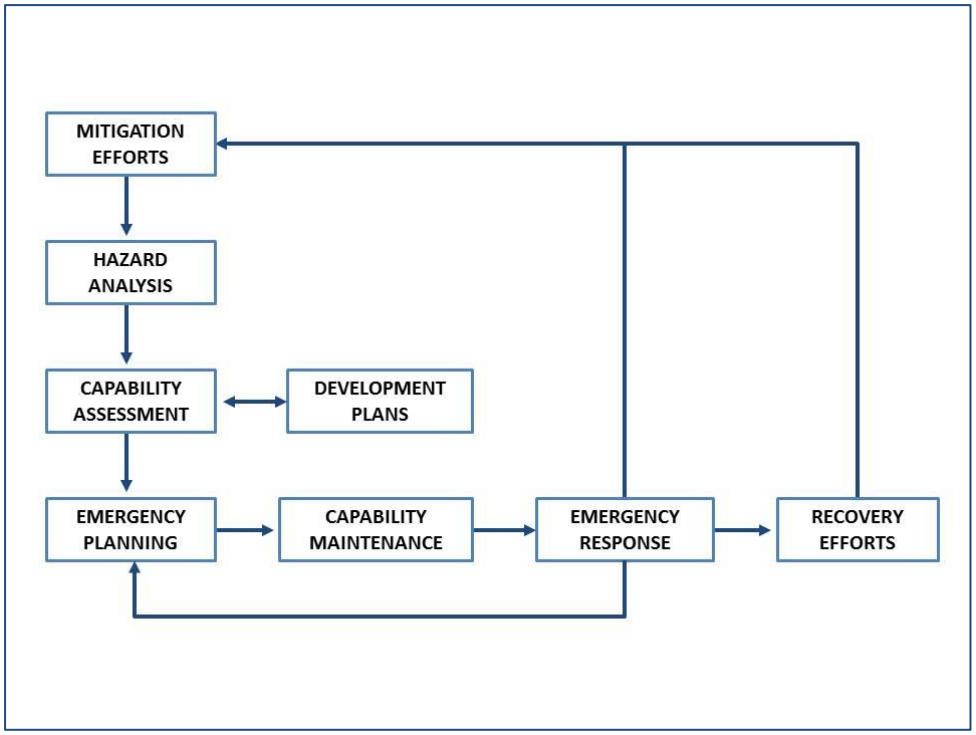
Both these definitions of emergency planning and major incident management are fairly narrow in scope and do not incorporate the considerable breadth of activities carried out throughout the disaster cycle from mitigation, preparation through to response and recovery. In this thesis, a more inclusive term, '***emergency planning and management***' (EPM) will be used to capture all planning and management activities that are associated with emergencies. As stated above, the various emergency management activities occur in a continuum throughout the disaster cycle. In addition, the actual response by services and various agencies to emergencies is to varying degrees a managed response and inherently some amount of planning is undertaken. This is particularly in view of the need for collaborative actions to be undertaken with various other stakeholders and agencies. Finally, this thesis seeks to explore the prevailing culture of emergency planning and management participants and as such a more unified term that encompasses the whole field is required.

1.3.3 Integrated Emergency Management System (IEMS)

The impacts of disasters are widespread and require a multi-sectoral response. It has long been recognized that in such situations, due to the number and diversity of responding agencies involved, there is an urgent need for effective coordination and collaborative action so that there is an integrated response.(Stuart-Black et al., 2008) This aspirational state of coordinated responses has been termed as '***integrated emergency management***'.(McLoughlin, 1985)

Attempts have been made to characterize this concept more fully including the formulation of more complex disaster management frameworks such as the Integrated Emergency Management System (IEMS) model as used by the US Federal Emergency Management Agency (see Figure 4). The IEMS model elaborates further the emergency management cycle and identifies additional broad categories including hazard analysis, capability assessment, capability maintenance, and development plans.(McLoughlin, 1985, FEMA, 1997) Unsurprisingly, there are overlaps with the simpler three- and four- stage emergency management cycle frameworks described earlier.

Figure 4. Integrated Emergency Management System framework



The key emergency management categories described in the IEMS framework(McLoughlin, 1985) are briefly defined as follows:

- **Hazard Analysis** – To identify hazards that may potentially threaten the community

- **Capability Assessment** – To assess what resources are available and identify gaps
- **Emergency Planning** – To make plans and preparations in anticipation of a disaster
- **Capability Maintenance** – This involves updating emergency plans, training staff and exercising plans to ensure readiness to respond to a disaster
- **Emergency response** – These are the immediate actions undertaken to save lives and protect physical property
- **Recovery** – These activities help restore the affected community back to its pre-disaster state
- **Mitigation** – These planned actions help prevent and/or minimize the effects of (further) hazards
- **Development plans** – Plans and actions to address gaps in capability identified.

1.4 Trends in disasters

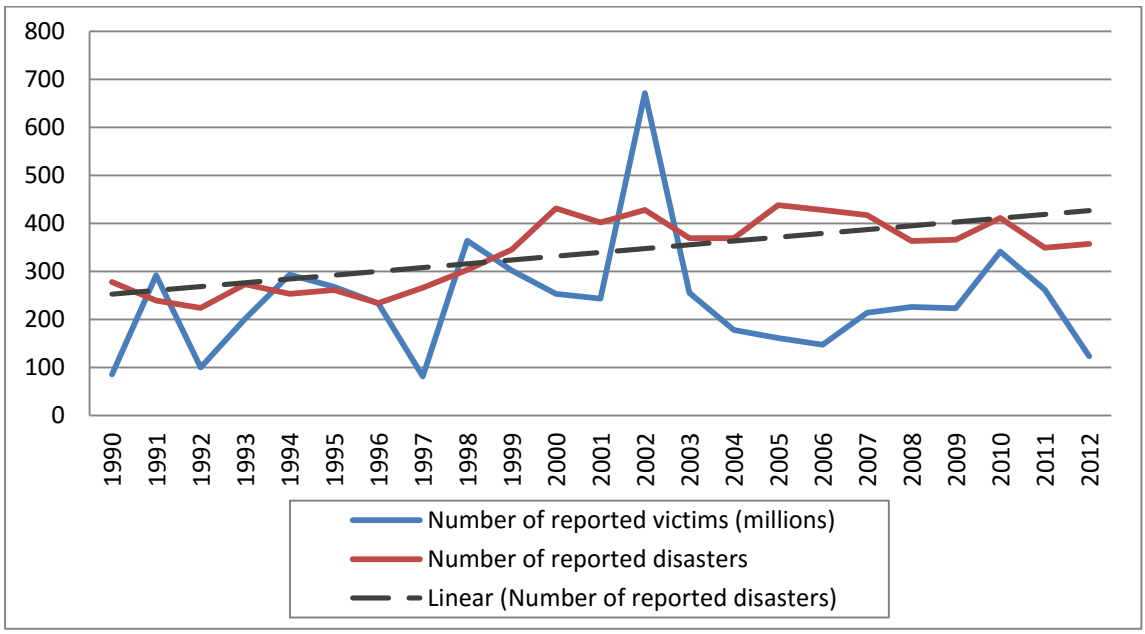
Disasters are not new phenomena and have occurred over millennia with some events having catastrophic proportions such as the Egypt-Syria earthquake of 1201 which left more than a million dead,(Coppola, 2006) or the plague pandemic (the Black Death) in Europe in the mid-14th century with estimates of mortality ranging from 75-200 million persons.(Benedictow, 2004) Some illustrative examples are given in the table below.

Table 4. Examples of disasters and their estimated casualties/deaths in history(Coppola, 2006)

Year	Disaster	Estimated casualties
1201	Earthquake, Egypt-Syria	1.1 million deaths
1346-53	Black Death, Europe	75-200 million deaths
1556	Earthquake, Shanxi, China	830,000 deaths
1737	Typhoon, Calcutta	300,000 deaths
1815	Volcanic eruption, Tamboro, Indonesia	80,000 deaths
1917	'Spanish' influenza pandemic	20 million deaths
1931	Yangtze flood, China	3 million deaths
1932	Famine, Russia	5 million deaths
1976	Earthquake, Tangshan, China	655,000 deaths
2004	Indian Ocean tsunami	228,000 deaths
2010	Earthquake, Haiti	316,000 deaths

Globally, in 2012 there were 357 reported natural disasters affecting 123 million people and resulting in US$157 billion in economic damage.(Guha-Sapir et al., 2013) The human toll of disasters is likely to be a conservative estimate, and has been challenged as being a gross underestimate due to considerable under-reporting that occurs.(Global Humanitarian Assistance, 2012) From the EM-DAT[6] data, the number of natural disasters reported has steadily increased between 1990-2012 from around 250 a year to more than 400 a year.(EM-DAT, 2012) Estimates of the number of persons affected by natural disasters fluctuate considerably but the average has been fairly consistent at around 340 million per year.(See Figure 4) In the UK, on average around three to four major incidents per year occur, although in some years as many as 11 major incidents have taken place.(Carley, Mackway-Jones et al. 1998)

Figure 4. Number of reported natural disasters and victims, 1990-2012. (Adapted from the Annual Statistical Disaster Review, 2013)(Guha-Sapir et al., 2013)



The natural disasters with the largest human impacts in terms of total numbers affected are floods (56%), droughts (19%), storms (16%), the extremes of temperature (5%) and earthquakes (4%). Other events such as epidemics, wildfires and volcanic eruptions are far less significant and account for less than one percent of all persons affected. As a cause of human deaths, earthquakes (61%) predominate, followed by storms (16%) and extremes of temperature (13%) whereas flood disasters

[6] EM-DAT is the International Disaster Database hosted by the Centre for Research on the Epidemiology of Disasters (CRED), School of Public Health, Université Catholique de Louvain, Belgium. This initiative is jointly funded by the WHO and Belgian government. More information on EM-DAT is available at the following website: http://www.emdat.be/

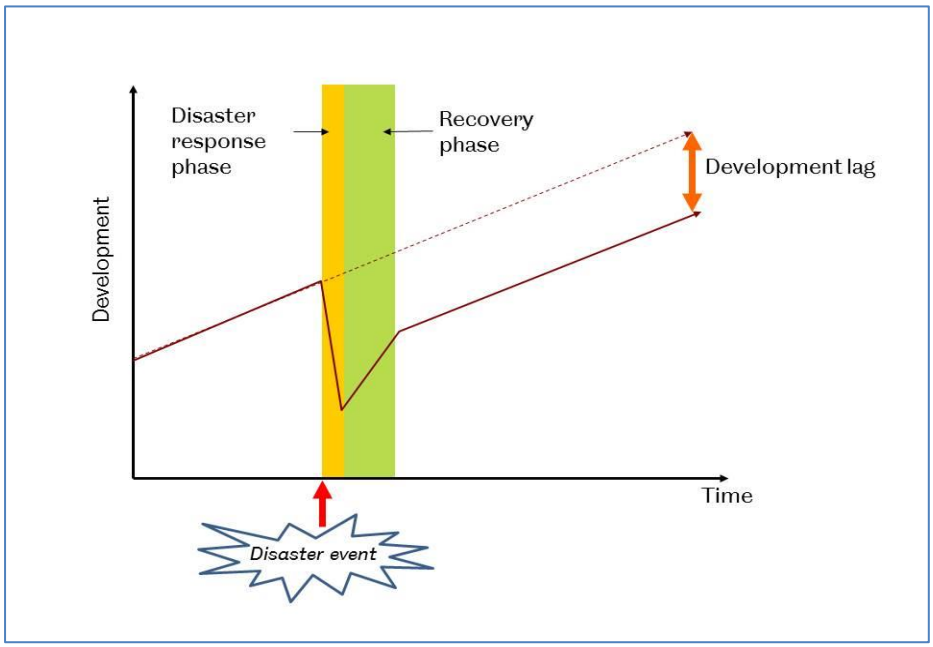
are relatively less lethal accounting for only 5% of deaths globally. (Global Humanitarian Assistance, 2012)

Compared to previous centuries, broadly speaking disasters today affect more people, occur more frequently and are more costly, but tend to be relatively less deadly. This is the result of accumulating disaster risk from increasing urbanisation, advances in technology, human development and globalisation.(Anderson, 1991) The differences in political, legal, and social contexts will undoubtedly have an impact on the vulnerabilities, risks and constraints experienced locally.

Also important to mention are the human health impacts of anthropogenic climate change. It is anticipated that climate change will lead to more extreme weather events, increased propensity for the spread of infectious diseases, food insecurity, and fresh water shortages that would lead to population displacement and conflict.(McMichael, 2013, Woodward et al., 2014) These hazards all have the potential for turning into disasters. As such, the trends for increasing frequency of disasters could be expected to continue in the coming decades.

What is also evident from the annual disaster reviews are that not all disasters are equal with low- and middle-income countries (LMICs) tending to be disproportionately more severely affected than high income countries (HIC).(Global Humanitarian Assistance, 2012) The development of these countries suffers when subject to repeated disasters and leads to what has been called a '*development lag*'.(Asian Disaster Reduction Centre, 2005) (See Figure 5)

Figure 5. Impact of disasters on development. (Asian Disaster Reduction Centre, 2005)



This greater predilection for disasters experienced by LMICs is partly due to the fact that as a country develops, it is able to invest more resources in measures to precautionary measures to mitigate natural disasters, and also is likely to have more resources to divert to disaster response and recovery. Conversely, populations most affected by disasters are those who have weaker economic and political bases, who are consequently less able to fund and implement the necessary countermeasures required.(Toya and Skidmore, 2007)

1.5 Current policy context

1.5.1 Recent historical background to emergency planning in the UK

The value of having effective civil protection and emergency planning in any country is without dispute. However, its relative priority compared to competing demands on the public purse has meant that in many countries it has low priority and tends to be a low profile activity.(O'Brien and Read, 2005)

Following a spate of major incidents and crises in the 1980s, a period of time also described as 'the decade of disaster for the UK', the visibility and need for emergency planning and preparedness in the UK was raised considerably in both the political and public eye.(Coles, 1998) Local authorities were tasked with developing an integrated approach to emergency management. In addition, in the late 1990s, benchmarking criteria and national performance standards were introduced together with requirement for local partnerships to be developed (the precursors to local resilience forums (LRFs)).

Subsequently, several emergencies in the early 2000s such as serious flooding, the Fuel Protests Crisis in 2000, and the national outbreak of Foot-and-Mouth Disease in 2001, exposed deficiencies in civil protection arrangements nationally. This led to the establishment of the UK's *Civil Contingencies Secretariat* (CCS), based in the Cabinet Office, in July 2001 tasked with improving the UK's preparedness and response to emergencies. The CCS is also responsible for maintaining the national risk register that lists the key concerns and threats based on a probabilistic assessment of their potential severity and likelihood. Current concerns on the risk register include terrorism, pandemic influenza, major transport accidents, major industrial accidents, coastal flooding, effusive volcanic eruptions, disruptive industrial action, public disorder, and extreme weather events such as flooding, drought, heatwaves, low temperatures and heavy snow.(Civil Contingencies Secretariat, 2013)

Much of the work of emergency planning and preparedness usually occurs in the background. However, following the terrorist incidents of 11 September 2001 in the US and 7 July 2005 in London, its prominence both publicly and politically was considerably boosted.(O'Brien and Read,

2005) The terrorist attacks in the US in 2001 galvanised the development of new emergency management legislation in the UK leading to the passage of the *Civil Contingencies Act* 2004 by Parliament.(Cabinet Office, 2004) This Act defines key emergency planning and response responsibilities for all primary care, acute hospital and ambulance service trusts and Category 1 responders. These agencies are required by the Act to prepare for major incidents through various activities such as emergency planning and exercising. The agencies are also required to identify and assess local threats and use this risk assessment to guide further emergency planning.

1.5.2 Current issues in emergency planning in the UK

A key driver for emergency planning was the political perception of the potential threat of a terrorist attack. High profile events such as the London 2012 Olympics and the 2014 West African Ebola epidemic continually re-iterated the need for emergency planning. Although these events have spurred the UK agencies with a role in emergency management to prepare and plan for emergencies, these activities are not clearly supported by an evidence-base. Little is known for example regarding which interventions are cost-efficient or effective. (Bradt and Aitken, 2010) An evidence-base is also essential to guide planning around longer-term "rising tide" incidents such as pandemic flu, outbreaks of newly emerging infectious disease threats such as Ebola and MERS-CoV[7], chemical, biological, radiological and nuclear (CBRN) events, and threats to key infrastructure and utilities such as floods and transport strikes. I will be exploring further in this thesis what is defined as the evidence-base, scoping its extent and limitations, and assessing the value of having an evidence-base to inform planning.

The calls to develop an evidence-base for emergency management are not new. The need to document and learn from major incident exercises has been previously articulated.(Rutherford, 1990) Arguments have also been made of the need for centralised reporting and investigation of past major incidents to inform future planning for over a decade.(Carley et al., 1998, European Union, 2003) Various systems have also been proposed for standardising methods of reporting.(Sundnes and Birnbaum, 2002, Leiba et al., 2009) Whilst efforts have been made to catalogue major incidents internationally (Lettieri et al., 2009) and various UK organisations such as the Emergency Planning College, Health and Safety Executive, and BASICs hold databases of incidents, these have not been collated into a coherent emergency planning resource in the UK.

Furthermore, in emergency planning in health care the application of the evidence-base is not always evident. From the literature it is observed that a mismatch exists between emergency plans written and what actually occurs during major incidents.(Asaeda, 2002, Auf der Heide, 2006) It has

[7] MERS CoV: Middle East Respiratory Syndrome Coronavirus

also been reported that compliance with national guidance by UK primary care trusts (PCT) previously was patchy and inconsistent.(Day et al., 2010) Similar issues were also reported for acute hospitals,(Williams et al., 2007) and at the primary care-secondary care interface.(Challen and Walter, 2006) Likewise, systems currently advocated in emergency response also appear to lack an underpinning evidence-base.(Challen K, 2008) There is therefore a need in the UK for a systematic evidence-base on emergency planning and response to be collated and disseminated.

1.5.3 Humanitarian aid

In the international context, disaster management, or more specifically disaster response and recovery, is carried out not just by state agencies as a function of civil defence but also by a myriad of other actors. These include

- Non-governmental organisations (NGOs), e.g. the International Committee of the Red Cross (ICRC)(ICRC), the International Federation of Red Cross and Red Crescent Societies (IFRC)(IFRC)[8], Medecins sans Frontieres (MSF), Oxfam and Save the Children;
- Intergovernmental organisations (IGOs) including United Nations agencies, e.g. UN High Commissioner for Refugees (UNHCR), World Food Programme (WFP) and the UN Development Programme (UNDP); as well as
- Donor agencies, e.g. UK Department for International Development (DfID), the Japan International Cooperation Agency (JICA), US Agency for International Development (USAID) and European Commission's Humanitarian Aid and Civil Protection department (ECHO).

One reason for the multitude of non-state actors in disaster response is due to deficiencies in civil defence and response capacity in many developing countries afflicted by natural disasters. Consequently, these agencies fill the existing gap in state provision especially during humanitarian crisis.(Stoddard, 2003) The response provided by these agencies is broadly described as "humanitarian aid". More formally, humanitarian aid is defined as "action are to save lives, alleviate suffering and maintain human dignity during and in the aftermath of man-made crises and natural disasters, as well as to prevent and strengthen preparedness for the occurrence of such situations." (Good Humanitarian Donorship Initiative, 2003)

Contemporary humanitarian aid has its roots in 1859 at the Battle of Solferino, a seminal event witnessed by a Swiss businessman, Henry Dunant. Dunant was appalled by the terrible suffering of

[8] The IFRC is a network of non-governmental organisations consisting of 189 national Red Cross or Red Crescent Societies. The IFRC is involved in conducting relief operations to assist victims of disasters. tend to deal with natural disasters. The ICRC is an independent, neutral non-governmental organization that seeks to ensure humanitarian protection and assistance for victims specifically of armed conflict and other situations of violence.

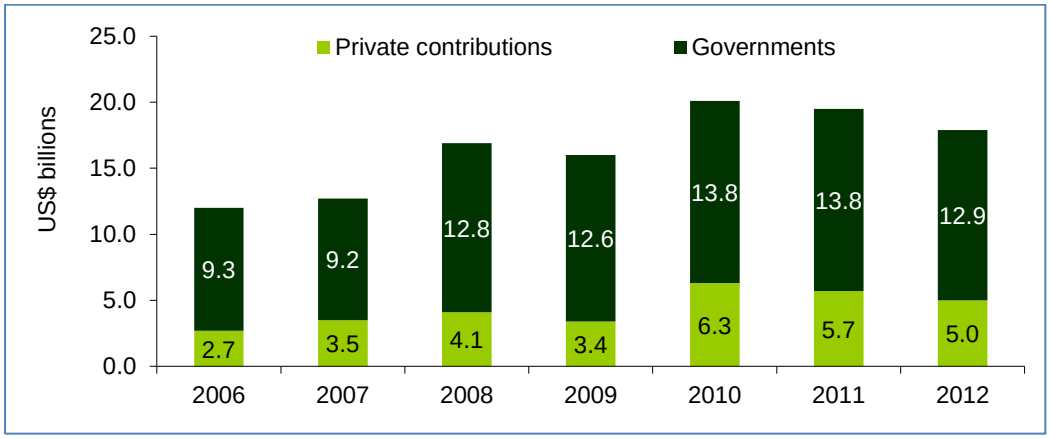
the wounded in the aftermath of the battle which subsequently led him to campaign for the establishment of national relief societies of trained volunteers, the precursor to the modern day Red Cross and Red Crescent Societies worldwide.(Moorehead, 1999) From this movement would spawn other similar non-governmental organisations with similar aims.

Initially, many of the disaster response NGOs were staffed with short term volunteers who held varying degrees of inexperience and expertise. Indeed Florence Nightingale was not in favour of the Red Cross societies for precisely this reason.(Moorehead, 1999) However, increasingly the sector is becoming increasingly professionalised and staffed with long-term career aid workers. Today, many of these NGOs are a substantial part of the disaster response for many disasters worldwide.

As a sector, humanitarian aid is not inconsequential. What may have started as a small scale industry based on public fundraising is now an industry in its own right. Some international NGOs, such as Medecins sans Frontieres and Oxfam, now have international membership and reach akin to other multinational companies.

The amount of funding for humanitarian assistance has risen in recent years from US$12 billion in 2006 to around US$17.9 billion in 2012. This includes both private donations to the NGOs as well as aid provided by states.(Global Humanitarian Assistance, 2013) (Figure 6) On average, humanitarian aid comprises around 8.3% of overseas development aid provided by countries.

Figure 6. Global Humanitarian Assistance, 2006-2012 (Source: Global Humanitarian Assistance Report 2013)



Despite the large sums of funding provided for humanitarian aid, the amount of international funding available for disaster response remains inadequate for meeting the needs of disaster affected populations. For example, in 2012, it is estimated that 37% of funds appealed for by the humanitarian sector for disaster response was not met. What has become increasingly clear to

policymakers globally is that the cost of responding to disasters far exceeds the actual cost of disaster prevention.(Christoplos et al., 2001)

1.5.4 International disaster management policy context

In 1987 the United Nations General Assembly in 1987 declared the 1990s as the "International Decade for Natural Disaster Reduction" (IDNDR). The aim of this was to advocate for coordinated efforts internationally to minimize the losses and disruption caused by natural disasters, particularly in low- and middle-income countries (LMICs).

Following on from this, in 1994, at the World Conference on Natural Disaster Reduction in Yokohama, the *Yokohama Strategy and Plan of Action for A Safer World* was devised.(IDNDR, 1994) This set out a shift in approach from disaster response to disaster prevention. Prior to 1994, the approach to disasters had been very much focused on disaster response and recovery activity. The focus was on single disaster events, and responses by a single agency or authority, with a short term view. Hierarchical relationships between stakeholders predominated and there was an emphasis on hardware and equipment requirements for disaster response. The Yokohama strategy set out a radical shift towards disaster prevention and disaster risk reduction (DRR), with an emphasis on addressing community vulnerability and risk. The approach advocated was based on addressing multiple risks and scenarios, involving multifaceted action by multiple actors and authorities, over the long term rather than short term. The focus was also very much on changing practices, knowledge and abilities, and working through horizontal, fluid relationships rather than hierarchy-based ones.

A UN Office tasked with overseeing disaster reduction policy was also set up, and in 1999 the UN produced the UN International Strategy for Disaster Reduction (UNISDR).(UNISDR) The International Strategy aims "to build disaster resilient communities by promoting increased awareness of the importance of disaster reduction as an integral component of sustainable development, with the goal of reducing human, social, economic and environmental losses due to natural hazards and disasters."

In 2005, a decade after the Yokohoma Strategy, the Hyogo Framework for Action was devised building on disaster reduction policy work to date.(United Nations Office for Disaster Risk Reduction, 2005) The Hyogo Framework's stated strategic goals were to:

- Integrate disaster risk considerations into sustainable development policies, planning and programming at all levels
- Develop and strengthen institutions, mechanisms and capacities at all levels

- Systematically incorporate risk reduction approaches into design and implementation of emergency preparedness, response and recovery programmes of affected communities.

These policy efforts have had some impact internationally with the disaster prevention agenda gaining prominence. This has translated as well to the operational end with mitigation interventions being increasingly planned into disaster response programmes.(Kennedy et al., 2008, Christoplos et al., 2001)

1.5.5 Disaster response: Bane or Boon?

Thus far we have explored the responses to disasters both by state actors involved in civil protection as well as non-state actors, both in developing as well as developed country settings. However, an assumption has been made here that disaster response is a good and necessary intervention. There is a commonly held belief that humanitarian aid in disasters, and especially foreign aid, is beneficial. Let me present a different perspective of this belief.

- *Goma, Eastern Zaire, 1994*

In one of the worse cholera outbreaks around 12 000 Rwandan refugees in Goma perished in July 1994. Despite the emergency medical aid provided by international NGOs who established treatment centres in Goma, cholera death rates were considerably higher than expected.(Siddique et al., 1995) This raised the concern whether the aid was actually leading to a worse public health outcome? In one camp, the case-fatality ratio was reported to be as high as 48% in a single day. The failure to prevent so many deaths during the epidemic was attributed to various factors such as the incorrect administration of intravenous fluids and slow rate of rehydration, inadequate use of oral rehydration therapy, and inexperience of health workers in the management of severe cholera.(Siddique et al., 1995)

- *Sri Lanka 2004/05*

In 2004/05, in Sri Lanka the Asian tsunami disaster caused 38,195 fatalities and 834,000 people were left homeless. Survivors faced various challenges such as severe shortages of shelter, clean water and sanitation. There was also extensive damage to the local transport infrastructure as many coastal roads and bridges were badly damaged or destroyed. There was considerable media interest which helped to galvanize the public around the world. Considerable amounts of funds were raised and the disaster affected areas were flooded with aid agencies. One would have thought that such a massive response would be beneficial.

However, six months after the disaster, local survivors revealed a lot of insights into the potential harms of aid. They reported that aid had aggravated social tensions between the different ethnic groups, for example why were some groups prioritised for aid over others. They also reported a lack of community engagement by the international NGOs that led to misunderstandings and grievances. The communities affected perceived a lack of transparency by the NGO, and community expectations were not always satisfied. (Lee, 2008) There was also a substantive review carried out by the Tsunami Evaluation Coalition of all the evaluations of various NGOs in the aftermath of the tsunami. What they found was that there was an accountability gap – many communities felt that NGOs were not accountable to them. Again, there was a lack of community engagement and worryingly the international response undermined local ownership of the disaster response and recovery.(Cosgrave, 2007)

So, what can be learnt from the Asian Tsunami disaster? Aid delivered in the wrong way has wider impacts beyond just health outcomes. Aid can and does cause harms. But many of the issues identified were not new issues. Indeed they had been reported previously in other disasters such as Rwanda.(Banatvala and Zwi, 2000a) So evidently something may be wrong if the way aid is delivered is re-creating many of the same problems again.

- *Haiti 2010*

Fast forward a few more years to Haiti in 2010. Then, a catastrophic earthquake struck the island nation of Haiti, leading to more than 230,000 deaths.(Bilham, 2010) Many foreign medical and surgical teams went out to help. Unsurprisingly, many of these teams from many different countries had different ways of doing things. One striking issue reported was the discrepancy in amputation rates varying from between two to four percent of trauma cases handled by these different teams.(Herard and Boillot, 2012, Merin et al., 2010) Could it be that some teams were more likely to attempt limb salvage whilst others did not? The long term consequences for the survivor of having a limb amputated or not are considerable, so why is there this huge variation in medical practice? The question that this raises for medical practitioners is “How can one be sure what is done is the right thing?” ‘Right medical practice’ is not always certain and clearly defined.

But problems with how we respond to disasters also extend beyond the health response. They affect how we prepare and prevent disasters. In Haiti, many of these deaths were preventable but for the poor enforcement and adherence to proper building regulations. Many buildings were poorly built and unsurprisingly were earthquake prone. In addition, the earthquake hazard in Haiti is not

unpredicted - they have had a history of earthquakes there including most recently in 2003. So why weren't people learning and adapting to the risk?

- *Philippines, 2013*

And finally, let us examine a more recent disaster. On November 8, 2013, Typhoon Haiyan struck the Philippines and wreaked death and destruction, leaving over 5,632 persons dead, 1,759 missing and nearly four million people displaced and homeless.(NDRRMC, 2013) Many died from flying debris, collapsed buildings, or drowned in the storm surge that hit coastal areas.

There are interesting parallels between this disaster and the Asian Tsunami Disaster 10 years previously. Firstly, the immediate response to both disasters for the first week was a local response. Whilst many criticised the late arrival of foreign aid, the reality is that it takes time to mobilise emergency responders and resources from abroad. Only aid agencies already operating in-country pre-disaster with pre-positioned supplies were able to act in the immediate aftermath.(Feinmann, 2013) This highlights the need for strong local emergency response capability and community-based emergency preparedness to hasten the emergency response.

For both disasters, immediate health needs included trauma care for injuries sustained during the disaster. However, the health needs of disaster-affected populations rapidly change within weeks, often reverting to a pre-disaster profile where non-communicable chronic diseases and minor ailments prevail.(Albukrek et al., 2014) Primary care rather than costly advance surgical teams are now required. The need for external emergency health provision is also strongly determined by the state of the country's public health infrastructure. Great care is needed to ensure that foreign interventions do not undermine local health systems.(Lee, 2005)

Another similarity was the large influx of many different actors flooding the disaster-affected areas. This included local and international non-governmental organisations (NGOs), private individuals and the military.(Cranmer and Biddinger, 2014) The NGOs not infrequently jostled each other as they sought to establish exclusive operational areas for the delivery of their aid programmes. This aspect of humanitarian aid is in part driven by the competition for donor funding and meant that aid responses are informed less by what disaster survivors need and more by donor agendas and NGO portfolios.(Harford et al., 2004) This led to instances of aid distribution being be haphazard and patchy, and occasionally wasteful duplication occurred which stresses the need for coordination.(Cranmer and Biddinger, 2014, Lee, 2005)

Typhoon Haiyan was characterised by a few positive developments such as the considerably greater application of social media(MacKenzie, 2013) and technology to guide emergency response such as

satellite imagery, geographic information systems and disaster informatics, as well as web-based information sharing and coordination.(United Nations Office for the Coordination of Humanitarian Affairs, 2013) However, some old problems remained. “Despite noble intentions, poorly prepared and poorly equipped responders have sometimes ended up depleting needed resources rather than providing solutions. Failure to coordinate with local response authorities or with international relief agencies results in either duplication of existing capacity or missed opportunities to fill gaps in delivery.”(Cranmer and Biddinger, 2014)

There also remain unanswered questions. For example, the determinants of the ability of households and communities to respond to disaster warnings are not known. The effectiveness of post-disaster health responses is uncertain. Likewise, it is not known what the optimal set up of surveillance systems are for monitoring and mitigating health risks in the aftermath of disasters. Neither is it known what is the best way to mobilise community volunteers in post-disaster situations and there remain gaps in technical knowledge.(Chan et al., 2013)

In summary, humanitarian aid can be beneficial but it can also be harmful, the impacts of aid extend beyond just health outcomes, and we need to minimize the harmful impacts of aid by putting into action “best practice”. But what is “best practice”?

1.6 Evidence-based practice

1.6.1 Defining ‘evidence’ and ‘evidence-based practice’

‘Best practice’ can be defined as intentional decisions or interventions undertaken that are more likely to lead to a desired outcome. Such decisions/interventions are likely to have some basis or rationale to justify them as well as some consensus acceptance by the wider body of practitioners that may be referred to as the ‘evidence’. However, defining what counts as “valid evidence” is not straightforward.

In evidence-based medicine (EBM), the term “evidence” often refers to empirical ‘scientific’ evidence, i.e. knowledge derived from observation and/or experimentation that is testable and reproducible, supported by data. Such knowledge is open to critical appraisal by the wider community of practitioners and academics, with the ultimate aim of establishing the “truth”.

This approach however could disregard the conclusions derived from the analysis of routine data or evaluations of programmes or indeed experiential knowledge including case reports that may be justified and valid forms of evidence. There are also complex issues regarding whether and how

evidence should inform practice and policy. Indeed, how practitioners make decisions is not solely determined by the evidence but also by their values.

However, 'evidence' is not discrete, immutable and objective. Indeed there have been criticisms made in the past two decades such as the myth that evidence is derived objectively when in reality it is impossible for observers to be completely independent from biases. As Cohen et al noted, 'observations cannot be made by a naive, completely objective observer'. As such, 'the biases, and therefore the world-view, of the observer must be identified and taken into account'.(Cohen et al., 2004)

The concept of 'evidence' also holds different meanings and values to different stakeholders. For example, managers may see it as information that is used to control the actions of subordinates, to mitigate "risk" or to give legitimacy to rationing decisions.(Harrison and Checkland, 2009) Experts in a subject may see evidence as a commodity they hold that reinforces their "expert status", e.g. for doctors it is a means to protecting 'medical power'. Practitioners on the other hand could feel that evidence threatens their "expert/professional status" such as the effect of guidelines and protocols that limit individual autonomy. For the public, evidence could be viewed as an entity that restricts their choices to certain interventions for example, or may limit their ability to participate in decision making processes. Put simply, evidence is a subjective entity that is culturally and contextually bound.(Sackett et al., 1996)

1.6.2 Evidence into practice

In recent decades, evidence-based medicine (EBM) has become the dominant paradigm in clinical practice. Practitioners from a medical background will be familiar with evidence-based medicine where treatments are guided by the best available research evidence. One simple definition of EBM given:

'Evidence-based medicine (EBM) is the doctrine that professional clinical practice ought to be based upon sound biomedical research evidence about the effectiveness of each diagnostic or therapeutic procedure.'(Harrison, 1998)

EBM has been described as a scientific process that involves the development, acquisition, critical appraisal and assimilation of the evidence into practice. It is a conscientious and explicit approach to clinical decision-making that seeks to incorporate the available body of medical evidence into practice by means of critical appraisal and reasoning.(Tonelli, 1998, Sackett et al., 1996) Culturally, this represents a significant shift away from clinical practice that traditionally relied on the intuition, medical reasoning and expertise of the individual practitioner.

Whilst evidence-based practice may be seen as the 'gold standard' best practice, the realization of evidence-based practice in reality is problematic not least because it is often beset with limitations of the available evidence-base. This may be through knowledge gaps or the availability only of weak studies. There has also been reported a lack of a comprehensive, searchable, and publicly-accessible database on humanitarian disasters and approaches to disaster response. (Mills, 2005) For example, it has been previously reported that in low-income settings, there is a lack of robust and reliable data and knowledge of the physical and mental health consequences of floods for the population in the long-term. As such the evidence-base so to speak to inform emergency preparedness and response planning is deficient.(Chan et al., 2013)

There was one systematic review of the existing literature on disaster management by Lettieri et al(Lettieri, Masella et al. 2009). In this review, they identified evidence gaps that could be grouped into two main categories: performance management and knowledge management. In addition, the review noted global inequalities in the evidence-base as much of it tends to come from North America, with considerably less from the rest of the world. However, this review was fairly limited as it only examined 31 articles published in peer-reviewed journals, thereby missing out the grey literature as well as potentially other relevant articles. In addition, its findings lacked the level of granularity needed to expose what are the current limits of the evidence-base and further research questions that need exploring.

In addition to the limited evidence-base, there are prevailing 'cultural' and system barriers as well that affect the translation of evidence into practice. As noted earlier, evidence-based practice in disaster management is weak and it is not part of the normative culture. There are multiple flaws in the current system such as issues around terminology, ambiguity of concepts, and problems with standardization in methods of data collection. (Bradt, 2009) Whilst the field is increasingly data-driven, this is not to say that it is evidence-based, indeed, the data tends to predominantly consist of process indicators, many of which are flawed proxy indicators at best. Bradt also observes that disaster management places undue trust in the eminence of so-called 'experts' rather than on the evidence-base.

Several reasons have been put forward as to why evidence-based practice is deficient in this field. Firstly, there is weak analytical capability in frontline organisations and at the practitioner level there are problems with flawed scientific inference. It is also not enough to have the 'evidence' to hand if there is a lack of political and organizational will to act on them. Evaluation practice is poor and 'when beliefs conflict with evidence, belief tends to win' (Bradt, 2009).

1.6.3 Justifying evidence-based practice

When EBM was first advocated in the 1990s, several benefits were cited. It was touted as a rational and systematic approach to problem solving. It was a means to sift out relevant knowledge to inform decision-making from a cornucopia of often irrelevant information that is currently available. It was seen as a way of improving the uniformity and quality of care, as well as help decision-makers make the best use of available resources.(Rosenberg and Donald, 1995)

All of the identified benefits proposed are as applicable to emergency management as it is to clinical medicine. The critical risk of not having a systematically collated and disseminated evidence-base is for potentially ill-informed decision-making in disasters. Indeed it could be argued that an evidence-based approach is much more necessary as the repercussions of bad decisions could be disastrous at the population level.

Disadvantages of the evidence-based approach have been raised. Indeed, evidence-based decision making does not guarantee good outcomes and 'may merely help one go wrong with confidence'. (Bradt, 2009) That said, the evidence-based approach can help inform the decision-making process, assist decision-makers in assessing the risks, benefits and consequences of their actions. Post hoc, it can help correctly explain why certain decisions led to a successful or failed outcome. It is for these reasons that the promotion of an evidence-based approach to disaster management is surely justified and desired.

1.7 Chapter summary and outline of thesis

1.7.1 Summary

To summarize what was known thus far, the current trend is for increasing frequency and consequences of disasters worldwide. As a consequence, this field has considerable interest from the public as well as global policymakers. Greater emphasis now is placed on preventing, preparing and planning for such emergencies. That said disaster management actions can have considerable repercussions, both positive and negative. What is also becoming increasingly apparent, both in the UK and internationally, is that there are deficiencies in the evidence-base for decisions as well as deficiencies in evidence-based practice. The importance of having such an evidence-base to inform decision-making by frontline practitioners, emergency managers, and policymakers alike, cannot be understated.

It is unclear where the boundaries are for the existing knowledge base (i.e. what don't we know?). Linked to this is a need to better understand what is known, i.e. to map the evidence-base, and to ascertain if what is known is helpful or deficient. Also needed is an understanding of how this knowledge base is utilised as well as identification of the barriers and facilitators of evidence-based practice.

1.7.2. Thesis aims

This thesis sets out both in the UK as well as in a developing country setting

- to explore and map the extent of the evidence-base for emergency planning and management;
- to identify knowledge gaps and topic areas that need further research; and
- to understand how evidence is used in emergency planning and management
- and to identify the determinants of evidence-based practice in this field.

Of note, the field of civil protection is diverse ranging from shelter and building design, environmental modification for natural disaster mitigation, water and sanitation issues, to security and policing aspects. For the purpose of this thesis, the focus will be from a *health* systems perspective.

1.7.3 Outline of thesis

In the light of the issues with the evidence-base for emergency planning in the UK context, it was therefore timely that, in 2009, the National Institute for Health Research put out a call for research to map the evidence-base. This was with a view to highlighting gaps in the evidence-base and identifying themes for further research, particularly with relevance to the UK context.

Part of this thesis (with regards to the UK component) is based on a scoping study carried out by a team of researchers from the School of Health and Related Research (ScHARR) at the University of Sheffield between 2009-2012 to address this issue. This team was led by the author of this thesis. The other component of this thesis set in a developing country context is solely the author's work that was carried out in 2013-2014.

This thesis is a mixed-methods study. An outline of the proposed thesis is as follows:

- (Chapter 2) A scoping review of the evidence for emergency planning published in academic journals, focussing on the UK and high-income country setting;
- (Chapter 3) A scoping review as well as narrative review of the grey literature for health-related emergency planning in the UK;

- (Chapter 4) A qualitative study consisting of interviews with key informants involved in the field of health-related emergency planning and response in the UK;
- (Chapter 5) A scoping review of the evidence for disaster management published in academic journals for Low- and Middle-Income Countries;
- (Chapter 6) A qualitative study consisting of interviews with key informants involved in the field of disaster management and risk reduction in Nepal.

A fuller account of the methodology will be provided in the relevant chapters.

Bearing in mind the different interpretations as to what constitute 'evidence', a mixed methods approach was used to evaluate the different possible forms of evidence from the outputs of research studies, findings of the analysis of programme data that may be reported in the grey literature, to experiential evidence as is often reported in commentaries.

The main research outputs include an outline of the evidence-base for emergency planning and management currently available in the UK and LMIC context, identification of existing knowledge gaps as well as identification of priority areas for future research. It will also cover a qualitative exploration of the agencies involved in emergency planning with regards to how they use this evidence-base, and identification of the barriers to and facilitators of evidence-based practice by this community.

1.7.4 End-users of the evidence-base

It is perhaps important at this juncture to clarify who the target end-user of the 'evidence' is in the context of this thesis. There a numerous actors involved in emergencies ranging from frontline emergency response crews to politicians as well as the public. The perspective I intend to use is that of the wider emergency management system, and how it operates and utilises (or not) the evidence-base. As such, the key end-users of the evidence-base anticipated here are emergency planners and managers.

In the UK context, most NHS organisations (including acute trusts (hospitals), ambulance trusts and primary care organisations), fire and rescue services, police and local authorities will have emergency planners. These individuals have a responsibility for civil protection, the assessment and mitigation of risks, emergency preparedness (including training and exercising), devising emergency plans and coordinating humanitarian relief.(Alexander, 2005) Other individuals involved in emergency management include senior officers in these agencies who may play a role in major incident management, training as well as the development and implementation of protocols. These emergency planners and managers therefore have a key role in determining how emergency

management unfolds both in the pre-disaster and post-disaster phases of the emergency management cycle. For this reason, in this thesis, when I refer to emergency planners and managers in the UK context, it is with reference to these key individuals who hold these roles.

Internationally, there is considerably more diversity in how emergency management systems are set up and operate, as described earlier. Irrespective of terminology, there will be individual roles in these other systems that fulfil the same civil protection functions as do the UK emergency planners and managers. The added nuance in developing countries is that a jargon term, "disaster risk reduction" (DRR), is used to refer to the emergency prevention and preparedness function. Individuals with this latter role may occasionally be referred to as "DRR project officers" for example. Nonetheless, these DRR officers and other disaster planners and managers, like the UK emergency planners and managers, I anticipate are a key end-user of the evidence-base.

For the sake of clarity in this thesis, the terms emergency planning, disaster planning, emergency management and disaster management, are used interchangeably.

1.7.5 Research collaborators

As mentioned above, NIHR funded the UK-based part of this study (NIHR SDO 09/1005/03)[9] and was a collaboration between researchers from

- The Centre for Effective Emergency Care, Manchester Metropolitan University(MMU),
- ScHARR and
- The Health Protection Agency (HPA).

The study team consisted of individuals with expertise in public health and emergency care as well as in secondary care research with a view to ensuring appropriate expertise in the team to guide, inform and deliver outputs of high-quality and relevance. Of note, the NIHR funded study included the scoping review, grey literature review, key informant interview and e-Delphi study. The latter were carried out separately by collaborators from MMU, and no part of this work is included in this thesis. The other three components were delivered by the following ScHARR and HPA collaborators:

- The author (AL)
- Professor Steve Goodacre (SG), ScHARR
- Dr Andrew Booth (AB), ScHARR
- Dr Kirsty Challen (KC), PhD student, ScHARR and Emergency Care Physician
- Paolo Gardois (PG), PhD student and information specialist, ScHARR

[9] For more information regarding the NIHR funded study, this can be accessed from the NIHR website at http://www.nets.nihr.ac.uk/projects/hsdr/09100503 (last accessed 18.11.14)

- Helen Buckley-Woods (HBW), Information Specialist, ScHARR
- Dr Wendy Phillips (WP), Health Protection Agency

AL was the project manager for the study, led on the qualitative study, and was co-investigator for the scoping and grey literature reviews. AL was also responsible for collating, analysing and writing the final report that was submitted to NIHR in 2011. Oversight of the overall research study was provided by SG. The contributions of the various collaborators are illustrated in the following table.

Table 5. Contributions of various collaborators for the NIHR funded study

Study component	Lead(s)	Collaborator
Scoping review	AL & KC	AB, PG, HBW
Grey literature review	AL & PG	KC, WP
Key informant interview	AL	WP

1.7.6 Research ethics

For the NIHR funded components of the study (Chapters 2-4 covering the UK scoping review of the evidence, grey literature review and key informant interviews in the UK respectively), we applied for NHS ethics approval from the NHS Sheffield Research Ethics Committee. This was granted on 4.10.10. (REC reference number 10/H1308/67). (Appendix 1)

The evidence scoping review for LMIC (Chapter 5) did not require ethics approval. As for the qualitative study in Nepal (Chapter 6), I applied for ethics approval from the ScHARR Research Ethics Committee. This was granted on 15.10.13. (Appendix 2)

Chapter 2: Scoping review of published academic literature for high income countries

The following chapter in parts or in full has been published by the author in the NIHR report on emergency planning (Lee et al., 2012a) and in an article in *BMC Public Health*(Lee et al., 2012b, Challen et al., 2012).

2.1 Introduction

This section describes the scoping review undertaken of the published academic literature, with a focus on articles relevant to the UK and high income country (HIC) context and for the health sector. The search strategy, including details of the filtering process used to identify and collate relevant articles, is described. A summary of the key findings and conclusions is provided together with an overview of some of the issues encountered.

The aim of this scoping review was to work out the extent of the existing evidence-base for disaster and emergency planning in the HIC context. It also sought to identify gaps in the existing evidence-base, as well as current policy issues. A scoping review differs from the conventional evidence reviews as it is a non-systematic review of the literature.(Anderson et al., 2008) This type of review is used in a wide variety of settings, for mapping the evidence-base, and is particularly useful for identifying key questions and topics for further research. As such I believed this approach would help me discern the extent of the evidence-base as well gaps in it.

2.2 Conceptual framework

In order to carry out the scoping review, there was a need to identify and develop a conceptual framework that would cover the breadth of the disaster management cycle. It also needed to have enough granularity in terms of describing key topics for each part of the disaster management cycle in order for the literature searches to be built around each topic. As a starting point, I looked at the various disaster management cycles currently in use.

As described in Section 1.3.1 there are a few variants of the disaster management cycle that are described worldwide, including the PPRR approach[10] as well as three- and four- phase disaster management cycles.(Petak, 1985, Cronstedt, 2002, Norman et al., 2006, Rogers, 2011) All the different disaster management cycles show considerable similarities. Conceptually, the three- and four-phase disaster management cycles are simple and easy to follow. However, their broad phase categories were limited and do not provide an adequate thematic framework for exploring in greater

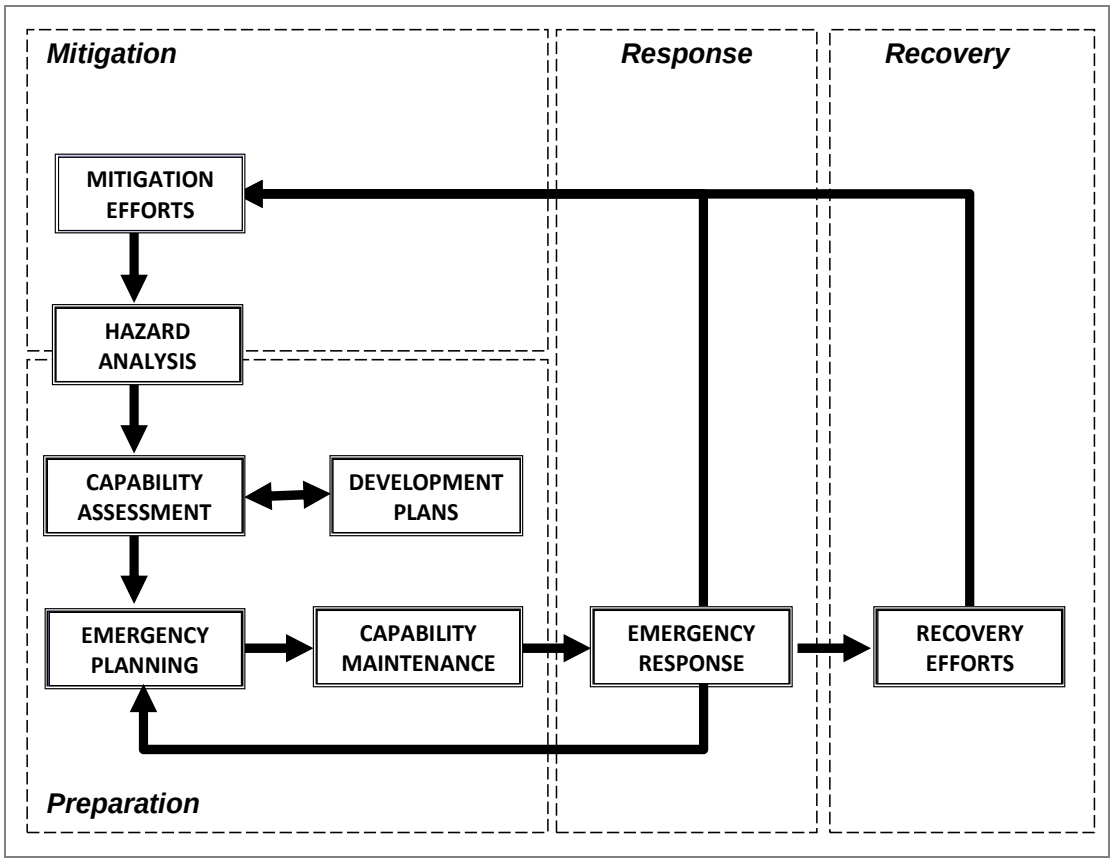
[10] PPRR – Prevention, preparedness, response & recovery.

depth and breadth emergency planning. As such, we sought a more elaborate conceptual model on which to base the scoping review on.

A better model in existence that I identified was the US Integrated Emergency Management System (IEMS) as previously described. The IEMS model breaks down the disaster management cycle phases into additional categories that include hazard analysis, capability assessment, capability maintenance, and development plans.(McLoughlin, 1985) It also maps on to the simpler disaster management cycles. The additional themes present in the IEMS model enable more structured analysis to be carried out. On this basis, I chose to use this model. In order to ensure that it captured all aspects of the emergency management cycle, I overlaid the 4-phase disaster management cycle framework on to the IEMS model (see Figure 6). By doing so, this created a list of searchable topic themes, as well as a framework with which to categorise and analyse findings form the scoping review, e.g.:

- Mitigation, Hazard analysis, Capability Assessment, Development plans, Emergency planning, Capability maintenance, Emergency Response/Relief, Recovery, Emergency preparedness/preparations.

Figure 6. Four phase emergency management cycle mapped on to IEMS



However, I was also mindful that the IEMS model may not cover all possibly relevant themes. For this reason, together with a study collaborator (KC), we brainstormed for other possible themes to include in the search strategy. This generated the following cross-cutting themes that were subsequently incorporated into the scoping study search terms: communications, business continuity, surge capacity, organisational behaviour and bio-security.

2.3 Methodology

A scoping review has two distinct and related aims.(Grant and Booth, 2009) The first aim is to obtain a representative sample of the evidence-base for this topic area. This sample is not necessarily comprehensive. The second objective is to assess and describe the quality of the evidence-base. This may be in terms of the types of study employed, topics covered, or the specific questions addressed by the studies identified.

2.3.1 Literature search strategy

The initial stage in the development of the literature search strategy required the compilation *a priori* of a list of themes and topics considered relevant to emergency planning by the research team. The search term headings devised were based on the themes and topics identified.

The next step involved identifying a list of literature databases to search. I identified the following databases as likely to hold articles relevant to disaster/emergency planning and management:

- Embase,
- Medline,
- PsycINFO,
- Biosis and Science Citation Index,
- CINAHL,
- the Cochrane library, and
- Clinicaltrials.gov.

Following compilation of the themes and topics we considered relevant, my study collaborator (KC) and I decided that it would be useful to carry out a pilot of the search strategy using one topic to ascertain the effectiveness of search terms in identifying relevant articles. This was to see if the articles returned could be thematically categorised using the adapted IEMS conceptual framework I had developed. We used the topic of 'business continuity' for this pilot search and sifted through

the identified topics together. We found that the framework developed seemed to fit with our purpose.

The final search strategy was then devised to identify and extract articles relevant to the specific scope of the review. The search strategy was further subdivided into Hazard analysis, Capability assessment and maintenance, Business continuity, Recovery, Organisational behaviour/Human Resources and Communications/informatics. This final search sought cross-sectional “slices” of the evidence, and was devised with a focus on identifying items where disaster prevention, control and mitigation (i.e. emergency planning) was a key focus of the scoping review. The purpose of this was to try and achieve a higher yield of articles that were relevant which would therefore make the exercise more time-efficient.

I provided the search terms and parameters to our project information specialist (HBW) who then carried out a search of the pre-identified electronic databases Embase, Medline, Medline in Process and PsycINFO via Ovid SP, Biosis and Science Citation Index via Web of Science, CINAHL via EBSCO, the Cochrane library via Wiley and Clinicaltrials.gov.(See Table 6). I chose not to limit the search to “human” only initially as there was a possibility that there may be some relevant literature on bio-security and zoonoses for example. Instead, it would be reliable to exclude articles not relevant to human emergency management and planning at the next stage when the articles were reviewed on the basis of their abstracts.

The search was limited to articles published between 1990 – 2011. Following discussions with my collaborator KC we chose the year 1990 as the cut-off as we believe that changes in the health systems, advances in emergency management and evolving socio-political contexts could render many articles pre-1990 less generalizable to the present time and more difficult to interpret.

We sought all articles in English, as well as foreign-language articles with an English translation of its title or abstract. Of note, many foreign-language articles and journals had an English translation of its title, and occasionally of its abstract to, in the internationally indexed literature databases. Consequently, we were able to assess and include articles from Japanese, Korean, Chinese, Iranian and Russian journals for example.

The references for the articles identified were downloaded into a Reference Manager database. The reference database was then de-duplicated and the cleansed database imported into a Microsoft Excel spreadsheet for subsequent coding.

Table 6. 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 organi?ational learning or rehabilitation).ti,ab. 5. 3 and 4 6. limit 5 to yr="1990 -Current"
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 organi?ational behavio?r 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 of articles

The extracted titles and abstracts were assessed for relevance and coded by a coding team of four consisting of two topic experts (myself (AL), KC) and two information specialists (AB, PG). Each coding pair consisted of a topic expert and an information specialist (AL+AB, KC+PG). This was intentional so that within each coding pair, there was an individual with topic expertise who could address topic queries, and similarly there was an information specialist who could advise on the coding process. The reference database was then divided equally between the four coding team members. The articles were then coded independently by all fur coders.

Various measures were introduced to reduce inter-observer variability in the coding process. Before coding was started, I delivered a tutorial on the topic of emergency planning to the information specialists to help orientate them. In this orientation tutorial, I explained to them the disaster management cycle, as well as the various key subject areas in this field. The coding team held regular discussions to clarify any issues and points of contention or ambiguity. We also sought to verify concordance between coding team members by carrying out an initial double assessment of a subset of articles. At least 20% of articles were double assessed by each topic expert-information specialist pair and Cohen's Kappa was calculated to assess concordance.(Cohen, 1960)

Cohen's Kappa is a measure of the degree of agreement between two 'raters', i.e. 'inter-rater reliability'. The two raters each classify *N* number of items into *C* number of mutually exclusive categories. The information is then put into an Excel-based spreadsheet with the Kappa test function, which then calculates the *K* value. The *K* value generated provides this measure of inter-rater reliability, and can be interpreted according to the following scale(Landis and Koch, 1977):

K value	*Interpretation*
< 0	No agreement
0.0 — 0.20	Slight agreement
0.21 — 0.40	Fair agreement
0.41 — 0.60	Moderate agreement
0.61 — 0.80	Substantial agreement
0.81 — 1.00	Almost perfect agreement

2.3.3 Sifting of articles for relevance

The coding team then read the abstract for each article identified by the scoping search. The abstract was reviewed and categorised as

- *relevant* (the subject matter is relevant to emergency planning and/or management),
- *equivocal* (the subject matter may be of relevance to emergency planning and/or management),
- *not relevant* or
- *insufficient detail* (there is insufficient information to enable reliable assessment for coding).

Of note, this scoping review focused only on articles relevant to UK health emergency planning and literature relating to comparable health services, i.e. high income countries. Articles that related to non-health aspects, were not about emergency planning, covered non-UK legislative issues, or were from low- and middle-income countries were excluded unless they were deemed to have material likely to be generalizable to the UK/HIC context. Articles that did not have an abstract were not coded. Although some of these had titles that suggested they could be of relevance to the topic, they were disregarded as it was not possible to confirm this without access to the individual publications in full.

2.3.4 Coding framework

If the title and abstract for the articles were deemed to be relevant or equivocal, further information relating to their *country of origin*, *type of publication* and *type of event* were extracted and coded. The categories and individual codes used are detailed in Table 7.

Publications were coded on a Microsoft Excel spreadsheet using aggregative synthesis. This is a technique that has been previously reported to be appropriate for exploring qualitative data where the concepts are secure, predefined and not contested.(Dixon-Woods et al., 2006)

We used the thematic framework developed based on the adapted IEMS model as described above. Notably, the IEMS model covers various topics across the disaster management cycle that are fairly mutually exclusive concepts. The eight broad categories described include: mitigation, hazard analysis, capability assessment, capability maintenance, development plans, emergency planning, response and recovery. We also identified three other thematic categories of relevance: disaster informatics and intelligence, communications and the mass media, and a “catch-all” category for other organisational issues that span different phases of the emergency management cycle or are distinct and important issues in their own right (e.g. gender issues, role of the military and aspects of human rights).The categorisation of country setting for the articles was done in accordance to

country income-levels as set out in the World Bank country classification of analytical income categories.(World Bank, 2015)

Table 7. 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)[1] ▪ 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. two 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)

This framework synthesis approach has been used elsewhere in conjunction with either aggregative or interpretive reviews. This has been shown to enable more rapid coding of the literature and is therefore particularly suited to scoping reviews.(Carroll et al., 2011)

Once the database of extracted articles was filtered for relevance and coded by the coding team, I then independently analysed the database using a simple quantitative and descriptive thematic approach.

2.4 Findings

In total, the initial literature search returned 2,736 articles that were extracted for further analysis.

As mentioned above, the articles were divided equally between the two coding pairs and assessed. At least 225 articles were double assessed independently by each coding pair to assess for inter-observer variability. The *K* values for the two pairs of coders were as follows:

Reviewers: AL & AB	Reviewer 2 Reject	Reviewer 2 Accept	Total	(*PO*) Observed Agreement	(*PE*) Expected Agreement	*K*	*se(K)*	Lower 95% CI		Upper 95% CI
Reviewer 1 Reject	28	14	**42**	0.848	0.641	**0.578**	0.066	**0.449**	**to**	**0.707**
Reviewer 1 Accept	11	168	**179**							
Title Total	**39**	**182**	**231**							

	Reviewer 2 Reject	Reviewer 2 Accept	Total	(*PO*) Observed Agreement	(*PE*) Expected Agreement	*K*	*se(K)*	Lower 95% CI		Upper 95% CI
Reviewer 1 Reject	138	19	**157**	0.872	0.509	**0.740**	0.041	**0.659**	**to**	**0.820**
Reviewer 1 Accept	16	101	**117**							
Title Total	**154**	**120**	**274**							

On the basis of the Kappa K values calculated, one coding pair (AL & AB) had moderate agreement whilst the other (KC & PG) had substantial agreement. The difference in Kappa K values is likely due

to the fact that one coding pair (KC & PG) jointly coded more articles together than the other coding pair. In addition, the relative lack of familiarity of the topic by the non-topic expert plus the greater expertise in the topic area by the topic expert in the latter pair (AL & AB) may have accentuated the lower concordance seen.

Of the 2,736 articles initially identified, 1,545 (56%) were assessed by the reviewers to be either relevant or equivocal. The remaining 1,191 (44%) were deemed to be either irrelevant, or had insufficient information in the abstract to allow a judgment to be made of their relevance or were duplicates. Notably, we found a few articles that had a duplicate published in separate journals. In this case, we retained one article from each duplicate pair and discounted the other from the scoping review. As I was more interested in the content of the article's abstract, the choice of journal in which the duplicate article was published in was immaterial and made no difference to the subsequent analysis. Articles that were irrelevant, or of insufficient information or duplicates were not examined further.

2.4.1 Publications by country of disaster

The distribution of publications by country of disaster is shown in Table 8 and Figures 7-8. As a benchmark for comparison, this was compared to the EM-DAT database at the Centre for Research on the Epidemiology of Disasters (CRED) from 2000-2011.(EM-DAT, 2012) EM-DAT is a multi-source validated database of disasters that records disaster events where ten or more people are killed, or where a 100 or more are affected, or a state of emergency is declared or a call for international assistance is made. The percentages shown relate to EM-DAT records for high-income countries.

The vast majority of publications in academic journals on disasters and emergency management originated from high-income countries with nearly a ten-fold difference compared to similar publications from LMICs. Of all the publications from high income countries, 71.2% of articles were from the US. There were comparatively fewer articles published originating from the UK (4.8%) and Europe (11.6%) in comparison.

However, the EM-DAT data is interesting as it shows that there are considerably more entries on the EM-DAT database than there are academic publications. This suggests a sizeable body of literature exists (most likely to be grey literature) that is not captured in academic journal databases. The other interesting point of note from the EM-DAT database is that there are more EM-DAT entries from LMICs (n=6,870) than from high income countries (n=1,350), in contrast to the trend seen in the academic literature. This suggests that most of the literature on disaster management for LMICs

may exist in a non-academic publication format (i.e. grey literature) or is not currently indexed and catalogued in traditional academic journal repositories.

Figure 7. Publications by country of disaster

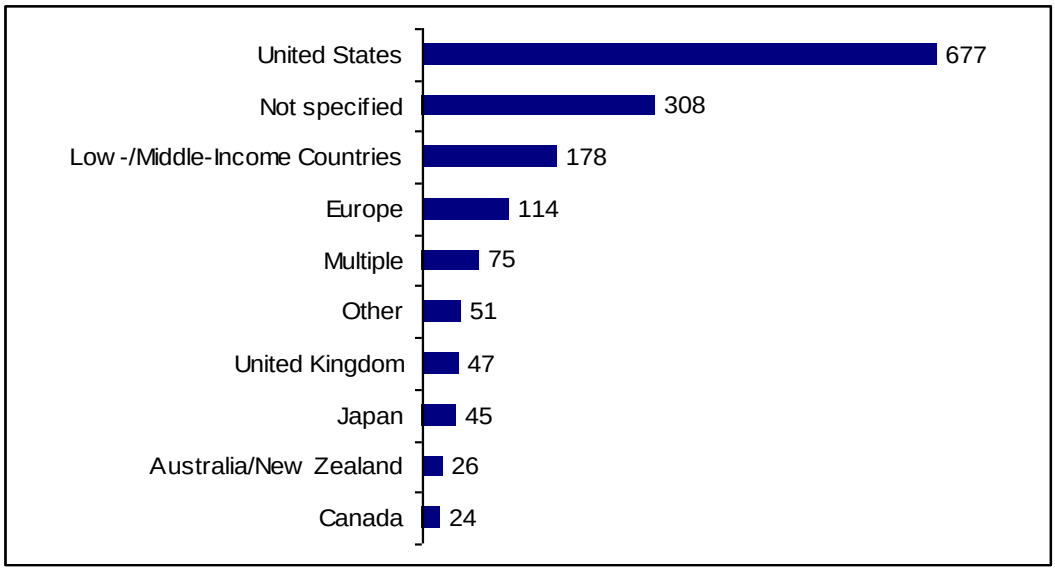


Figure 8. Source of published academic papers on disaster management.

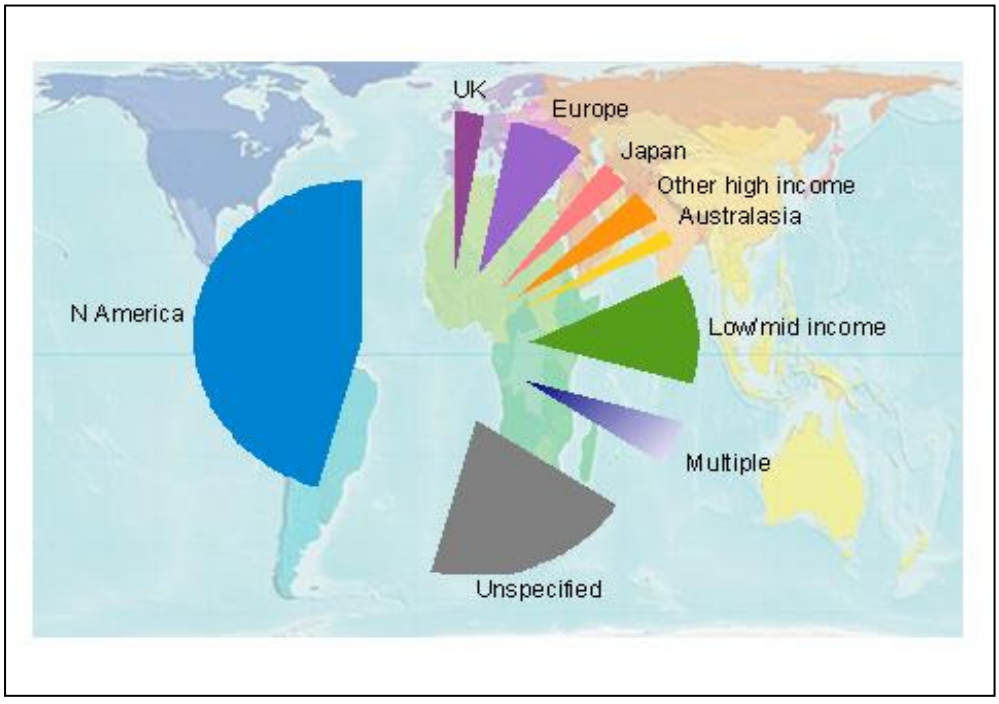


Table 8. Publications by country of disaster

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

2.4.2 Publications according to type of disaster

The distribution of publications according to the type of disaster covered is shown in Table 9 and Figure 9. 41.9% of articles were of a generic nature. Of the remainder, the majority (n=339; 21.9%) were related to natural disasters. The other prominent disaster types were CBRN incidents (n=135) and terrorism events (n=119). In comparison, articles pertaining to infectious disease outbreaks and epidemics such as pandemic influenza were relatively few (n=89; 5.8%), and there were even fewer covering industrial disasters (n=42; 2.7%).

Figure 9. Publications by disaster type

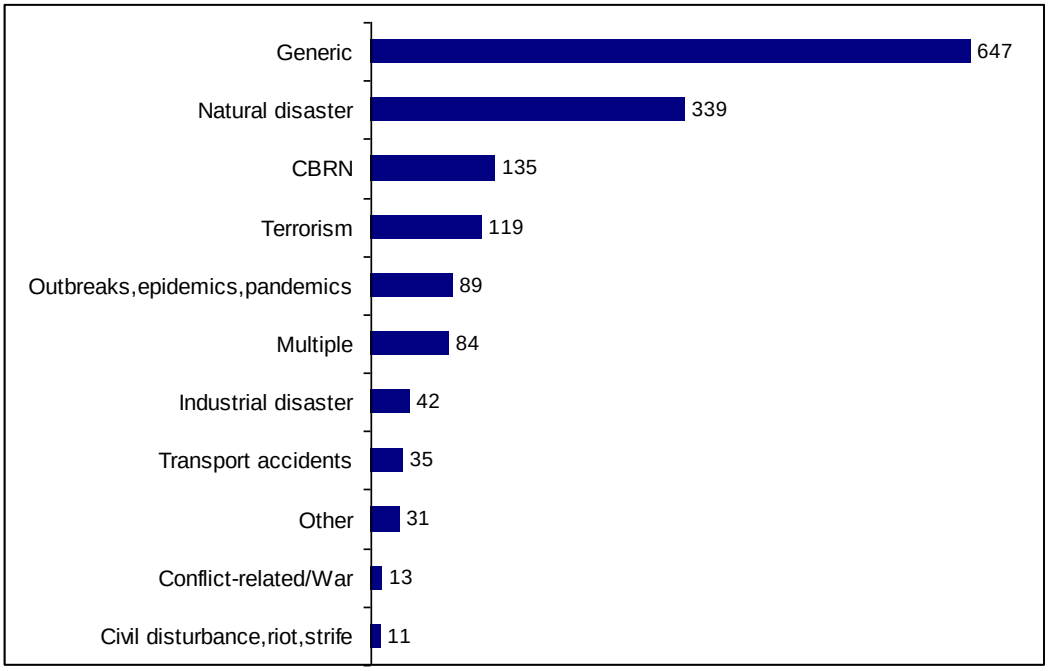


Table 9. Publications by disaster type

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

2.4.3 Types of published articles

The distribution of the publications by type of publication is shown in Table 10 and Figure 10. More than a quarter of the articles were commentaries or editorials (27.3%), and a considerable proportion of articles were event reports (24.0%). There were very few systematic reviews (n=11) and exceedingly few randomized controlled trials (RCTs) (n=2).

Figure 10. Types of publications

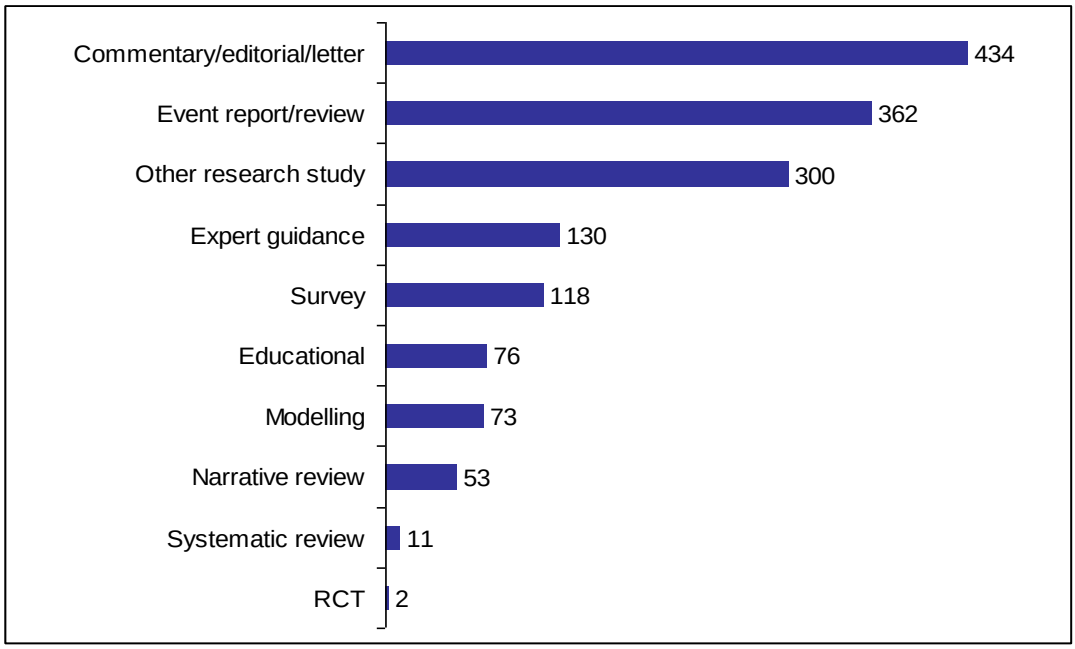


Table 10. Types of publications

Type of publication	Number	Proportion (%)
Other research study or survey	491	31.8%
Commentary/editorial/letter	422	27.3%
Event report/review	371	24.0%
Expert guidance	122	7.9%
Educational	75	4.9%
Narrative review	51	3.3%
Systematic review	11	0.7%
RCT	2	0.1%
Total	1,545	

2.4.4 Thematic analysis of published articles

The distribution of articles by disaster themes are shown in Table 11 and Figure 11. Whilst some articles covered only one thematic category, several addressed more than one thematic category. There was a preponderance of publications relating to emergency planning (55.3%) and emergency response (35.5%). In comparison, there were relatively few articles that addressed mitigation (11.5%) or recovery aspects (11.7%).

Figure 11. Proportion of publications by theme

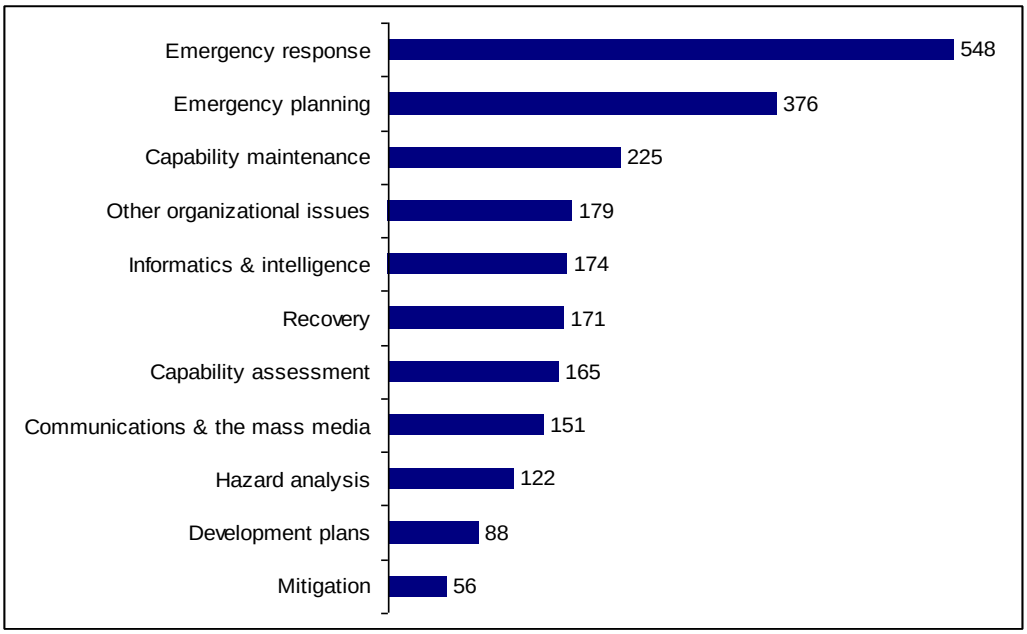


Table 11. Thematic analysis of publications

Theme	Number	Proportion (%)[11]
Emergency response	548	35.5%
Emergency planning	376	24.3%
Capability maintenance	225	14.6%
Other organizational issues	179	11.6%
Informatics & intelligence	174	11.3%
Recovery	171	11.1%
Capability assessment	165	10.7%
Communications & the Mass Media	151	9.8%
Hazard Analysis	122	7.9%
Development Plans	88	5.7%
Mitigation	56	3.6%

The topics covered by the eleven systematic reviews identified were:

- Disaster research methods;
- Priorities for research in pre-hospital care;
- Public health systems research in emergency preparedness;

[11] Total exceeds 100% due to multiple themes in individual publications

- 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
- The Cooperative Extension Service System: Response and Educational Resource in the Field of Stress and Families.

The themes covered by each type of publication are detailed in Table 12 below.

Table 12. Thematic analysis by publication type

Theme	Publications by type[12]					
	Event reports (n=371)	Narrative review (n=51)	Systematic review (n=11)	Other research study (n=491)	Expert Guidance (n=122)	RCT (n=2)
Mitigation	1.6%	3.9%	0.0%	3.1%	6.6%	0.0%
Hazard analysis	1.9%	5.9%	0.0%	13.2%	9.8%	0.0%
Capability assessment	5.1%	13.7%	18.2%	16.3%	9.8%	50.0%
Emergency planning	15.6%	45.1%	36.4%	20.8%	43.4%	0.0%
Capability maintenance	10.5%	7.8%	9.1%	16.9%	9.0%	50.0%
Emergency response	62.0%	39.2%	54.5%	22.2%	24.6%	50.0%
Recovery	14.3%	13.7%	18.2%	12.8%	6.6%	0.0%
Development plans	4.6%	5.9%	9.1%	4.1%	9.0%	0.0%
Communications/mass media	8.9%	5.9%	0.0%	9.0%	9.0%	0.0%
Informatics and intelligence	7.8%	5.9%	0.0%	13.2%	10.7%	0.0%
Other organisational issues	8.9%	13.7%	0.0%	11.2%	8.2%	0.0%

[12] The table should be read by columns, i.e. each publication type covered different thematic aspects. The total percentages in each column exceed 100% as the various publications frequently covered multiple themes. The table should not be read across by row.

2.5 Discussion

2.5.1 Main conclusions

The published academic literature on health-related emergency planning disproportionately originates from North America. There were surprisingly fewer publications from Europe and Australasia when one considers the number of reported major incidents occurring in these regions. This finding confirms findings from a systematic review of disaster management previously carried out by Lettieri.(Lettieri et al., 2009) The predominance of American disaster literature may reflect the catalysing effect that the terrorist attacks of 11 September 2001 have had on both research and publications in this field.(Bradt and Aitken, 2010)

There was also a predominance of descriptive event reports and commentaries. For many of the observational studies reported, there was a lack of use of controls against which to compare the reported effectiveness. This makes it difficult to assess the reliability and actual effectiveness of the actions and interventions reported. Consequently, this highlights the need for more systematic and robust ways of capturing learning from disasters.(Bradt and Aitken, 2010)

Finally, a high proportion of articles were focused on emergency response and preparedness aspects. There was considerably less published on other elements such as hazard assessment, disaster mitigation and recovery.

2.5.2 Limitations

There have been previous reviews of public health systems research in emergency preparedness (Savoia et al., 2009) and disaster management (Lettieri et al., 2009). However, this scoping review to the best of my knowledge represents the first attempt to scope and map the extent of emergency planning literature that is relevant to health in HIC setting.

Publications on disasters and emergencies tend not to be coded well bibliographically and there is no universal taxonomy. This may reflect the different conceptual frameworks used for disaster management, and possibly different approaches to emergency management worldwide. This diversity in understanding makes the identification of relevant articles using MeSH headings difficult as multiple terms may be used around the world to describe similar processes. It is therefore not possible to guarantee or ascertain that all relevant articles were fully identified. However, my search strategy attempted to mitigate this by deliberately being inclusive, i.e. more likely to keep an article in rather than exclude it. This approach would have improved the sensitivity of the literature search and I believe will have identified most if not all relevant published articles in academic journals in the journal databases interrogated. That said the inclusive nature of the strategy could in turn render

some of my findings optimistic in terms of applicability of the evidence as the ability to translate such evidence into practice is likely to be context-bound.

In reality, the various phases of the disaster management cycle are not always distinct. For example, hazard analysis may be carried out in both the mitigation phase as well as planning and preparation phase. Similarly, emergency response activities eventually merge into recovery phase activities. The categorisation of articles by phase may therefore artificially demarcate what is essentially a continuum of interwoven and related activities that occur throughout the disaster management cycle. The categorisation by disaster management cycle phase used in this scoping review was however necessary in order to enable a means of analysing the articles identified.

Due to time constraints and the volume of articles being scoped, the scoping review was limited to reviews of the abstracts only. As such, it was not possible to ascertain whether the articles had sufficient analytical power to either inform the development of theoretical concepts and frameworks or test hypothesis. In retrospect, a fairly traditional medical model of hierarchy of evidence was used in reviewing the publications. Consequently, the scoping review may have failed to appreciate and identify articles that may have considerable analytical rigour and insight, but was missed because they did not conform to the traditional evidence hierarchy.

2.5.3 Implications for research and practice

There is a predominance of academic publications that cover emergency preparedness and response phase aspects compared with those that address mitigation and recovery issues. This suggests a relative lack of published literature on the latter topics. Whilst it could be argued that it is not possible to objectively ascertain how many publications on each topic would be “adequate” (i.e. how much is enough?), the marked imbalance in the distribution of articles across these topic areas is striking and would suggest deficiencies are likely to exist. As such, a more balanced redistribution of research towards those topics that are less published on may prove fruitful.

There are also a disproportionately high number of publications that either originate from or pertain to the US. Whether the findings of these studies from the US can be generalized elsewhere in the world is debatable, given variations that exist in the legal frameworks and emergency response infrastructure for different countries worldwide. That said, the imbalance in country of origin of articles also highlights the scarcity of UK-based research and paucity of the evidence-base to inform emergency preparedness and response plans in the UK.

The scoping study also revealed a dearth of higher-order research study types such as RCTs. That said, the traditional hierarchy of evidence as applied to clinical research where RCTs are highly

valued may not be appropriate in this field.(Bradt and Aitken, 2010) With the exception of certain specific fields (for example studies examining psychological interventions for disaster survivors), RCTs are likely not to be practical or feasible in disaster settings.

In view of the large number of event reports and commentaries, narrative synthesis of these observational studies could be done. However, the robustness of any analysis of these studies is hindered by the lack of consistent data collection protocols that affects the comparability of studies.(Rodgers et al., 2009) There have been repeated calls made for the reporting of major incidents to be standardised and suggestions have also been made as to the format this should take.(Carley et al., 1998, Sundnes and Birnbaum, 2002) However, there is little evidence at the present time of this occurring. Whilst there are numerous event reports in existence, no meta-syntheses of these have been done to provide that evidence-base. Furthermore, the type of evidence that would be of greatest utility for emergency planners and practitioners has also not yet been defined.

I also observed that there was a difference between disaster management in high-income country settings and in low-/middle-income country (LMIC) settings. Conceptually, the disaster management cycle should apply and operate similarly in both settings. However, the contextual differences lead to greater emphasis in high-income country settings on emergency planning and preparedness. In LMICs the focus is much more on disaster response and recovery.(Pearce, 2003) Similarly, high income countries focus on *emergencies* whilst LMICs on *disasters*. This is unsurprising as more vulnerable societies are more likely to experience disasters and be more severely affected by them. That said, in the last twenty years globally there have been policy shifts with greater emphasis on 'disaster risk reduction' in LMICs, mirroring the current focus of HICs. Research into disaster management in these 2 different settings is neither mutually exclusive nor antagonistic but could offer new insights and shared learning for both settings.

2.6 Conclusion

In the wake of 9/11 and Hurricane Katrina, the US bias in the published literature is unsurprising. This applied both to the US setting and emergency planning priorities (natural disasters and terrorism). What is not known however is the generalizability of insights from the existing evidence-base from North America to the UK context. In addition, most articles focused on the peri-emergency period with little on mitigation and recovery. The literature that is available tends to be of weak evidential strength. Indeed, my findings revealed the limited evidence-base available to assist emergency planners and policymakers in the UK, particularly in the areas of mitigation and recovery. There is therefore a critical need to address this evidence gap and to build up a robust,

local evidence-base holistically spanning the entire emergency cycle to inform emergency planning and management in the UK.

2.7 Summary points

- Much of the published academic literature is from the US and based around US priorities.
- The articles tend to be focused on emergency preparedness and response phase with much less on mitigation and recovery.
- The literature quality tends to be poor and of questionable transferability to other settings.

Chapter 3: Scoping review of the grey literature

The following chapter in parts has been published by the author in the NIHR report on emergency planning (Lee et al., 2012a) and in an article in *BMC Public Health*(Lee et al., 2012b, Challen et al., 2012).

3.1 Introduction

A scoping review of the grey literature was also carried out. As for the scoping review of the published academic literature, the aim of this grey literature scoping review was similar, i.e. to map out the existing evidence-base for disaster and emergency planning in the HIC context and to identify gaps in the evidence-base.

The objective of this scoping review was to search for and identify relevant documents on emergency planning and management not published in peer-reviewed academic journals, and to carry out a descriptive narrative review of them using thematic analysis. The rationale for examining the grey literature was because it was suspected that a substantial amount of material such as incident reports are written by emergency practitioners for practitioners and not necessarily for an academic forum. As such it is likely that such material does not make it into academic journals but may be lodged elsewhere in other repositories.

It could be argued that I could also have carried out a scoping review of the grey literature for disasters in Low- and Middle-Income Countries, especially considering that there is potentially a wealth of information in various relevant databases such as Reliefweb(OCHA), the Overseas Development Institute(ODI), and various INGO websites. In addition, humanitarian standards for the delivery of aid in disaster and emergency situations have been devised as published by the Sphere Project(The Sphere Project). Undoubtedly the Sphere Project's standards would have been devised with input and consensus from experts in the field. I however chose not to do this as at the time of my research (2011-13) I was aware of a much larger multi-centre initiative run by the London School of Hygiene and Tropical Medicine, and Harvard School of Public Health, precisely set out to examine the evidence base for health interventions in humanitarian crises. They initially reported their findings in 2013 and subsequently this has been published.(Blanchet et al., 2013) Consequently, it was evident to me that this knowledge and research gap was and has been addressed elsewhere.

3.2 Methodology

3.2.1 Sources

The first stage involved identifying potential sources of grey literature. I carried out a brainstorming session with my project collaborator, KC, as well as consulted with the expert advisors attached to our NIHR funded study. The experts consulted included

- Dr Darren Walter, Clinical Director for Urgent Care and a Consultant in Emergency Medicine at the University Hospital of South Manchester
- Dr Wendy Philips, Regional lead for Emergency Planning and Director of South Yorkshire Health Protection Unit, Health Protection Agency

The scoping review of the grey literature only included documents that pertained specifically to the UK context. These comprised the following articles:

i) Incident (post-event) reports that had some health-related aspects;
ii) Public health emergency preparedness and planning guidance documents produced by the Department of Health (DH) or other health organizations in the UK; and
iii) Protocols and guidelines for emergency preparedness in the UK.

Other potential databases were also identified through the initial published literature mapping exercise (Chapter 2) and a few were identified by key informants participating in the qualitative interviews (see Chapter 4). Using this search strategy, the following databases were identified and combed for relevant documents:

- Health Protection Agency website
- NHS Evidence Search
- British Association of Immediate Care Schemes
- Emergency Planning College[13]
- Health and Safety Executive Major Hazardous Incident Data Service

➢ ***Post-event/Incident reports***

Much of the grey literature reviewed was in this category as either event reports or reviews. Broadly speaking, event reports were descriptive and/or narrative reports of an incident written

[13] The search of the EPC library database found a number of relevant documents which were available online and subsequently downloaded and included in the review. A further 11 articles were identified that were judged to be potentially relevant on the basis of their title. However, these articles were not freely accessible and consequently it was not possible to add them to the review.

in the aftermath. These tend to have little or no appraisal of the event. On the other hand, event reviews tended to have a greater degree of reflection and critical appraisal of the handling of the event.

Post-event/Incident reports were searched for from the following databases:

a) *Health Protection Agency*

The Health Protection Agency website was searched for relevant event and/or incident reports. The most relevant articles were found in the ***Chemical Incidents Report***[14] (1999 – 2003) and the ***Chemical Hazards and Poisons Reports***[15] (2003 - 2011). All recent reports from 2010 and 2011 were examined. A small random sample from previous years was also looked at.

b) *Inquiries into major incidents*

An internet (Google) search was also carried out for all reports from inquiries initiated by the UK Government for various major incidents that were publicly available online 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 from the Ministry of Justice's website.[16] These summary reports are published twice a year by the Ministry of Justice that collate coroners' reports as well as responses received from organisations asked to consider action to prevent future deaths . We attempted in particular to find the Coroner's reports for some of the key UK disasters in recent decades:

[14] Health Protection Agency *Chemical Incidents Reports*. Available from http://webarchive.nationalarchives.gov.uk/20140714084352/http://www.hpa.org.uk/Publications/ChemicalsPoisons/ChemicalHazardsAndPoisonsReports/ (Last accessed 23.11.14)

[15] Health Protection Agency *Chemical Hazards and Poisons Reports*. Available from https://www.gov.uk/government/collections/chemical-hazards-and-poisons-reports (Last accessed 23.11.14)

[16] Ministry of Justice *Summary of Reports and Responses under Rule 43 of the Coroners Rules*. Available from: https://www.gov.uk/government/publications/summary-of-reports-and-responses-under-rule-43-of-the-coroners-rules (Last accessed 23.11.14)

- 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

Emergency planning guidance

A search was done for guidance on health emergency planning using the following sources and approach:

a) NHS Evidence Search

A search of NHS Evidence, using its 'search' function for articles on emergency planning that was accessible online.[17]

b) Department of Health website

The DH website was also searched. The search included both current and archived contents of the Department of Health (DH) Emergency Planning website. Only those documents that contained detailed guidance for health professionals were downloaded and included in the scoping review.[18]

[17] NHS Evidence - health management, Emergency planning. Available at: http://www.library.nhs.uk/healthManagement/viewResource.aspx?resid=61258&code=1774203adf7a1efde93962c440bdc813

[18] For the complete list of documents see: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4121072 and http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/Managingyourorganisation/Emergencyplanning/Deliberaterelease/index.htm

c) *Health Protection Agency*

The Health Protection Agency website was also extensively searched for relevant guidance documents. As mentioned above, the most relevant articles identified through this search were found in the *Chemical Incidents and Poisons Reports* database.

d) *UK Resilience*

The UK Resilience website[19] was also examined. From this website, we identified a few key documents regarding the Civil Contingencies Act and associated consultations. These were downloaded and examined.

3.2.2 Sampling strategy

I was mindful that the purpose of the review was to elucidate the extent of the evidence-base. As such, inclusivity and breadth was a priority. All types of emergencies were considered including CBRN emergencies and natural disasters. Considerable effort was made to find and obtain those articles that fell into the three main categories stated in section 3.2.1 above (i.e. post-event reports, guidance documents, protocols and guidelines). Those articles that were potentially relevant but which did not fall into any of these three categories were not excluded but were also looked at for possible relevance.

No distinctions were made between documents that were current and active or older versions and superseded documents. Where there were several versions of the same document available, we chose the most recent version to be reviewed.

As stated earlier, only grey literature from the UK were considered. This was for reasons of feasibility: neither I nor my study's expert advisers were fully familiar with the North American, European, Japanese or Australasian grey literature repositories. As such had an attempt been made to explore the grey literature from these other countries, it is possible that key repositories and documents may be missed. Whereas by adopting a focused UK-only approach, I could be reasonably sure that most if not all of the relevant UK repositories were identified and interrogated.

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

Where we found inactive web-links to articles that were potentially relevant, a further search was carried out of the Internet Archive by document name. If this was unsuccessful, a search was also

[19]UK Resilience website accessible at: http://interim.cabinetoffice.gov.uk/ukresilience.aspx

carried out using the document's name via the Google search engine. If the articles could not be accessed by either route, they were not considered.

A complete list of the grey literature reviewed is given in Appendix 3.

3.2.3 Filtering for relevance

Articles identified through the initial trawl of the grey literature were then subjected to filtering for relevance. Key inclusion criteria were as follows:

- Incident/post-event reports, guidance documents and guidelines/protocols
- Relevant to emergency planning, response and management
- In the UK context only

The following documents were excluded from the search: technical documents, directives (e.g. short documents that contained instructions for accessing stocks, reporting timelines, etc.), glossaries, lists of acronyms, diagrams and guidance for patients. By virtue of the databases searched articles were in English and excluded non-human articles, except where there was a relevance to human health (e.g. articles on animal feeds with potential risk to human health were included).

The grey literature articles identified were recorded on Microsoft Excel and coded according to pre-defined thematic codes. These thematic codes were sets of metadata identical to that applied in the scoping review of the published academic literature detailed in Chapter 2. Coding was carried out by AL, and three other study collaborators, KC, WP and PG. As with the scoping review of the published academic literature, coders were briefed by AL on the coding framework to be used and shown a couple of examples of how this was done.

192 documents were selected for coding. The number reviewed and coded by each coder was as follows: AL (n=56), KC (n=53), PG (n=45) and WP (n=40).These articles were initially assessed for relevance. Of the 192 documents, 95 (49.5%) were discarded as irrelevant.

Frequency analysis of the data was performed using Microsoft Excel 2010. The data was also descriptively analysed by themes and the findings are presented in sections 3.3 and 3.4.

3.2.4 Qualitative analysis of key themes

- ***Descriptive coding***

97 relevant documents were coded for type of incident, type of publication and emergency phase. These are simply described in terms of frequency and proportions in the next section.

➢ *Thematic coding*

93 of the 97 documents were further interrogated to identify key issues. Reviewers read through all 93 of these documents. (The remaining four were not interrogated because full articles could not be obtained apart from the articles' abstracts or executive summaries). For the purpose of this scoping review, I defined key issues as the "key messages" emerging from each document. They were expressed using short 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 coders annotated each article entry on a Microsoft Excel spreadsheet with these key issues entered as free text. An example of this is illustrated below:

Figure 12. Screenshot of excel spreadsheet to show coding framework used

DOCUMENT NAME	REVIEWER	1st AUTHOR	TITLE	ORGANISATION	If other organisation, specify	YEAR	INCIDENT TYPE	PUBLICATION TYPE	If other publication type, specify:	EMERGENCY PHASE	KEY ISSUES IDENTIFIED
http://www.hpa.org.uk/Publications/ChemicalsPoisons/ChemicalHazardsAndPoisonsReports/Issue17ChemicalHazardsandPoisonsReport/	WP	Brunt H et al	Sulphur mustard incident, Swansea	HPA	Public Health Wales	2010	Chemical	Event report/ review	N/a	RESPONSE AND RECOVERY	Benefits of a coordinated multi-agency response; sulphur mustard remains a risk from post war ordnance and will be included in Chemical Recovery handbook

The 97 documents reviewed yielded a total of 236 key issues. On average, each document flagged up around two issues (mean = 2.44, median = 2.00, range 0-9). The key issues were then thematically coded and categorised. For a complete list of coding options, see Appendix 4.

Once extracted, I checked each key issue to ensure that they were understandable. The key issues were only modified when necessary (e.g. for typographical errors, abbreviations, etc.). In order to analyse the results, I followed the principles of thematic analysis. Each key issue was coded thematically. Some key issues could have up to a maximum of two codes where necessary as the issue could span different thematic codes. The thematic codes were successively categorised into higher themes and eventually into major thematic categories related to the most important topic areas (see section 3.4).

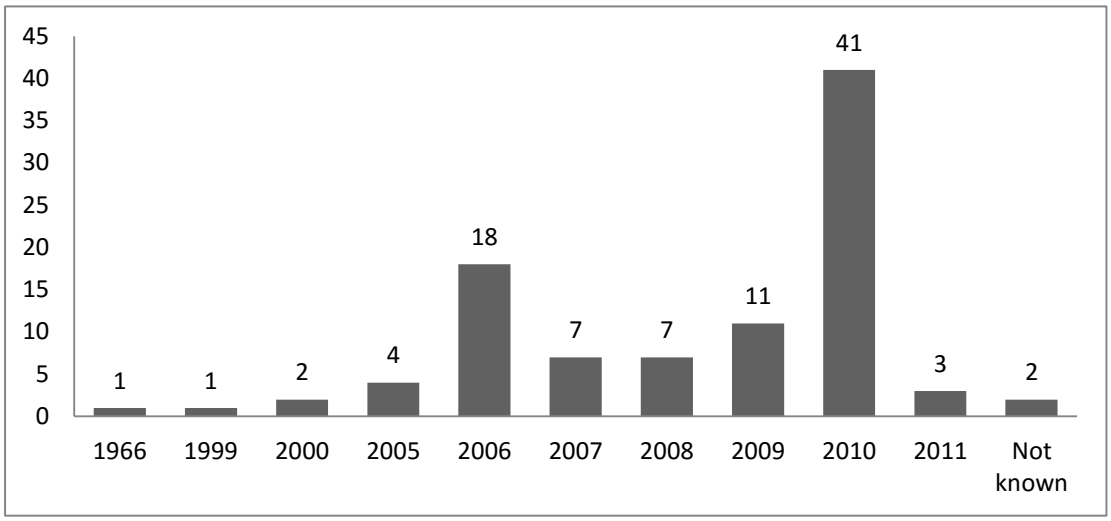
3.3 General description of included documents

3.3.1 Year of Publication

The retrieved documents were categorised according to several different parameters. Figure 13 shows the distribution of articles retrieved by year of article publication. An acknowledged limitation though was that the *Chemical Incident Reports* and *Chemical Hazards and Poisons Reports* for the

years 1999 – 2009 were not wholly examined and incorporated. Had I done so, this would have significantly increased the number of reports for that time period. However, those articles retrieved from these two journals would have artificially skewed my findings predominantly towards chemical incidents as this was the main focus of these reports.

Figure 13. Year of publication of included documents (n=97)

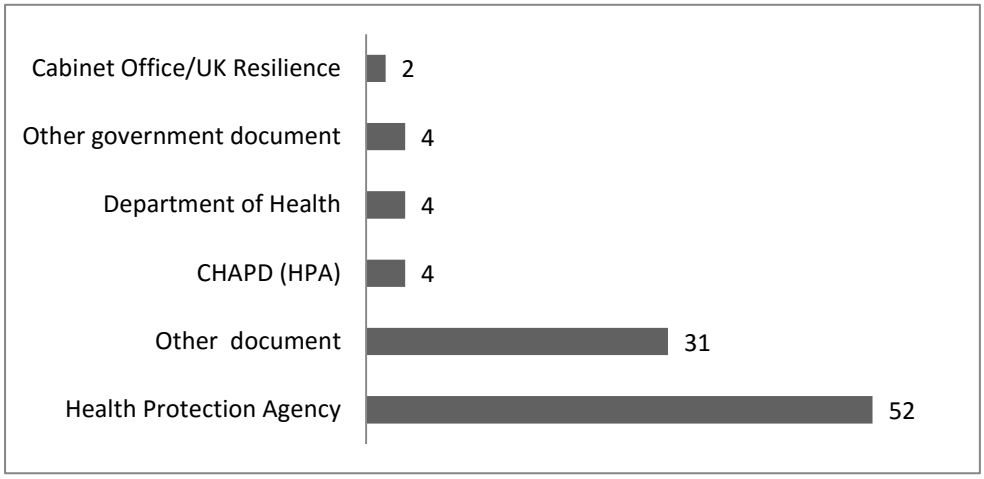


The documents included in this scoping review were published in the last decade. This was intentional as I sought to get a fairly up-to-date snapshot of the grey literature currently. There were very few exceptions where articles from further back in time were included. This included the reports into the Aberfan disaster (1966) and Ladbroke Grove rail disaster (1999). These were purposively included as I felt they were key disasters where inquiries into their cause and effect is likely to have had some bearing on emergency planning and response practice today.

3.3.2 Source of publication

Whilst the majority of articles were published by the HPA (54%), many grey literature documents originated from several other organizations including various government departments as well as local organizations such as local resilience forums. (Figure 14)

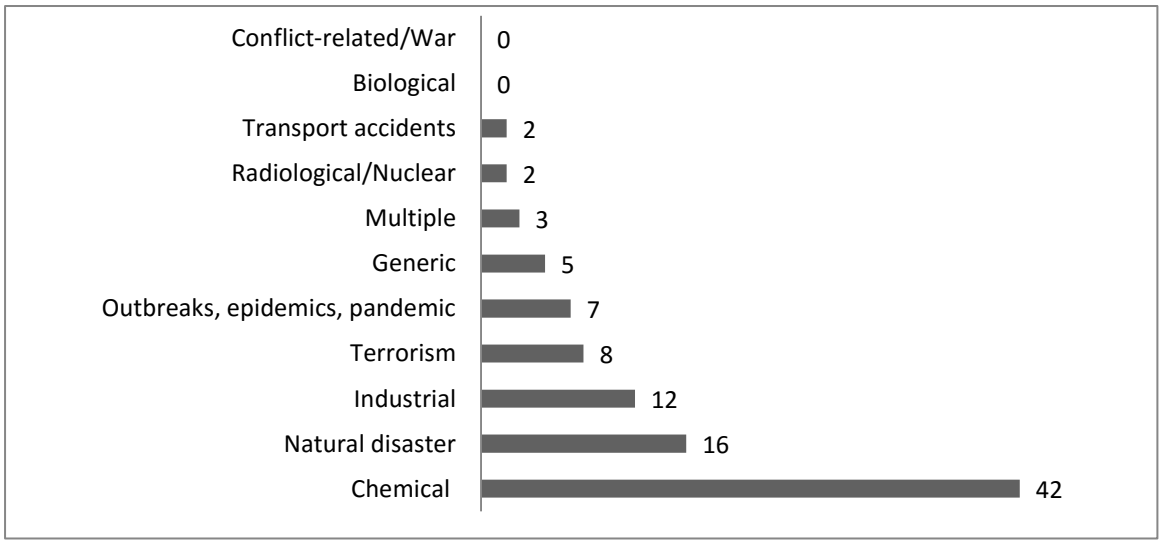
Figure 14. Organisations attributed to publication of included documents



3.3.3 Type of incidents

Documents included focused mainly on chemical incidents (43%), again probably an issue with ascertainment bias as the Chemical Incident Reports and Chemical Hazards and Poisons Reports constituted a significant source of reports. Other incident types covered included natural (16%) and industrial disasters (12%), terrorism (8%) and outbreaks, epidemics and pandemics (7%). (Figure 15)

Figure 15. Type of incidents described in included documents



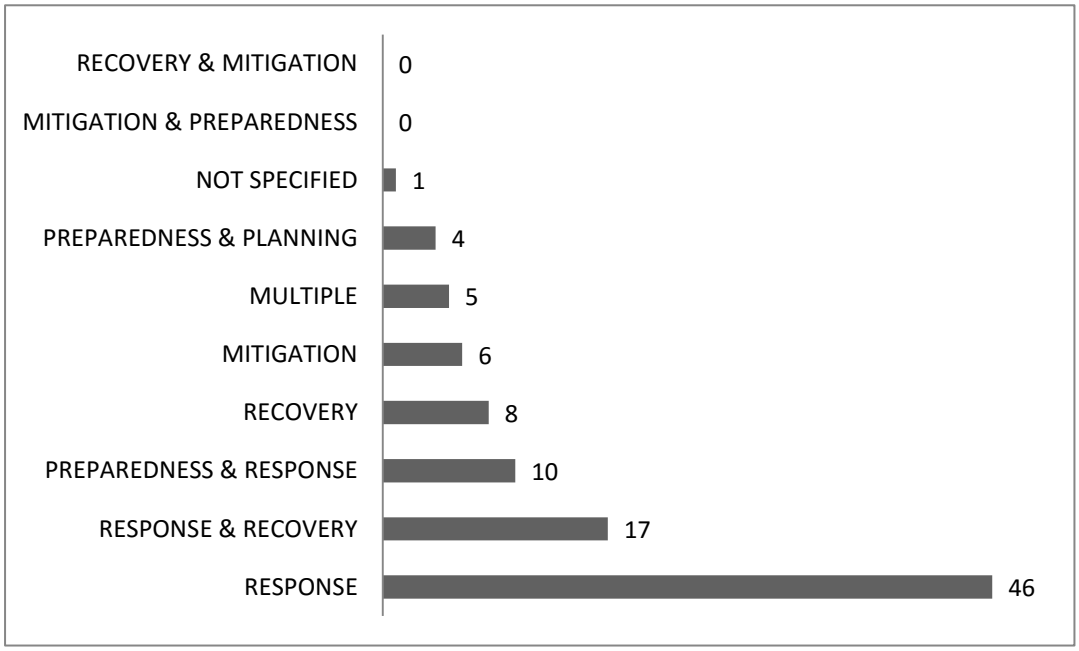
The preponderance of chemical incidents reported suggests that in relative terms, chemical incidents could be a more common occurrence. That said, it was also clear from the chemical incident reports that many of these incidents were fairly minor events which whilst requiring multi-agency responses tended not to be on a “disaster” scale as some of the other non-chemical incidents. It is also clear that by virtue of there being a periodical that collates and reports these

chemical incidents, chemical incidents are therefore better reported and recorded than other incident types.

3.3.4 Phase of disaster management cycle covered

Figure 16 shows that the *emergency response* phase was by far the most frequently described in included documents (47%). It was also sometimes described in conjunction with recovery or preparedness (10%). Other aspects of the disaster management cycle such as mitigation and recovery were comparatively less frequently reported (14%).

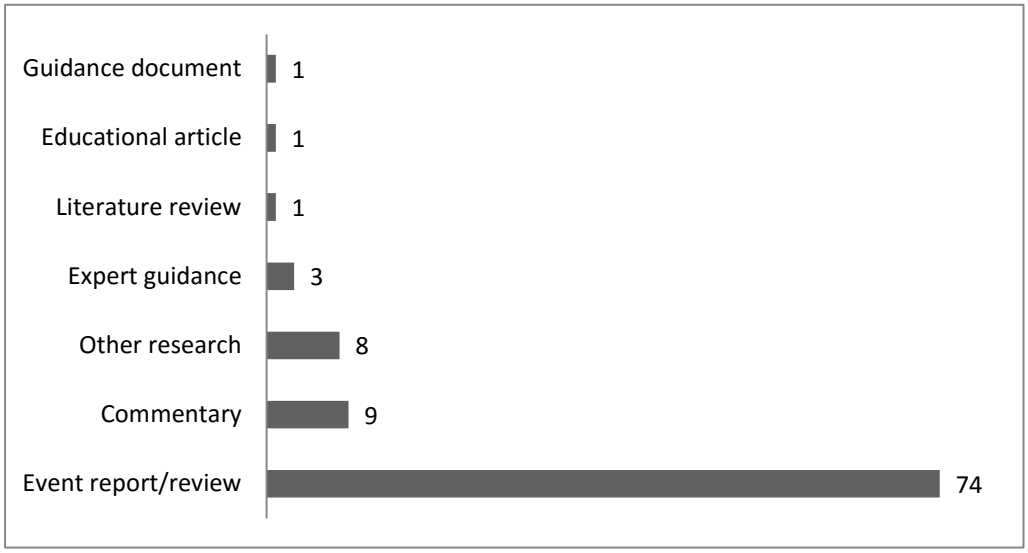
Figure 16. Main emergency phase described in included documents



3.3.5 Type of publication

As illustrated in Figure 17, more than three out of every four documents were *event reports*. Other publication types were less common. These included commentaries, other research, expert guidance and guidance documents. (The latter being documents more of an instructional nature to practitioners)

Figure 17. Publication types



3.4 Qualitative Findings

The key themes from the grey literature scoping review are presented in the following table (Table 13).

The key issues identified fell in to three thematic categories:

- ***Disaster management system*** issues: which covered mainly organizational issues such as how the system is configured as well as operational issues such as informatics and intelligence issues, operational issues related to the four phases of the disaster management cycle, communication issues and aspects of risk management;
- ***Community context***: which included issues such as community engagement as well as community characteristics that affect their resilience or vulnerability to disasters; and
- ***Knowledge management***: which covered issues to do with how the knowledge- or evidence-base is collated (e.g. through organizational learning), shared and communicated.

Table 13. Main themes emerging from the grey literature

Key issues identified from grey literature	Minor themes	Major themes	Thematic Category
Command & control	Leadership issue	*Cross-cutting organizational issues*	***Disaster Management System issues***
Decision-making & leadership			
How the system is set up/organized	System configuration		
Roles & responsibilities	Coordination issues		
Multi-agency coordination/ joint working			
Staff engagement	Human resource management issues		
Making best use of available staff			
Mitigation of late effects	Disaster prevention/ mitigation issues	*Operational issues*	
Building resilience			
Business continuity planning	Emergency planning & preparedness issues		
Capability maintenance e.g. need for emergency exercises			
Alert & Warning systems			
Staff exposure/protection	Emergency response issues		
Managing surge			
Standard operating procedures			
Logistics/Supply chain issues			
Monitoring effects of hazard exposure	Recovery issues		
Monitoring disaster impacts			
Data gathering/monitoring	Informatics & Intelligence		
Modelling impacts/forecasting			
Applying scientific/technical expertise			
Inter-agency information sharing issues e.g. patient data & confidentiality issues			
Data gathering/monitoring	Risk assessment	*Risk management*	
Mapping & modelling hazards			
Communicating risk	Risk perception		
Stakeholder risk perception			
Public awareness			
Engaging policymakers	Upward communication	*Communication issues*	
How agencies communicate	External communication		
Handling the media			
Communicating with the public			
Disseminating information/knowledge	Internal communication		

Table. Main themes emerging from the grey literature (continued)

Key issues identified from grey literature	Minor themes	Major themes	Thematic Category
Community involvement		*Community engagement*	***Community context***
Human behaviour		*Community characteristics*	
Social capital			
Social structures			
Operational queries	Accessing expert advice/ knowledge	*Knowledge-sharing*	***Knowledge management***
Specific scientific/technical queries			
Need for professional networks			
Communication of technical and scientific advice to practitioners and public	Communication aspects	*Knowledge communication*	
Hazard exposure issues	Unknown consequences of hazards	*Knowledge gaps*	
Actions required in a particular situation	Research needed		
Debriefing after incidents	Organizational learning	*Learning from disasters*	
Need for guidance			
Staff & organizational training needs			

A summary and discussion of the major themes from each category is presented below.

3.4.1 Disaster management system

For many of the articles, operational and organizational issues predominated such as emergency management system processes and configuration, human resource management, communications, inter-agency coordination and informatics/intelligence in emergencies.

3.4.1.1 Cross-cutting organizational issues

- System configuration and multi-agency working

  The commonest theme reported had to do with organisational issues pertaining to how the system was set up and configured. Issues with the emergency management system and organizational structure, as well as roles and responsibilities were identified in 44% of documents (N = 35). There were numerous themes identified by the reviewers grouped notably around the challenges, but also the benefits, of multi-agency collaboration and coordination.(Brunt et al., 2010)

- Decision-making & leadership in emergencies

  Issues around command and control hierarchy within and between organisations, and problems with clarity of command functions were the second major theme in this area. In the articles examined, there were issues regarding the roles played by different key actors in an emergency such as emergency department practitioners, volunteers, the Consultant in Communicable Disease Control (CCDC), and Emergency Planning Officer (EPO).(Middlemiss et al., 2010) In one documented incident, the key issue that emerged were the difficulties encountered with regards to identifying key commanders in an incident.(Fisher, 2010a)

  Another key cross-cutting issue that frequently came up was with regards to how decisions were made in emergencies. Decision-making featured in 35% of documents (N = 28). This theme was frequently discussed in conjunction with related organizational issues such as roles, organizational hierarchy, and command and control. The lack of political leadership and inter-agency collaboration were reported to be significant issues, especially in emergency situations where it has been reported to be vital for effectively managing uncertainty. There was a reported need for clearly identifying key commanders whilst ensuring a degree of flexibility in command and control.(Fisher, 2010a, McBride, 2010)

  Other factors that were reported as influencing (or hindering) effective decision-making in incidents included:

  - An understanding of sociological aspects such as human behaviour in emergencies(Urquhart and Bardsley, 2010);
  - Familiarity of roles and responsibilities between partner agencies(Middlemiss et al., 2010, Taye et al., 2010);
  - Technical or procedural aspects, such as the importance of logging decision-making and the issue of inconsistent practices of different agencies in maintaining decision logs.(Greater Manchester Resilience Forum, 2008)

- Coordination issues

  As hinted above, multi-agency responses in emergencies are complex and difficult, and there are considerable coordination challenges that are frequently encountered. That said multi-agency responses are essential particularly in incidents with potentially wide public health ramifications. The importance of involving early the health advice teams in such incidents was iterated in several documents.(Harper et al., 2009, Cotton and Mallaghan, 2008, Kumbang et al., 2009, Fisher, 2010a, Brunt et al., 2010, Dunne et al., 2010) Multi-agency

collaboration was also advocated when dealing with incidents involving potential contamination from unknown chemical agents.(Fisher, 2010a) Likewise, there was benefit reported in combining health and safety (occupational) advice in an advisory cell in order to ensure consistency in response activities.(Cotton and Mallaghan, 2008, Wilson et al., 2008)

- Roles and responsibilities

  However, whilst it was recognized that a rapid multi-agency response can minimise the health risks for disaster-affected populations,(Yadav, 2010) the documents also identified several aspects of the multi-agency response that required improvement.(Kumbang et al., 2009) Problems with coordination often arose from a lack of clarity of roles and responsibilities of the agencies involved e.g. Greater Manchester Resilience Forum Exercise Naval debrief report(Greater Manchester Resilience Forum, 2008). In the Pitt Review, it was reported that the role of the Scientific and Technical Advice Cell (STAC) was vague,(Pitt, 2008) and in another article issues were reported with communicating scientific and technical advice during an incident.(Wilson et al., 2008)

  Problems were also reported in the Buncefield fire multi-agency debrief around issues that arose due to having numerous health representatives attending 'Gold'-level[20] meetings. In another, it emerged as a lack of understanding of the role of the Air Quality Cell (AQC)[21].(Izon-Cooper, 2010) These documents highlight the importance of stakeholders being familiar with and understanding the roles and responsibilities of partner organisations.

- Human resource management

  Also reported were human resource management issues, particularly around how best to make use of available staff and other resources. For example, in one report, there were issues around how volunteers could be utilised with specific problems around how the credentials of volunteers could be verified during an incident.(Department for Culture Media and Sport, 2009)

[20] Gold-level meetings refer to the top layer of incident management in the UK that provides strategic leadership and policy direction to the Tactical ('Silver') and Operational ('Bronze') levels of incident management.STUART-BLACK, S., STUART-BLACK, J. & COLES, E. 2008. *Health emergency planning: a handbook for practitioners,* London, TSO. ibid.

[21] The Air Quality Cell is a scientific and technical advisory group that may be set up as needed to advise incident commanders and incident management teams.

3.4.1.2 Operational issues

- Disaster Prevention/Mitigation

  Some articles highlighted operational issues related to hazard or threat mitigation (N=18, 22.5%). Whilst various issues were identified, only three had wider implications. These were the need to mitigate the late effects of disasters(Soler et al., 2010), for precautionary measures to protect public health and the need to find ways to mitigate the adverse effects of disasters on the most vulnerable populations(Fisher, 2010b). Examples for the latter include structural evaluation or adaptations of buildings such as schools and hospitals against heat waves, tighter controls on the storage of fireworks to reduce the risks of explosion, better mapping of tyre dumps, and mitigation of risks related to refrigerator leaks in a hospital setting.

- Emergency Planning and Preparedness

  More than a third of articles (N = 30, 37.5%) pertained to emergency planning issues. Organisational cultural issues were cited especially with regards to the management of uncertainty as a key element.(Hine, 2010) Another issue was the reluctance by individuals and organisations to adopt a 'worst case' approach to planning.(Hine, 2010, Hertsfordshire Resilience Forum, 2007) Also stressed was the importance of learning from past experiences and best practices. Such learning could be facilitated if emergency plans were more systematically reviewed and debriefed. However, this is sometimes constrained by the dearth of information contained in post-event reports currently.(Hertsfordshire Resilience Forum, 2007) Likewise, the grey literature indicates that there is benefit in engaging with communities and involving local businesses, clinicians, as well as human resources and finance departments in emergency planning.(Soler et al., 2010)

  Other challenges with emergency planning were also identified such as the lack of clarity and ambiguity of definitions for incidents used, difficulties with inter-agency communication and incorporating scientific advice into planning.(Fisher, 2010a) In several documents, the lack of plans or specific procedures (or attempts to provide initial guidance) was also identified. These were in specific sectors where such plans, protocols and guidance were essential for mitigating disasters. Examples include:

  - the lack of recovery planning(Hertsfordshire Resilience Forum, 2007);
  - the need to include in emergency plans specific lockdown procedures for healthcare settings in case of terrorist threats, and for guidance for full hospital evacuation(Checkley and Mansford, 2010); and

- the need to implement 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(Chemical Incident Response Service, 2003), management of marine spills, health registers for monitoring the situation following disasters, or specific protocols to convene Scientific and Technical Advice Cells (STACs)(Greater Manchester Resilience Forum, 2008) or to stockpile personal protective equipment by health care trusts.(Hine, 2010)

Business continuity management was covered in a few articles (N = 13, 16%) and seen to be important across a range of organisations. For example, it was highlighted that health-related institutions, such as residential and nursing care homes, need their own specific business continuity plans.(Cowen and Mallinson, 2005) Emergency departments are also are risk of being disrupted by emergencies such as chemical incidents and therefore they too had a greater requirement for business continuity planning.(Alcock, 2006) Other key business continuity issues raised concerned the importance of protecting utilities during emergencies.(Bell, 2007) Business continuity is an operational issue with considerable relevance to emergency planners particularly when devising organisational emergency plans. However, it is unlikely to be an issue that is well addressed or reported in academic publications.

The need for building and maintaining emergency response capability, i.e. *capability maintenance,* through education and training of staff as well as emergency exercises, was raised in a few articles (N =10, 12%). From the qualitative comments, the specific issues identified were mainly concerned with the lack of regular emergency exercises, the importance of multi-agency collaboration in training particularly in specific sectors (for example, the prevention and management of incidents at sea) and the need for training to attain better emergency preparedness for search and rescue facilities.(Greater Manchester Resilience Forum, 2008, Kumbang et al., 2009, Yadav, 2010) Finally, one key weakness identified was that in some situations emergency exercises failed to address worst case scenarios.(Cumbria County Council, 2005)

❖ Emergency response activities

Many articles (N = 53, 66%) covered post-disaster response activities and major incident management. 21 documents (26%) raised the issue of *plan activation*. The preponderance of documents that pertain to the emergency response phase mirrors the publication content

trends noted in the previous scoping review of the published academic literature reported in Chapter 3.

The types of emergency situations described varied considerably in terms of severity, impact and scale. They included:

- fire incidents (e.g. 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.

Operational issues predominated such as the reported lack of *standard operating procedures* (SOPs) and protocols for responding to flood warnings and the delay in activating the 'Gold'-level committee.(Pitt, 2008) Perhaps notable more for its absence were triage protocols which were surprisingly under-reported especially as it has been reported elsewhere to be a key knowledge gap.(FitzGerald et al., 2010) Only one document (1%) covered 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 following the July 7 bombings,(Greater London Authority, 2006) and the lack of agreement on triage processes for critical care units during the 2009 Influenza A/H1N1 pandemic.(Hulf, 2010) Paradoxically, issues also arose where there were standard operating procedures (SOPs) as these could occasionally conflict with the need for flexibility of responders in emergencies.(McBride, 2010)

There were also concerns regarding the lack of a functional critical care network organized to husband critical beds, issues with the *supply chain* for critical care units, of treating children on adult intensive care units; as well as the importance of physical and virtual "space" in response to terrorist attacks.(Hulf, 2010, Department for Culture Media and Sport, 2009) A related theme was the challenge of organising more *surge capacity* in the

context of pandemics: there are significant human resource implications and issues that emerged related to health professionals working in extended roles.(UK Resilience, 2007) There were also occupational health and safety issues such as the need for *protective measures for staff* exposed to hazards in the course of their work responding to an incident, as well as the need for longer term health monitoring of staff.(Chow et al., 2007)

From experience with past incidents such as the Aberfan disaster, specific challenges were noted such as mortuary issues, the identification of victims, and the reception of survivors and relatives.(Davies, 1967) There has also been reported difficulties with accessing vulnerable people after the Carlisle storms in 2005 due to the floods.(Cowen and Mallinson, 2005) Further issues were identified with regards to the logistics of organising the evacuation of populations.(Asgari, 2006a) 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.(Middlemiss et al., 2010) In another document, difficulties emerged in dealing with the bodies of chemically contaminated victims.(Rutty, 2007)

Various other cross-cutting issues were identified such as knowledge management aspects, communication aspects and disaster informatics and intelligence issues. These are covered in a subsequent section later on.

- Recovery

  Recovery phase issues were covered in 27 documents (34%). Several documents underlined the general difficulties in conducting recovery activities, due to the fact that it is often difficult to assess the long term consequences of disasters, both for the environment and human activities, and for the victims.(Urquhart and Bardsley, 2010, Kirkpatrick and Meltzer, 2006) The lack of recovery planning was reported as a problem in one case, whilst in another incident difficulties were identified in coordinating the recovery and carrying out monitoring.(Hertsfordshire Resilience Forum, 2007, Asgari, 2006b)

  A proportion of the documents that discussed recovery issues covered a range of contamination related incidents such as floods, fires and sulphur mustard incidents.(Brunt et al., 2010) 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 considerations 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 fire-water run-off generated as a result of fire-fighting action.(Izon-Cooper, 2010, UK Resilience, 2006, Stewart-Evans, 2010a)

Several important recovery issues emerged for disaster affected persons. Firstly, there is a need to better understand the psychological consequences and post-event anxiety amongst survivors, as well as to identify measures to ameliorate this.(Hertsfordshire Resilience Forum, 2007) 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 which 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.(Smith, 2000)

More generally, problems were identified with the 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.(Hertsfordshire Resilience Forum, 2007, Yadav, 2010) Strong social and community support may help overcome the adverse 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. (Urquhart and Bardsley, 2010, Hertsfordshire Resilience Forum, 2007)

- Informatics & Intelligence in Emergencies

  A third of documents (33%, N = 26) involved issues concerning the use of information technologies, disaster informatics and health intelligence in emergencies. This covered the *forecasting of risks* and possible impacts of disasters. Modelling was found helpful in certain contexts such as plume assessment, hazard analysis and the evaluation of the public health impact of an emergency incident.(Webster, 2006, Bennett et al., 2008, Lamb, 2010) However, modelling is not infallible as pointed out in the Pitt Review of the 2007 floods where limitations of flood modelling were reported.(Pitt, 2008) The *monitoring of the impacts* of hazards and disasters beyond the acute phase and in the longer-term were also cited as an important consideration.(Kirkpatrick and Meltzer, 2006, Urquhart and Bardsley, 2010)

About a third of articles covered the subtopic of *alert and warning* (N = 29, 36%) but there were no clear themes identified by the reviewers. Some of the issues outlined in the reviewers' comments included the need for alert systems and activities 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). One challenge is the difficulty of communicating risk in the light of changing and/or limited information that often characterizes emergency situations(Stewart-Evans, 2010a). Another challenge is producing public information on risks that is appropriately tailored to local communities and needs.

However, several informatics and intelligence-specific challenges were also identified such as *data collection issues*. 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.(Harper et al., 2009, Hertsfordshire Resilience Forum, 2007, McBride, 2010) There were also particular concerns with regards to *information sharing* due to data protection concerns.(Pitt, 2008)

In several cases, the assessments of the impact of incidents were reported to be difficult. This was the case especially with air quality monitoring and control.(Harper et al., 2009) Examples of difficulties encountered included the lack of pre-agreed sampling arrangements for chemicals or radiation monitoring protocols. (UK Resilience, 2006) These problems affected both the on-site and off-site assessment of hazard impacts.(Stewart-Evans, 2010b)

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.(Stewart-Evans, 2010b, Jessop and Orford, 2010) Similarly, it was reported that syndromic surveillance could be applied to measure the impact of extreme events or incidents.(Elliot, 2010)

3.4.1.3 Risk management

Risk management was another common theme covered. This included the subthemes of methods and approaches to *hazard analysis and risk assessment*, *risk perception*, *communication of risks* to stakeholders.

A third of documents (N = 27, 34%) raised key issues concerning *hazard analysis and risk assessment*. There was a diverse range of topics covered ranging from the impact on air quality of fireworks (Galea and Powles, 2010) to carbon monoxide poisoning(Meltzer et al., 2008), the risks from

aluminium phosphide(Chemical Incident Response Service, 2003), maritime chemical incidents(Lamb, 2010) and sulphur mustard incidents.(Brunt et al., 2010)

The issues identified concerned the assessment and detection of various risks and hazards. This included aspects such as how hazards were mapped and modelled, and how data was gathered to monitor the hazards and their consequences. Hazard analysis can be complex (Pearce, 2003) and non-emergency responders in particular may not always appreciate or understand fully this complexity. It is particularly challenging conducting multi-agency risk assessments due to the differences in understanding of risk.(Fisher, 2010a) Some tools and procedures were described in various articles to guide and support the risk assessment process such as the use of an existing database of Control of Major Accident Hazards (COMAH) sites, modelling techniques and a risk assessment matrix.(Stewart-Evans, 2010b, Lamb, 2010)

Risk assessment issues included the difficulties of assessing the risk of secondary contamination in acute poisonings(O'Connell et al., 2010), or the risk of domino effects in hazardous sites adjacent to the location of the disaster(Taye et al., 2010), 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(Wilson et al., 2008). Of note, several articles covered risk assessment *during* or *after* the event, or were retrospective risk assessments, and very few actually were prospective and anticipatory.

The other major theme under the risk management heading was that of *risk perception*. As noted above, there were issues arising from different stakeholder perceptions. There were also problems due to a relative lack of public awareness and therefore perception of the risks posed by various hazards. It was also challenging to communicate risks especially in situations where information is limited or constantly changing.(Stewart-Evans, 2010a, Meltzer et al., 2008)

3.4.1.4 Communication

Issues with communication within and between organisations was reported in 44% of documents (N = 35). The communication problems reported ranged from problems with internal communication within organisations, inter-agency communication, communication with the public and the mass media, as well as upward communication to key decision-makers and policymakers. It also covered the more technical aspects of communication such as hardware-related issues. Some of the key communication issues reported are as follows:

- Information dissemination issues

In the emergency response phase, issues around the dissemination of information were common. For example, it was observed that communicating technical information and scientific advice to emergency responders could be difficult.(Wilson et al., 2008, Fisher, 2010a) (Hertsfordshire Resilience Forum, 2007). There are also problems with delays in the communication of information from 'Silver'-level commanders[22] to frontline responders such as the ambulance service(Cowen and Mallinson, 2005). Flaws were reported with the dissemination of clinical advice to health professionals and especially to temporary staff such as locums.(Hine, 2010) Another issue was with regards to inconsistent health and safety advice being given to responders as was reported for example in the Buncefield disaster.(Hertsfordshire Resilience Forum, 2007) Good inter-agency working and communication was reported to be vital in order to ensure consistency in the advice given.(Kettle et al., 2010)

- Inter-agency communication issues

  Information sharing between agencies was another problem. As mentioned earlier, there were problems encountered in communicating pandemic outbreak information to primary care or emergency departments and between local authorities.(Hine, 2010) Difficulties were also reported in obtaining specialist scientific and technical advice(Fisher, 2010a).

  One major barrier identified was *data protection concerns* that were reported in 6.3% of articles (N =5), including both the Pitt Review and the Home Office's report on the London bombings.(Pitt, 2008, Reid, 2006).

  Difficulties obtaining accurate and timely information from the scene of a disaster were also described. In one report, there was difficulty getting any information about vulnerable persons in a care home affected by a flooding incident(Cowen and Mallinson, 2005), while in another case it proved difficult to get an accurate 'bed state'[23] at the time of a hospital fire which hampered the evacuation.(Middlemiss et al., 2010) The provision of insufficient information from the casualty bureau was also raised as an issue by the Cullen Inquiry into the Ladbroke Grove Rail Disaster in 1999.(Cullen, 2001)

  Inter-agency communication also covered not just information dissemination between agencies, but also of relationships and links between the various agencies. The necessity to strengthen links between the NHS and local resilience fora (LRFs) as well as regional resilience fora (RRFs) was iterated.(Newton, 2007) The quality of these inter-agency

[22] 'Silver' refers to the tactical level of command and control by emergency responders.
[23] 'Bed state' or 'bed status' refers to the number of available hospital beds for admission at a point in time.

relationships in turn is likely to manifest in practice. For example the lack of contact information for key ambulance service staff during emergencies can be a significant impediment to information sharing.(Cowen and Mallinson, 2005)

Some of the issues reported undoubtedly arose from the lack of familiarity of the roles and responsibilities of partner agencies.(Urquhart and Bardsley, 2010, Middlemiss et al., 2010, Taye et al., 2010). This led to delays with accessing public health advice in emergencies by responders(Foster, 2008), as well as delays in informing the relevant health authorities (e.g. primary care trusts) about an emergency situation.(Cowen and Mallinson, 2005) The need for courtesy calls from emergency responders to hospital emergency departments was also identified(Gurney, 2011).

- Communications hardware issues

  Some of the communication issues within and between agencies reported were due to hardware problems. These included the over-reliance on mobile phones and the Internet. The former may be problematic in an emergency due to, for example, limited availability of *AirWave* underground, the lack of *Access Overload Control* (ACCOLC)[24] by emergency responders or simply because mobile phones can run out of battery power especially during a prolonged incident.(Reid, 2006) The London Ambulance Service, for example, was noted not to be on ACCOLC.(Greater London Authority, 2006) In another incident, the January 2005 Carlisle storm and floods, the ambulance service experienced a critical loss of access to the internet following the loss of power. (Cowen and Mallinson, 2005)

- Communicating with the public

  40% of articles (N = 32) pertained to external communications with the public and mass media in emergencies. One of the challenges is being able to accurately communicate to the public information about the risks faced. However, public risk perception may not match the real risk posed by a hazard or in an emergency situation. For example it was reported that there is still currently poor public perception of the risks of carbon monoxide(Meltzer et al., 2008). It was also reiterated in another report of the need to improve public risk perception of chemical health threats(Dunne et al., 2010). Several documents highlighted the value of using the mass media to communicate risks to the public.(Dunne et al., 2010, Stewart-Evans, 2010a, Meltzer et al., 2008) However, it was also reported that the mass media can worsen the confusion. In the Ladbroke Grove Rail incident, the number of casualties was

[24] *ACCOLC* (Access Overload Control) is a procedure used in the UK to restrict mobile phone usage in the event of a major incident.

exaggerated by the media (Cullen, 2001). Similarly, in the Buncefield incident, problems arose from the inconsistent use of local media to inform the public(Hertsfordshire Resilience Forum, 2007).

The appropriate use of external communications was also noted to be essential in all stages of the disaster management cycle: from the provision of timely and accurate information to the local population in the pre-disaster phase (Newton, 2007), to delivering reliable information to survivors in the aftermath of a disaster (Department for Culture Media and Sport, 2009). However, problems do arise from inappropriate public communication such as through the use of overly technical language in public communication. (Hine, 2010) Consequently, how the information is targeted to the public (be they householders or businesses for example) and how it is communicated is also crucial.(Head et al., 2010)

3.4.2 Community context

Another major aspect was that of the community context. The need for *community engagement* in emergency management, particularly around disaster mitigation and resilience activities was emphasized.(Soler et al., 2010) Community characteristics determine the *community vulnerability* to disasters. For example, it has been observed that disadvantaged populations tended to live close to the sites of chemical incidents.(Calvert and Murphy, 2005) Conversely, social capital for example in the form of social networks and social support can help communities overcome the health effects of disasters.(Yadav, 2010) However, communities differ and not all have the right social structures in place that enables community response and provides resilience.(Coates, 2010)

3.4.3 Knowledge management

Various technical 'knowledge gaps' were identified from the grey literature. There were questions with regards to the use 'controlled burning'[25] and its impact on population health(Barker, 2010); as well as how environmental testing is applied and interpreted (for example false positives for toxins were reported to be quite common).(O'Connell et al., 2010) There were also questions related to the interpretation of toxicology information(Fisher, 2010a); technical issues related to food testing and animal waste testing(Mortimer, 2010); as well as assessment methods to estimate excess deaths from heat waves that can inform and improve the response(Andrews et al., 2010). Another issue reported was the rescuers' lack of familiarity dealing with the threat posed by military and other explosive devices.(Greater Manchester Resilience Forum, 2008) These problems with knowledge gaps in disaster management also raise a wider issue as to how knowledge is managed, i.e. how

[25] Controlled burning, or "hazard reduction burning", is a process of managed burning undertaken to reduce a fire risk. It is commonly used in forestry management to minimize the risk of forest and bush fires.

knowledge is shared, how it is communicated to stakeholders including the public, how knowledge gaps are addressed and how organizations can learn from disasters.

3.4.4 Limitations

As mentioned above, only a selection of *Chemical Hazards and Poisons Reports* were reviewed. The rationale for only examining 2010 – 2011 reports was pragmatic on the basis that these reports were focused primarily on chemical hazards and incidents, and it was likely that themes from the various years were likely to be similar. The random selection of reports from earlier years was carried out to ensure that themes identified from the 2010 - 2011 reports were indeed similar to previous years. As not all of the reports were reviewed, there is a possibility, however remote, that there may be other key issues and insights not uncovered by this scoping review. The other acknowledged limitation is that due to the high number of *Chemical Hazards and Poisons Reports* that were reviewed, this could unbalance the scoping review and provide a skewed view of the grey literature towards predominantly chemical-related incidents.

We found only four issues of the *Summary of Reports and Responses under Rule 43 of the Coroners Rules* published by the Ministry of Justice. These four issues were examined but no useful or relevant information for this study was found. Our attempts to acquire inquiry reports for various UK incidents and emergencies were limited. Apart from the inquiry into the July 7 bombing, many of the other inquiry reports were not accessible, or not available in full. I noted that the scrutiny of incident reports tended to vary quite considerably. Some were comprehensively and rigorously written such as public inquiry or coroner reports. Others however were brief event summaries with little detail. The former would have been open to public scrutiny, whilst for other reports it is unclear if there was any form of scrutiny or peer review applied.

I found it difficult finding a repository of grey literature on emergency planning which was easy to access and openly accessible. The HPA's database of *Chemical Incidents and Poisons Reports* and the Emergency Planning College library were the two main repositories. Although there was a library at the Emergency Planning College at Easingwold, access to their resources was restricted and not publicly accessible. At the time of the study, the EPC had been contracted out to a private company, SERCO.

Finally, for this part of the study, inter-rater variation was not checked for as was done for the scoping review of the published academic literature in Chapter 2. Ideally, this should have been done and in its present form it is not possible to ascertain the extent of inter-rater variability of the coding for the grey literature scoping review. That said, at the time the grey literature scoping review was

carried out in 2010, the coders did meet regularly and discuss articles where there were any ambiguities or lack of clarity.

3.5 Discussion

This scoping review of the grey literature sought to map out the key themes and topics of the articles reviewed. The focus was therefore mainly on providing a narrative of the breadth of issues reported rather than depth or quantitative assessment of the knowledge base. The review was consequently descriptive and did not set out to explore the relationships and meanings of the themes uncovered. Many of the themes reported tended to reflect *operational* issues and difficulties encountered by practitioners. Virtually all were *event reports* of some form. The scrutiny that the grey literature were exposed to was also very variable ranging from highly scrutinized public inquiry reports, to event reports that were not subject to any form of peer review process.

That said there were many commonly encountered issues reported, such as inter-agency communication difficulties and coordination challenges, lack of clarity of roles and responsibilities, as well as challenges with regards to risk management and public engagement. Various reports made recommendations and identified lessons. Whilst undoubtedly some recommendations would be perfectly reasonable and appropriate, their generalizability could be questioned in view of the considerable contextual variability present for each incident. In addition, the robustness of the recommendations made is vulnerable to critique due to the lack of peer review and rigour as to how they were derived. For example, the process of drawing insights from such reports appears vulnerable to a number of cognitive biases, such as *confirmation bias* (seeking data to support a preconceived belief), the *availability heuristic* (greater credence is afforded to information that is more abundant and easily available) and *hindsight bias* (identifying as errors decisions that are only obviously erroneous in retrospect).(Tversky and Kahneman, 1974)

The other potential issue with grey literature reports is that the context in which these reports are written is not always known. There is a political dimension and there could be expectations placed upon report authors that could affect their objectivity. For example, there might be a strong expectation that report authors would identify lessons, draw firm conclusions and make recommendations, when from an academic/scientific perspective it would be neither robust nor reasonable to do so owing to limitations in the available information. Similarly, might there be political influences that could lead to a report being more or less critical of the participants involved?

My conclusion thus far from the scoping review of the grey literature is that it could be a potentially good source of learning for practitioners. It is more likely to be directly relevant to practitioners as

they are often written from an operational perspective, citing direct lessons learned and the recommendations made are usually targeted at practitioners. However, the grey literature is not always easy to find and access.

As such, the first priority is *where* this literature is stored and accessed. There is a need for some repository of such literature that is preferably openly accessible and online for ease of access. It should also be bibliographically catalogued and organized in such a way that would facilitate easy literature search and retrieval, and data extraction.

The other conclusion I have drawn is that for this type of literature to be of greater benefit to the sector, we have to look at *how* the events are recorded, reviewed and reported. The reporting needs to be done more robustly and subjected preferably to critical peer review to ensure the quality of what is reported. Otherwise the validity of what is reported cannot be assured. This heterogeneity in type and quality of the grey literature makes it difficult if not impossible to carry out robust evidence synthesis.

Finally, the other issue is with regards to *what* is reported. Most of the event reports are focused on the emergency response phase. It would be interesting to learn what were the outcomes, i.e. it is perhaps of greater relevance to hear how well any recommendations from the various inquiries and reviews were acted on and affected practice.

3.6 Summary points

- The themes reported tended to reflect operational issues and difficulties encountered by practitioners.
- The grey literature consisted mostly of event reports of variable quality and generalizability.
- The grey literature was not easy to find and access as there is no single repository
- The focus of much of the grey literature was very much on emergency response phase activities and concerns.
- It is unclear what value grey literature adds and whether it changes practice.

Chapter 4: Qualitative interviews with key informants in the UK

The following chapter in parts has been published by the author in the NIHR report on emergency planning (Lee et al., 2012a) as well as in an article in *BMC Public Health*(Lee et al., 2012b).

4.1 Introduction

The scoping reviews of the literature revealed where much of the existing disaster research and related articles were published. This provided a semi-quantitative map of where the likely evidence gaps were. Just to recap: much more has been published on operational elements of the response and preparedness elements than mitigation and recovery, and much of the evidence-base was from high income countries, and especially the United States. However, the scoping review only gave a superficial overview of the emergency planning and management field. What was lacking from the scoping review was contextualisation of the evidence-base to enable better understanding of how it was sited and translated in practice. It was therefore clear during the formulation of this study that a qualitative element was necessary in order to explore and better understand the current state of UK emergency planning in health.

4.2 Methodology

As mentioned above, based on the initial findings of the scoping review, a more detailed understanding of the state and functioning of emergency planning and management was needed. To do so, I planned to use a qualitative research approach that involved either face-to-face interviews or telephone interviews with key informants involved in the field of emergency planning.

4.2.1 Sampling Strategy

The key informant interviews would be with individuals who held senior positions in this field or who had either relevant expertise or experience who would be best placed to provide key insights into this field. I adopted a purposive sampling approach in order to get a breadth and depth of views from all levels of the emergency planning and management community, from frontline operational staff right up to those involved at the strategic and policy levels. Initially, I consulted my research collaborators who were topic experts in this field to identify and draw up a list of individuals who were potential key informants. These individuals were identified on the basis of their recognized technical expertise, work experience, or academic research in emergency planning and management. Participants were identified from:

- The Board of Directors of the World Association for Disaster & Emergency Medicine (WADEM) and Task Force on Quality Control of Disaster Management,

- Members of the Emergency Planning Clinical Leaders Advisory Group, Department of Health (UK),
- Faculty members of Manchester Metropolitan University who taught on the Masters course in Health Incident Command there,
- Senior faculty members of the Emergency Planning College and
- Senior Health Protection Agency staff that were involved in emergency planning, preparedness and response.

I also sought public representation through the Sheffield Emergency Care Forum for the 'general public's voice'. The SECF consists of interested members of the public that are involved in research in Sheffield. Their involvement includes providing a public voice or lay representation in emergency care research.

I contacted potential participants by telephone, e-mail and/or letter (Appendix 5). Invitees were given a summary document that outlined the project in brief. Potential participants were not pressurized into participating and did not have to decide immediately whether or not to participate. Those invitees who agreed to participate further were then given more detailed information in the form of a participation information leaflet (Appendix 6). They were also asked to sign and return a consent form (Appendix 7) or email correspondence stating their agreement to participate. A mutually agreed interview date, time and venue was then set for the interview to be carried out with each participant individually. Participants were aware they could decline participation at any point without need for explanation and with no negative consequence.

4.2.2 Interviews

I developed an interview guide (Appendix 8) and sought feedback on the relevance and scope of the guide with one of my research collaborators, Dr Wendy Philips, in order to hone it better. The interview guide consisted of a list of research questions and themes to be covered. These had been generated from the initial conceptual mapping process undertaken at the start of the study. I also intended to adopt an iterative approach as the study progressed, and made some minor modifications to the interview guide over the course of the interviews so as to explore new themes as they emerged that had not been identified *a priori*.

Two interviews were carried out jointly initially by myself and Dr Wendy Philips in order to check the usability of the interview guide and to aid familiarisation with the interview guide and process. All subsequent interviews were conducted individually by myself bar one that was conducted solely by Dr Wendy Philips.

As stated above, the interviews conducted were done mostly face-to-face although a couple were carried out by telephone interview as mutually agreed with the interviewees in advance. Almost all the interviews lasted no longer than an hour. Audio recordings of the interviews were done with the participant's consent using digital audio recorders which were then transcribed later for subsequent analysis. Transcribing of the interviews was done by administrative staff members who were part of the pool of transcribers at ScHARR. I also took handwritten notes during the interviews in order to capture additional information, especially elements that may not be easily captured by the audio recorder, e.g. nuances and body language of interviewees.

4.2.3 Data analysis

The data from the interviews were then analysed using a thematic approach techniques. Much of the data analysis was carried out by me within a few of weeks of the interview. This helped me during analysis to recall the interviews as they had happened in the recent past. Initially, I read and re-read the transcripts in order to familiarise myself with the material. After familiarisation with the material, I carried out coding of the material. I utilised several different variants of coding that included descriptive coding, in vivo coding, process coding and versus coding approaches(Saldaña, 2012):

- *Descriptive coding*, also known as *topic coding*, summarizes the basic topic of a passage of qualitative data in a word or as a short phrase.
- *In vivo coding*, or *verbatim coding*, involves the use of a word or phrase actually articulated by the participants interviewed. I used this form of coding where what was said by participants expressed or summarized a point laden with meaning.
- *Process coding* as the term implies are codes that connote action in the qualitative data.
- Finally I used *versus coding* where some of the concepts described had binary outcomes (e.g. 'generic' versus 'flexible' plans). I was particularly interested to see where there may be conflicting and contrasting views held between the different stakeholders interviewed, especially where they were from different agencies (e.g. health vs. emergency services) or levels (strategic vs. tactical vs. operational).

The thematic codes that emerged were then grouped, re-grouped and eventually merged into higher level thematic categories, and re-defined using new codes as necessary. These codes were subsequently mapped out to display the relationship between codes. The findings of this study are described in full in the following section below.

4.2.4 Key informants interviewed

The initial list drawn up of potential key informants identified 50 individuals. With advice of my collaborators, I narrowed the list down to 27 "high-value" individuals to approach. I did this on the basis of their expertise, reputation and experience, and more importantly to ensure that I had a broad field of persons interviewed from all the relevant different agencies and levels of emergency planning and management. The other 23 individuals on the list would be placed on a "reserve list" if needed. I anticipated that I would probably need to interview between 15-20 informants to reach thematic saturation.

Of the initial 27 high value individuals identified and approached, 17 agreed to be interviewed. The interviewees came from diverse professional backgrounds including health service managers, health policymakers, emergency planners, scientific advisors and technical experts. They came from a range of different organisations including the health service (both community and hospital), ambulance service, civil service, the military, private sector, members of the public and the Health Protection Agency. Some participants have experience working at the frontlines locally, whilst others worked at senior levels in government as well as internationally. The profiles of the interview participants are illustrated in the following table (Table 14):

Table 14: Profiles of key informants interviewed.

Interviewee[26]	Practitioner	Technical expert	Scientific or Academic Expert	Policymaker	Public representative
A			√		
B					√
C	√	√			
D					√
E					√
F	√	√			
G			√		
H		√			
I				√	
J				√	
K	√	√			
L	√	√	√		
M	√	√		√	
N		√	√		
O	√				
P	√				
Q	√				

[26] The participants are listed randomly above and the order above does not correspond to the order that they were interviewed to.

A description of the key informant profile categories are as follows:

- ***Practitioners*** are those individuals that are involved in frontline operational work, and are usually involved in implementing emergency plans and instructions. They include ambulance team leaders, hospital-based emergency medicine consultants and PCT managers involved in emergency planning.
- ***Technical experts*** were individuals with specialist technical expertise (usually from an operational perspective) such as Health Protection Agency specialists who worked in emergency planning and response.
- ***Scientific and academic experts*** were individuals with special expertise whose role in emergency planning involved providing scientific advice, or they were academic researchers in the field.
- ***Policymakers*** refer to individuals who held more senior management roles, usually at a strategic level, who were involved in policy formulation or the translation of national policy directives into regional or local policy. They were often senior civil servants whose remit covered some aspect of emergency planning and management.
- ***Public representatives*** here refer to members of the public, i.e. "lay" persons, with no specific emergency planning expertise or experience.

As mentioned above, at the outset I had initially intended to interview around 15-20 key informants. The 17 that eventually agreed reflect my first choice interviewees. I did not feel there was a need to invite the reserve list of secondary informants as I found that very rapidly the responses from my initial interviews became very similar and thematic saturation was reached after 12 interviews. Subsequent interviewees afterwards returned redundant themes and topics that had already been identified and covered in earlier interviews. Indeed, no new themes were identified in the later interviews. I am certain that a wide range of informants from diverse agencies have been included and interviewed.

4.3 Overview of findings

4.3.1 Explanatory notes

In the following section, certain jargon laden terms are used. The term e*mergency planning* is used as is understood in the UK context: it refers to activities undertaken by an organisation to plan and prepare in anticipation of an emergency. Emergency planning also extends to emergency response

planning and post-disaster recovery planning. In the pre-disaster phase, emergency planning includes hazard analysis and risk mitigation. I have also made reference to *emergency management*. There are different interpretations of this term as it can refer to specifically activities undertaken in the emergency response phase only, or it can be broadly used to describe a comprehensive range of activities that include emergency planning as well as other activities undertaken in an emergency. In this thesis, I have adopted the broader, more generic definition of emergency management, and have used the terms emergency planning and emergency management interchangeably. Also of note, the term emergency management used here does not refer to actual clinical management of casualties.

The following interviews have been carried out from a *health* perspective. The interpretation of the data from the interviews therefore is carried out using this lens. Of note, a wider perspective of health is adopted that is not limited to a healthcare perspective.

Where reference is made to *emergency responders* or responding organisations, these are primarily frontline 'first responder' services such as the police, fire and rescue service, and the ambulance service. The term *emergency practitioners* refers not just to frontline emergency responders such as the ambulance service but also to other individuals who work at a frontline operational level such as health service emergency planners, hospital consultants and health protection specialists. *Health organisations* referred to in this section including hospital and primary care organisations within the National Health Service in the UK. It does not include private healthcare providers.

The term ***evidence-base*** also had different meanings and connotations for the different stakeholders involved in emergency planning who were interviewed. This ranged from a legal interpretation to a scientific one. For example, evidence-base could be interpreted as 'evidence' in a forensic legal sense. Some others interpreted it to mean 'data'. I have therefore also referred to it here in the text interchangeably as the ***knowledge base*** as this term better matches the academic understanding of 'evidence-base' and what many practitioners understood it to mean.

4.3.2 Major Thematic Categories

From the interviews with the key informant, the themes that emerged could be categorised into four thematic categories related to emergency planning in health:

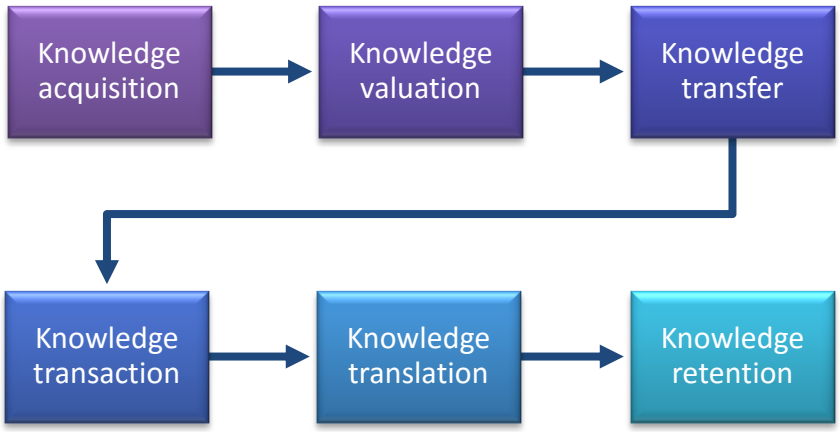
i) the knowledge (or evidence-) base for emergency planning,
ii) how individuals and organisations react and behave in emergencies,
iii) the health care system in which the emergency management occurs, and
iv) the public to whom the system serves.

These four thematic categories are further subdivided into related major and minor themes. These are covered in further detail in the followed section.

4.4 Thematic Category 1: The Knowledge Base

From the transcripts, I was able to identify several related themes that pertained to the knowledge base dimension. In this thematic category, process codes were common covering issues such as how knowledge was obtained, passed on and used. I was able to further categorise the themes and minor themes and order them into sequential subcategories as illustrated in the following figure. These subcategories suggest a natural, sequential and narrative process for how the knowledge base from the stage of knowledge acquisition through to valuation, implementation and retention. Each subcategory can be demarcated to correspond to a defined stage of the process. This is further elaborated on below.

Figure 18. The knowledge-base process narrative



4.4.1 How knowledge is acquired

The first step of the process covers how the knowledge (or evidence) that underpins emergency planning is acquired.

In traditional biomedical science, the evidence-based is founded on the systematic collation of research studies and reviews as published in peer-reviewed journals. The process is fairly well understood and there is a universally agreed hierarchy of evidence to grade the publications. Greater credence is given to those studies that have been conducted empirically and rigorously.(Concato et al., 2000) However, unlike most biomedical studies, emergencies and disasters are not easily studied using conventional research approaches.

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 reasons for why conventional research is not possible are attributed to the unpredictability as well as variability in the type, scale, speed of onset, and complexity of the emergency. There are inherent difficulties in carrying out research data-gathering in emergencies. Randomized controlled trials for obvious reasons cannot be carried out easily.

It's very difficult to (study). You can't do a randomised control trial. You can't compare because every situation is very different.

Emergency Planning Technical Expert 1

The current research environment can also introduce further barriers, for example, it was reported that in the UK the existing research commissioning process is too slow. Current processes for applying for funding, as well as ethical and research governance procedures, are lengthy and can lead to considerable delays in the process. These delays prevent researchers from being able to gather valuable data from an emergency as close to, if not during, the event. Consequently, an urgent priority identified was the need to create a more enabling environment for disaster research. In the US, this exists to an extent as disaster researchers are much more integrated into the emergency response infrastructure. They are therefore better able to access disasters in order 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 encountered when carrying out research in disasters, there is a need to find ways of gathering data from disasters in real-time as the events unfold. There is a clear role for researchers here to establish research methods that can be used to study health emergencies *in vivo* as they occur. There is also a role for researchers in synthesizing existing knowledge and applying a degree of academic rigour to the process.

4.4.2 How knowledge is valued

4.4.2.1 Inter-agency differences in knowledge valuation

It was apparent that the different stakeholders "valued" different "evidence" differently, and consequently the "appetite" for evidence varied. Some stakeholders clearly did not see the value of research or research evidence.

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

These differences were attributed to inter-agency cultural differences in how knowledge is viewed, valued and used.

...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

4.4.2.2 Experience = Expertise and Evidence

As noted earlier, the different interviewees articulated different understandings of what constitutes 'evidence'. One group of interviewees equated expertise with personal experience of dealing with emergency incidents. 'Evidence' was therefore interpreted to mean personal experience and insight gained from managing emergencies. This 'experiential knowledge' held greater credibility whilst 'academic knowledge' was less valued. These interviewees also desired practical knowledge that could be directly implemented in practice. This view of the evidence was more commonly-held by the practitioners interviewed who came from a military or a "blue-light" emergency services background.

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

In contrast, those interviewees who came from a health background (e.g. medicine and nursing) were more accepting of 'scientific knowledge' as evidence. The evidence as they understood this refers to "knowledge" that has been peer-reviewed and published. This may reflect the effect of the evidence-based medicine movement in recent decades that has mainstreamed this form of knowledge in the health sector.

It's not built into the culture of the blue response service 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.

Emergency Planning Technical Expert 3

4.4.2.3 How the evidence is appraised and graded

A different "evidence hierarchy" in emergency planning and management also emerged from the interviews. Experiential knowledge was valued more highly. National guidance was also perceived by some to hold greater credence than academic knowledge. Interestingly, there was also a degree of flexibility as to how national guidance was valued, interpreted and used.

Guidance is mostly top-down (from national experts) but there is an element of second guessing locally.

Emergency practitioner 6

(We judge guidance) by our previous experience, although it is dependent on how strong the edict is. You will "do it the HSE way unless you can evidence it another way".

Emergency practitioner 7

Most will follow the guidance from some government, or the rest will use that but they'll tailor it to their own circumstances. So the frameworks (are) there but it's entirely a local decision what's done.

Policymaker 2

I also observed that at times the interviewees could be uncritical of certain information whilst paradoxically being more critical and discrediting other forms of information. For example, information from academic sources was occasionally disregarded because from the interviewees' perspective it was not 'experiential knowledge' from a practitioner.

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 anecdote or based on experience. The evidence-base is only anecdotal and perhaps that's symptomatic of the field itself … To me it reflects the fact that what people take as quality assured knowledge is different from what they may just glean from all sorts of different sources. The question is how far they actually can judge what is good quality information and procedures and what is just what they have picked up from somewhere else …

Emergency Planning Academic and Technical Expert 2

The degree to which information was critically appraised was also variable. Emergency practitioners could be uncritical of their information sources, accepting them at 'face value' without further scrutiny. Possible explanations that were proposed included the lack of time that practitioners had to scrutinise the information, or a lack of critical appraisal 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

This highlights a need to develop a rigorous evidence grading system that is adapted to the requirements of the emergency planning community. This can help enable practitioners and policymakers to rapidly appraise the quality and reliability of the evidence that is available to them.

4.4.2.4 Generating the demand for evidence

Although it was important for both practitioners and policymakers to appreciate the value of having robust and reliable knowledge to guide their actions, however there was little demand for this evidence.

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) … really aren't very interested.

Emergency Planning Technical Expert and Policymaker

As mentioned earlier, this has been attributed to the prevailing culture. As such, it was intimated that there needs to be a culture shift where evidence-based practice is the norm rather than the exception. If this were the case, demand for the evidence would automatically be generated from practitioners and policymakers. Such a culture shift is unlikely to occur rapidly and on its own without some added impetus, i.e. it would require some direction and effort to effect this change as was the case with the evidence-based medicine movement.

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

4.4.3 How knowledge is transferred

The next step in the process is that of dissemination of knowledge. This can be viewed from two perspectives, in terms of :

a) *knowledge transfer*, i.e. how knowledge is transferred between academics and practitioners, and
b) *knowledge cascade*, i.e. how it is cascaded within organisations.

4.4.3.1 Knowledge transfer

The first step of knowledge dissemination involves the movement of the knowledge from its source (e.g. academia as an output of research) to the user (i.e. practitioners who would use the knowledge). This "knowledge transfer" agenda is not new and is common in academia in other fields of study. Currently, there are real difficulties disseminating academic knowledge and research findings to emergency practitioners as there does not appear to be a mechanism of doing so.

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

Likewise, how academics communicate their research findings to emergency practitioners also appears to be a problem. It has been reported that the information can be perceived differently by different professional groups. It was also iterated that for knowledge acquired through research by academics to be useful to practitioners, it has to be communicated in a form that is comprehensible, pertinent and usable to the practitioners who are the ultimate knowledge end-users.

... 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

4.4.3.2 Knowledge cascade

The second issue is with regards to how knowledge is transferred between individuals within organisations. The optimal way to cascade knowledge within organisations is not apparent. Some of the knowledge transfer appears to happen in an ad hoc way such as "by word of mouth". Knowledge transfer within organisations has also been described as information that "just bounces along".

(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

This issue affects both the movement of knowledge horizontally (i.e. between practitioners of equivalent rank or function) but also vertically (i.e. from managers and senior practitioners to more junior staff). The latter could have considerable impact on how emergency plans and decisions translate into practice.

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, the senior bed manager may well have 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

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

There may therefore be value in finding effective mechanisms for disseminating knowledge within organisations.

4.4.4 How knowledge is transacted

I also observed that when knowledge was transferred from one party to another, the exchange could take on a much more transactional nature. Knowledge was not passed on unchanged but could be repackaged and transformed in the process. This was most clearly evident when information was transferred between organisations, such as when emergency practitioners communicated information to mass media agencies. However, there were especially problems reported when information of a technical nature was communicated to emergency practitioners from scientific or technical advisors. As one respondent put it:

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 suggests that 'knowledge parcels' cannot always be passed on from one party to the next in its unaltered state. Information from a provider (e.g. a scientific or technical advisor) has to be processed and repackaged in a form that the receiver (e.g. front-line emergency responder) is able to unpack, understand and translate into action. If this was not done correctly, the 'knowledge parcel' could be misunderstood or not utilised. It also suggests that there are expectations by the recipient of what knowledge they would like as well as how it is presented to them. In this sense the knowledge sharing process is more of a transaction. This phenomenon appears to be more a feature of knowledge sharing between individuals from different organisations and roles.

This 'failure of communication' also in part is due 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. More worryingly, there is a hint that the different agencies seem to make presumptions that each understands what the other means. This stresses the need for universally accepted terminology to be defined and used.

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

Emergency Planning Academic and Technical Expert 2

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

The main value of knowledge ultimately is to help inform decisions and actions undertaken. As such there is a need for this information to be readily accessible and available to the information user in a timely way. In emergencies, decision-makers often demand and expect the information instantly. The evidence-base therefore must be available and can be accessed rapidly by the end user.

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

In this regard, there is an immediacy to the knowledge transaction and low tolerance for delays in receiving it. Indeed, the need and value of the information probably diminishes with temporal distance from the emergency event.

4.4.5 How knowledge is translated into action

The value of knowledge depends on how it is used, i.e. translated into action. However, knowledge may not always be utilised for a variety of reasons as highlighted earlier; e.g. practitioners may not be aware of the available knowledge base, or the knowledge may be perceived to be irrelevant and disregarded by practitioners. The transfer of knowledge between and within organisations could also break down, or the knowledge may not be retained in organisational memory. Organisational cultures can also affect the use of evidence.

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

The approach that practitioners adopted when managing an incident at times appeared to be dictated by intuition or past experience or occasionally was based on guidance. Indeed, it was reported that decision-making tended to be more often based on the experience and intuition of the individual and not necessarily on the evidence-base.

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

It may be that practitioners may lack the ability to translate the knowledge into their context and to marry it with their experience of the local situation. However, another explanation may be that they neither have nor value the evidence-base. For evidence to be translated into practice, a culture shift may be needed at the operational end such that practitioners value and demand the evidence-based more, and seek to ensure that their plans and decisions are evidence-based as much as practicable.

4.4.6 How knowledge is retained

This next section pertains to how the knowledge or evidence-base is retained by individuals, organisations and within the system.

4.4.6.1 Where is the evidence?

The first issue was: "Where do emergency planning practitioners obtain the evidence from and how do they access it?" There was no repository of such knowledge identified that is publicly accessible in the UK.[27] As reported in the earlier chapter on the scoping study of the published literature, there is not much published literature on emergency management for the UK health context. This scarcity of accessible peer-reviewed evidence was also reported by several interviewees:

[27] Currently in the UK the main repository is the privately managed Emergency Planning College library at Easingwold near York.

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

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 … Depends on what information you have access to and what is around.

Emergency Planning Academic and Technical Expert 2

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

The need to develop a UK evidence-base that is contextualised to local circumstances was also identified in the interviews. If the intention is to move emergency planning towards a more evidence-based footing, it would need the evidence to be easily accessible. There is therefore a need for an accessible knowledge repository.

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, accessible, presented and applicable in a way that is useful for practitioners.

Emergency Planning Academic and Technical Expert 2

However, the 'trustworthiness' of the available evidence is questionable. This may particularly be significant as the evidence users may be uncritical and accept information at face value without questioning its validity or reliability as was noted earlier.

4.4.6.2 Local versus international sources of evidence

There was also an issue with regards to the sources of the evidence, particular for international sources. Some interviewees ignored international evidence as irrelevant on the basis of contextual differences with the UK. Others were more cautious with regards to extrapolating international evidence to the local UK context:

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

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

"But it's New Zealand! It's nothing to do with us!" It's those sorts of blockages…

Emergency Planning Academic and Technical Expert 1

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

That said, other interviewees supported the incorporation of international evidence with the UK evidence-base on emergency planning. They acknowledged that the UK socio-political context and demographic profile, as well as the configuration and operation of its emergency management system, is different to other countries. However, they argued that there are generic lessons to be learned from experience elsewhere, and that international evidence may address local knowledge gaps.

It's very important that we're just not sort of UK centering. See what plans are 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 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

4.4.6.3 How is the knowledge retained within organisations?

The knowledge base has to be somehow "captured" by organisations and retained as part of organisational memory in a form that is readily accessible when called upon in the future (i.e. knowledge "recall"). However, there were difficulties reported in maintaining organisational memory due to staff turnover for example and the lack of internal mechanisms to safeguard organisational experience and knowledge gathered over time.

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

This process of knowledge capture, retention and recall is not well understood. Identifying means of maintaining this *'organisational memory'* is therefore of importance in order ensure knowledge gained is not corrupted in translation or lost when key staff members leave the organisation.

4.4.7 How do we learn from emergencies?

A related theme to evidence retention was also about how evidence was learned by individuals and organisations.

4.4.7.1 Lessons are not always learnt

A recurrent issue voiced in the interviews was the problem of learning lessons from emergencies. For example, it was reported that reviews were not always conducted after every incident. When reviews were conducted after an emergency incident, some debriefing may have been carried out and lessons identified in the process.

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

Health Emergency Planning Manager 2

However, lessons identified did not always result in enduring organisational change. One suggested explanation proposed by interviewees had to do with the organisational culture of some of the agencies involved. In some of these agencies, reflective learning may not be the norm for various reasons such as the lack of time, competing organisational priorities, or the previous occupational backgrounds of the individuals employed by these agencies. Post-incident review discussions were not always constructive, and the individuals involved could be disempowered or reluctant to participate for whatever reasons.

There are "can do" organisations that are 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 … It doesn't come naturally to them.

Emergency Planning Academic and Technical Expert 2

4.4.7.2 Variable quality of reviews

If the incidents were debriefed, it appears that learning from these events tends to occur from the 'after action' reviews. These 'after action' reviews include post-incident debriefings done informally or on an ad hoc basis, as well as formal reviews and rarely legal inquiries. The rigour and robustness of these reviews varied considerably and there was considerable variation in the degree of peer review applied. Some were unobserved internal debriefs whilst others were heavily scrutinised public inquiries.

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. ...

Emergency Planning Academic and Technical Expert 2

As such it was unclear how transparent and complete debriefings were especially with regards to identifying and reporting errors or failures, be it at the individual or organisational level. As noted above, the reviews carried out could be uncritical and not widely shared.

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

4.4.7.3 Lessons not embedded

For the incidents that were reviewed, it was common for "lessons learnt" reports to be produced by some agencies. However, such reports are a misnomer because "lessons learnt" did not always mean lessons were learnt. Learning tends to imply that the knowledge gained has somehow changed practice and been embedded by the individual or organisation. As such, it was more often the case that "lessons learnt" actually meant "lessons identified".

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

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

As one interviewee succinctly 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.*"

4.4.7.4 Differences in how organisations learn

There were also differences reported with regards to how different agencies learn. This was attributed to differences in organisational cultures and practice. For example, the traditional emergency services such as the police and ambulance services tended to learn through debriefing exercises and via lessons learnt reports. On the other hand, health professionals were more likely to look to the 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

4.5 Thematic Category 2: Individual and Organisational Behaviour

4.5.1 Social and behavioural science knowledge gaps

Many respondents noted that there was a clear "social and behavioural science gap" with regards to knowing how individuals and organisations behave in emergencies. One expert highlighted for example social knowledge gaps with regards to "issues of power, implied power, command, control and locus of control". Indeed this socio-behavioural aspect was perceived by some as the top research priority in this field:

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 nose 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

On further questioning, it became apparent that the practitioners, policymakers and even the technical experts interviewed did not have a good grasp of how individuals (both the public and emergency responders) behave in emergencies. Often presumptions were made that had no grounding in an existing evidence-base as the planners and responders may not have had any training on this aspect. As one technical expert observed, "a*ssumptions are made about how individuals or groups of people will react and there is little evidence whether those assumptions are correct or not".* This view was also reiterated by other technical experts interviewed and highlights this as an important knowledge gap in emergency planning:

(The 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

The need for evidence on this aspect was further illustrated by interviewees who described the current situation of emergency practitioners tending to *"muddle through"*, often relying on their personal experience and intuition, rather than on any robust evidence-base or knowledge of the wider socio-political or behavioural aspects. One explanation given for this was the fact that in some organisations, the responsibility for emergency planning was tasked to individuals who were not necessarily trained for the role.

(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

As such, there is a need to better understand how individuals (both practitioners and the public) behave in emergency situations.

4.5.2 Decision-making in disasters

Another group of individual behaviours in emergency settings raised during the interviews pertained to how individuals in key positions make decisions. Their decisions can translate into organisational responses and may significantly affect the nature and outcome of emergency responses. Evidence gaps identified included gaps in our understanding of *how* decision-makers make decisions, *what* constitutes good decisions, and how do we train or develop this attribute in key decision-makers.

4.5.2.1 What constitutes good decision-making

One key aspect that is often thoroughly examined in many post-incident reviews and inquiries is the question of what decisions are made and the consequences of those decisions. The decision-making process is scrutinized and the justification for the decisions made challenged. Individuals in key positions holding decision-making power can significantly influence the response of an organisation in an emergency. Their individual decisions and actions can have significant repercussions. As such, ensuring that the best decision is taken is a sought after objective. However, the key informants interviewed observed that these key individuals were not always empowered to make decisions.

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

This lack of empowerment in turn can lead to decision-makers having low confidence levels in leading through difficult crisis situations. This was highlighted as an important training need:

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 ... I think the decision-making - leadership is the bit that is missing from major incident training.

Emergency Planning Policymaker 1

Another attribute of good decision-making reported was for decision-makers to have the awareness and ability to recognize when the "situation has changed", and to have the confidence to alter previous decisions they have made:

(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

4.5.2.2 Leadership

Another reported observation was the trend for appointing former emergency services personnel to emergency planning roles in health organisations. The reason given for this was the assumption that these individuals, on the basis of their past occupational experience, would have gained the necessary expertise and competencies required for the role.

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

The ability to make sound decisions in emergencies was recognized as one key aspect of leadership. However, there were contrasting opinions as to what other attributes constituted good leadership in crises, and what competencies would be expected of "good" leaders. Indeed, the relevant competencies for this role have not been described or universally agreed. For example, there were concerns that emergency planners from an operational background may be less able to think 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 ... (We need) people who think in a different, in a slightly more strategic and lateral thinking (way) and not just problem solving.

Emergency Planning Technical Expert 1

In addition, there is the added complication that leadership and management in emergencies could be fragmented. For example, the individuals tasked with devising policy, developing plans and implementing the plans tended to be different individuals who were often based in different agencies as well. This can affect the coherence of plans and its implementation. Furthermore, the competencies required of a "good" planner are likely to be significantly different from that required 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

Consequently, persons in positions of leadership in emergencies may lack the necessary skills and training for the role. This could especially be a problem in organisations where the emergency planning function was seen as an add-on role:

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

Health Emergency Planning Manager 2

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 where somebody was promoted beyond their ability. And then we had the repercussions of that.

Public representative 1

The specific competencies required for each role has be identified, agreed on and clearly described. In turn, the key personnel involved will have to be appropriately trained to acquire these competencies.

4.5.2.3 Reactive versus Proactive approaches to emergencies

From the interviews it was apparent that the current emergency planning stance in the UK tends to be *reactive* to incidents as they occur, rather than *proactive* in their mitigation:

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

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

As one emergency planner explained, *"the emphasis is on operational planning rather than contingency planning"*. Consequently, the response to incidents tended to be less pre-planned, with decision-makers tending to *"muddle through"* the situations until their eventual resolution.

In the literature, 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 were much more reactive in their stance to emergency management.

(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

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

4.5.2.4 Assumption of being right

Another issue that was flagged up was the prevalent view held by some practitioners within the emergency planning community that they are *"good at this"* on the basis of past experience. What is also interesting is that the "over-confidence" of these emergency planners was not always recognized by the individuals themselves:

We do sometimes tend to say "We're good at this", "We've done so many that we're good at all this". 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

This assumption feeds into the process of emergency planning and could introduce weaknesses into the plans, emergency preparations and subsequent responses. It also could mean that evidence from other settings may be ignored:

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

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

The root cause for this 'over-confidence' was not apparent but it could be that it has its origins in the occupational backgrounds of these emergency planners. Many have come from a "blue-light" service

background such as the police, fire and rescue, ambulance service or the military. The bravado associated with this 'masculine' group of professionals may deter individuals from admitting not knowing, or prevent them seeking help:

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

If decisions are made on faulty assumptions and decision makers are blindsided by over-confidence, this may result in potentially catastrophic consequences. It would therefore be important to explore and understanding better the drivers for this phenomenon and the potential vulnerabilities that it engenders. It could be argued that there is also a need to encourage practitioners to acknowledge and be mindful of their own limitations. This is an education or training gap to be explored further.

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

4.5.2.5 How do you train decision-makers and leaders?

This then leads on to the question of how these key decision-makers and leaders are trained to fulfil their roles. This depends to a large extent on the "outcome" expected from the training. One view was that having relevant educational or training qualifications should be a requirement:

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

Another view was that the individuals should have the necessary technical knowledge but also be trained to approach emergencies in a systematic rational way:

"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

Yet another view seem to suggest that the ideal solution for emergency planning would be to create a cadre of well-trained officers who are able to exercise informed decision-making in difficult circumstances, i.e. what is sought are personnel who can make rational decisions systematically under duress:

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

Developing reflective learners was also seen as important:

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

These views are interesting as they lean towards individuals having the flexibility to discern and make decisions which stands in contrast to the current UK emergency management system which is heavily "protocolized".

4.5.3 Risk

The wider issue of risk was another frequently cited issue in the interviews. A range of different aspects is included from the understanding of risk, risk perception by different stakeholders, how risk is assessed, as well as how risk is communicated and mitigated. This is not a new issue and risk has been studied in many other fields such as business and finance. However, in the emergency planning in health context, it appears to be less well understood. The following section explores the various aspects of risks identified.

4.5.3.1 Risk perception

In health emergency planning there was no collective understanding of risk. Risks were perceived differently by different individuals as well as by different agencies. Some of this risk perception may be influenced by the occupational backgrounds of the individuals involved. Some emergency

planners, especially those from a “blue lights” service background, were more concerned about the risks of “Big Bang” events, i.e. acute emergency situations with potential for catastrophic damage or loss of life. In contrast, emergency planners from a technical or health service background were more concerned about chronic emergency situations such as ‘winter surge’ or ‘summer heatwaves’:

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.

Emergency Planning Academic and Technical Expert 1

Another reported driver of risk perception was the political element, i.e. the extent to which politicians were concerned about a particular issue. This political concern may not be based on actual risk:

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

Interestingly, the various stakeholders seemed to be unaware that there could be marked differences in understanding of risk between the different agencies. This may be important as these differences in risk perception influences the perceived vulnerabilities to various hazards and threats. The danger, as noted by one interviewee, is that a “risk-based approach” based on perceived risks could ignore other hazards:

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

This difference in risk perception, particularly where certain risks are missed or neglected could in turn have adverse knock-on consequences. In order to mitigate this, it is essential that organisations have adequate risk awareness and that addressing risk is seen as a common priority for all in that organisation:

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 turn, individual risk perception, particularly by those in key decision-making positions, affect the priority given to that particular risk and affect whether it is acted on or not:

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

Public representative 1

4.5.3.2 How risks are assessed and prioritized

The differences in how risks are perceived, particularly by emergency practitioners and policymakers, can cause problems. For example, it can affect the assessment of risks or how risks are prioritized. The *status quo* is not ideal as risk perception is apparently subjective and affected by external factors such as coverage by the mass media or politician interest:

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

This therefore may create vulnerabilities that arise from hazards that are disregarded, or lead to over-concern about other risks that are disproportionate:

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

This raises several key questions:

- How can health hazards and their associated risks be objectively assessed?
- Can a common definition of risk be described and universally agreed?
- And are there tools that can be developed to assist both policymakers and practitioners carry out risk assessments in a balanced and objective way?

4.5.3.3 Risk sensitivity

There are evidence gaps in our understanding of how different individuals, organisations and health systems react to different risks. How different individuals and agencies respond to these risks can be quite dissimilar, in part due to the differing perceptions (as noted above) as to what each individual and agency considers to be a significant risk. For example:

(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

Health Technical Expert and Policymaker

From the interviews it also emerged that the different agencies also had different tolerance thresholds or *risk sensitivity*. Unlike military or police for example, it was noticed that health services tended to be *"risk averse"* and less willing to accept casualties. Consequently, a range of different of responses may be instituted. Some organisations *"play safe"* and arguably *"over-react"* to risks that other agencies may judge to be less significant. Vice versa, some organisations may be *"unreactive"*

to risks and therefore not actively respond to them. Confusingly, the NHS was said to be both risk averse as well as unreactive to various health risks and hazards:

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

Health Emergency Planning Manager 3

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

Organisational risk sensitivity also appears to be dependent on their awareness of the risks and perception of the severity of the risks posed by a particular hazard. Organisations tended to be better prepared for hazards that they had greater familiarity 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."*

Another issue had to do with the scale of the emergencies prepared for. The UK organisations tended to prepare for small scale incidents rather than large scale ones. This may be due to the fact that the agencies may either underestimate the possible scale of emergencies, or struggle to imagine the full range of possible scenarios:

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

As such, the key evidence gaps identified from the themes in this section include:

- the need to gain a better understanding of variations in risk sensitivity that exists between the different agencies;

- to develop methods for accurately identifying and quantifying the risks posed various by different hazards;
- and to understand what causes organisational inertia to wider health hazards in organisations such as the NHS, and find effective ways of enhancing their reactivity.

4.5.3.4 Communicating risk

There are also issues with regards to how risk is discussed within emergency planning as well as how it is subsequently communicated to others such as policymakers and the wider public. As one policymaker interviewed observed: *"the trouble is around risk assessment, the perception of 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."* It is not clear how much information should be communicated to the public, or the purpose of such communication, or the consequences of doing so.

Further research into risk communication in the health emergency management context was articulated to be a priority by several interviewees. It is also one aspect for research where academics may have a clear role to play. Some of the key questions arising from the interview data include:

- What is the best way of effectively communicating risks to policymakers?
- Similarly, what is optimal way of communicating with the public?
- And how does one reliably gauge the right amount and level of information to communicate to policymakers and/or the public?

4.5.4 Organisational and Professional Cultures

From the interview data it was also apparent that there were marked differences in culture between the different organisations involved in emergency planning in health. Differences were seen between the various frontline provider organisations, as well as individuals such as planners and policymakers. These are more than just differences in their approaches to emergency planning and management, but also affected how their organisations were configured as well as the professional cultures that exist within them.

The organisational cultures were persistent and current recruitment practices ensured that it was self-perpetuating as well. For example, one interviewee described 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.

Up to now, there has been a presumption made that the composition of the various organisations is fairly similar and likewise so too are their responses. However, in reality there is considerable diversity and the different agencies interpret, react and respond to incidents differently:

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

Health Emergency Planning Manager

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

These differences can manifest as inter-agency conflicts and relational difficulties. They may also contribute to communication failures for example. These culture and organisational clashes could lead to misunderstandings that may be potentially catastrophic in situations where their personnel have to make critical decisions 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.

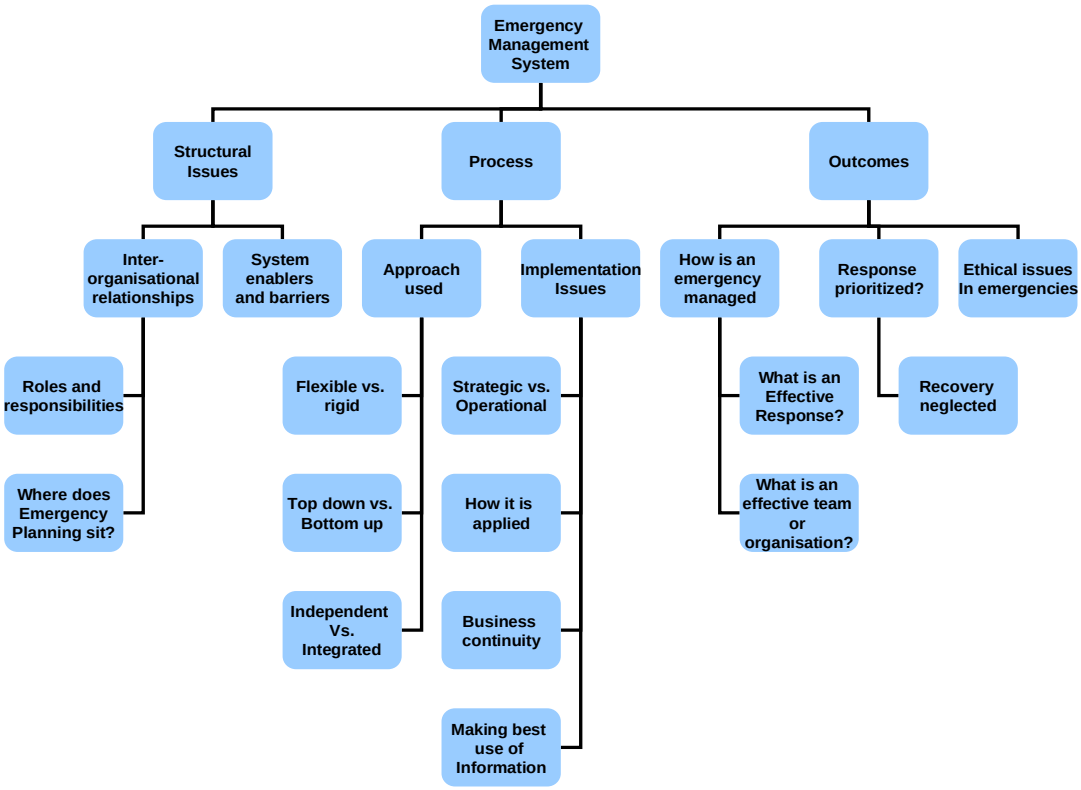
Emergency Planning Policymaker 2

Different organisational hierarchy and professional cultures may also lead to blurring of roles and responsibilities. There is a need to understand better the different organisational and professional cultures that currently exist, and study how they affect the functioning of the emergency management system. A greater awareness of the organisational and professional differences would also be beneficial through improving inter-agency collaborative working.

4.6 Thematic Category 3: Health Care System

There were several topics raised and discussed as well that categorically related to systems-level issues in which health emergency planning and management takes place. These are illustrated in the following figure.(Figure 19) I chose to adopt a Donabedian(Donabedian, 1988) approach to categorising these themes which are discussed as follows:

Figure 19. The health care system dimension



4.6.1 Structural issues

Most of the interviewees recognized that the emergency management scene has evolved and improved considerably over the past decade. This was partly attributed to the enactment of the Civil Contingencies Act, 2004 that has helped delineate the statutory roles and functions of the different organisations involved. Recent emergencies both in the UK and abroad have also reiterated the necessity for better emergency preparedness in order to tackle potential threats in the future.

4.6.1.1 Differing organisational cultures and set-ups

However, interviewees noted marked differences in how the various agencies operated. As reported earlier, they have different organisational cultures and are organized differently e.g. they may have different command and control structures and hierarchy. The way they communicate both internally with each other and externally with other organisations also differs. The different agencies often have their own language and terminology, and different aspects of the emergency management process may be interpreted in their own unique way. These differences can (and do) create considerable friction between agencies, lead to misunderstanding and cause inefficiencies, as was described by a member of the public who had observed an emergency planning exercise:

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

4.6.1.2 Familiarity with form

The military technical expert interviewed recounted for example how military trauma teams are trained to handle multiple trauma situations. As a consequence the military teams are better organized and prepared to deal with such incidents compared to civilian teams. He also observed that civilian emergency response teams form infrequently to deal with major incidents. They therefore have less familiarity managing such situations or with working with each other. The setup of military medical teams is also markedly different with a narrower focus on the injured casualty. On the other hand civilian medical teams have to contend with a more varied mix of patients that present with a more diverse range of injuries and illnesses. Civilian medical teams very rarely have to

deal with disaster-related injuries that are different to the injuries and illnesses seen in routine medical practice.

(The) military are small hospitals. 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 are 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

The other insight gained from this section is also the exploration of how teams are organised, how they are trained and how they work. Often the focus of the interviewees was on the leadership shown in disaster settings. However, as highlighted above, 'followership' and teamworking in disasters may equally be important if not more so. The military medical teams were described as being much more responsive and flexible in terms of role. They were reported to be more highly exercised and trained, albeit for a more limited set of scenarios than perhaps civilian medical teams have to face. Whilst the interviews did not cover team dynamics, they did identify some of the characteristics that exemplify high performing high reliability teams. These aspects warrant further research.

There are therefore potentially lessons that can be learnt from the military health system that may benefit the civilian setting, particularly around:

- How teams of emergency responders are organized and trained,
- Their hierarchy and command structures, and
- Measures used to improve the effectiveness of joint working between organisations.

4.6.1.3 Comparability of systems

The configuration of the emergency management system also differs between countries. It is therefore challenging to compare how the different systems perform relative to each other. Neither are there any universally agreed measures or benchmarks to base such assessments. It is likely that there are contextual specificities for each setting that have determined how each emergency management system has evolved over time.

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

In summary, some of the key structural issues that could be explored further include:

- Identifying the optimal skill mix of practitioners required for emergency planning and management;
- Developing methods of assessing the performance of the different emergency management systems;
- Identifying the "ideal" emergency management system that is best suited for the UK setting.

4.6.2 Process

4.6.2.1 Unclear functions and processes

The second subcategory related to how the emergency management system in the UK operates. From the interview data, there was a sense that most of the emergency planning activity is currently focused on emergency preparedness and response, and on emergency responders (ambulance, fire and rescue and police) but not the system as a whole.

(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

Indeed, there also appeared to be a lack of understanding by the health service of their role in emergency planning. If the objective is to achieve a more comprehensive 'whole systems' approach to planning for emergencies, the lack of clarity of role for the health service is worrying.

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

Getting separate organisations that are used to operating autonomously to work jointly together can be difficult. The outcome of any emergency response is undoubtedly influenced by the collective action of the various responding agencies. They clearly have to respond to emergencies in a whole systems manner and not as separate entities. The questions for further research in this area are:

- How do we objectively measure the response of the emergency management system?
- Likewise, how do we assess how well the emergency management system is performing?
- And how do we enable a joined up whole systems approach to emergencies?

4.6.2.2 Planning processes issues

a) Generic versus specific planning

Another issue discussed was the process of emergency planning itself. There were conflicting views as to how emergency planning is conducted or should be done. Some felt that it was important to produce generic, routine, simplified plans, whilst others favoured use of more specific plans tailored to specific situations or incidents. Paradoxically, regardless of whether generic or specific plans were produced, it was apparent from interviewees that plans are not always used in emergencies:

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.

Health Emergency Planning Manager 3

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…

Scientific and Technical Expert

We might plan well but whether it's ever implemented is another matter.

Public representative 2

b) Process of planning versus output of planning

The fact that plans are not always used in emergencies calls into question what their real value is. There was a strong consensus view voiced that the *process* of planning was more important than the actual *output* of the planning process (i.e. the plans themselves).

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

However, paradoxically in the health system it was apparent that emergency planning does not always occur, and when it does it is not always comprehensive and addresses all issues.

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

Reasons for this were not clear but it was suggested that the agencies may be under duress to produce plans and have thus adopted a much more tick-box approach to planning.

We're under pressure from the SHA[28] for plans. (They're) done under duress, and not always done right.

Health Emergency Planning Manager 2

Paradoxically, the plans that are produced may not actually be used in reality and may not be useful to agencies.

c) Planners versus Plan implementers?

There was also the question of whose responsibility was it to prepare emergency plans. Some interviewees believed that this was the responsibility for a select group of individuals with specific skills and experience to be tasked devising the plans. There was also an apparent distinction made between those who "plan" and those who "implement" plans. These different roles require different skill sets and expertise.

[28] SHA – Strategic Health Authority

(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

One possible adverse consequence of this is that there may be a "disconnect" between planning and implementation, i.e. those who plan are not those who put into action plans (if they are implemented at all). As one interviewee noted:

The well-crafted plan is fine [but] if it can't be implemented it's pointless.

Emergency Planning Policymaker 1

It was apparent that there was a difference between what is planned and what is implemented. Those who plan and those who implement plans may not be the same individuals or even agencies. How emergency planning intentions are achieved in reality is therefore not known. In addition, this problem is exacerbated by communication issues within and between organisations as described earlier.

Sometimes it might happen at some of the hospital plans and they've obviously written them just amongst themselves. And one or two plans are sort of three big lever arch files and I've often said to people when we're involved that's no good because when the proverbial happens you can't be leafing through three files.

Health Technical Expert and Policymaker

Another interviewee observed that research into the process of planning rarely happens in the NHS. It would be useful to understand better how planning takes place, what constitutes proper planning and how the quality of planning can be assessed. Unfortunately, there are no universally agreed methods for objectively assessing the quality of planning currently.

d) Flexible vs. Rigid

One aspect discussed that received polarised feedback was whether emergency management should adopt a flexible or rigid approach. Some preferred a more reactive and flexible approach to emergency planning and response that was also underpinned by some generic framework or approach.

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 … 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.

Emergency Planning Technical Expert 2

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.

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

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 situations that are standard. However, it was recognized by the military that often in reality in the field there is a requirement for flexibility to respond to 'non-standard' situations. In such circumstances, the decision-making is left more to the discretion of well-trained officers or team leaders in the field. Consequently, the focus for the military is on training key personnel to make those decisions. In contrast, in the civilian health service staff are expected to follow pre-determined protocols and algorithms. There is consequently less flexibility in decision-making and a lot more SOPs put in place that are continually being added to.

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

An alternative view is that the requirement for flexibility or rigidity in individual and organisational responses is not fixed. As one interviewee noted, "n*o plan is set in stone and will have to be amended and updated in light of any information or evidence."* Instead it depends on what outcomes are sought as well as the circumstances in which the planning activity is occurring in as this is specific for that particular context.

… 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

One interviewee feared that emergency planning could become overly prescriptive and restrictive. In turn, this could be detrimental to the decision-making process during emergency incidents.

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

Conversely whilst a degree of flexibility is required in response, it is not clear how much flexibility again would be optimal.

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

Health Technical Expert and Policymaker

e) Top-down versus bottom-up

From the scoping reviews, two contrasting approaches to how emergency management is governed and controlled emerged. The first was a "*top-down*" hierarchical approach. This classic management approach 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 was also common in emergency planning in different countries beyond the UK such as the United States. In comparison, the

approach adopted in other parts of the world, and in particular LMICs, was more "*bottom-up*". This approach is more common in development settings and is exemplified by various community-based disaster risk reduction programmes that have been developed in South Asia and elsewhere.

When asked about their opinion on type of approach, interviewees gave a range of responses. Some interviewees preferred a top-down model as they felt it was necessary in order to maintain clear lines of accountability, and strengthen coordination and control.

… 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

Others favoured a more bottom-up approach as they felt it would engage the interest and energy of the community, and would help strengthen community resilience to disasters. This approach would also be necessary to ensure that national guidance and directives are appropriately contextualised and adapted to local circumstances.

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

Yet others suggested that a mixed approach may be required. They could see that both approaches were valid, necessary and may have to be used in conjunction with each other.

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

Another view given was that both approaches were necessary equally valid, but what mattered was *when* each approach was applied: in the early phase, a top-down approach may be more appropriate, but in the latter recovery phase, a more bottom-up approach is needed.

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.

Health Technical Expert

In the first four 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.

Emergency Planning Technical Expert 2

As was apparent, no clear consensus emerged as to which approach was the ideal. A mixed approach is likely to be what is done in reality due to the diversity of emergency planning situations, as well as the dynamic nature of emergencies that continually changes over time. The more relevant questions may be whether both the top-down and bottom-up approaches should be applied *in parallel* or s*equentially*, how it fits with emergency planning objectives in the UK and whether there are organisational specificities where one approach is better suited over another. In addition, the appropriateness of the approach may differ at the systems level compared to the individual agency or individual practitioner level.

f) Familiarity

As already discussed earlier, there was also a question of how the emergency management system should be set up. Currently, the perceived wisdom is for an integrated emergency management system to be established. However, in reality most of the responding agencies are autonomous and independent entities. Within each agency, how it is organised particularly at the front-end 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). This could lead to participants lacking familiarity with their organisation structures in the event of a major incident.

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 (me) the doctor and myself trusting the paramedics.

Health Technical Expert

This lack of familiarity is exacerbated by the infrequency of emergency incidents occurring. As one interviewee observed, "t*he trouble is that there are always gaps identifiable because people don't get into response mode very often".* In contrast, certain agencies such as the military have greater familiarity and better integration of response that is gained through regular training or actual response to incidents. 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.

... 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 four patients so we're going to need to improvise, get four 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

As such, the question raised here is how to effectively organise civilian emergency responders in such a way that best improves their familiarity with emergency response set up and processes.

g) Independent versus Integrated operation

At the systems level, the different agencies involved in usually operate autonomously but are required to work collectively to provide a unified response with the other emergency services. Generally, the frontline emergency responders operate relatively well together and they have got some experience of doing so previously. However, when the wider health economy is considered (for example including hospitals and primary health care providers) the overall system response may be less well integrated. As some interviewees described, the different organisations 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 other's 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 working, whilst they may be working together in responding to a major incident, the various agencies involved may still not be cohesive particularly with other organisations in the wider system. This is because the inter-organisational links at the wider level may be less well established. Other stakeholders, such as civil society organisations (i.e. NGOs), whose activities may be an essential component of the emergency response process, may also be marginalized and less well engaged.

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

h) Independent versus Integrated

There is a tension between having "independent" organisational set ups and processes that conflict with the goal of having an "integrated" system. If the activities of the emergency management system were to be assessed, its overall effectiveness is likely to be measured as the *outcomes* produced by the whole system and not just the *outputs* of individual agencies. One criticism of the *status quo* thus far is the segmentation of the emergency management processes with an over-emphasis on the response phase as well as actions of individual 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 to achieve an *integrated* emergency management system, then a holistic view of the "whole emergency response journey in its entirety" has to be taken. The research needs here are for more operational research to explore how better integrated working can be achieved and facilitated.

4.6.2.3 Implementation challenges for altering processes

a) Organisations resistant to change

One key barrier to implementing evidence-based practice is the difficulty implementing change within organisations and at the systems level. Change management as a subject is not new and much has been written about this including for the health sector. But in terms of the health emergency

management system, it is a fairly new and alien concept and there is considerable resistance to change:

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

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 change is put into practice.

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

A better understanding of the drivers and barriers to change within the emergency management system is needed.

b) Translation into action

Another issue is how emergency plans are applied or translated into action by the emergency management system. This will partly be determined by how the practitioners involved respond in crisis situations as discussed earlier. Organisational cultures and hierarchies will also influence how these organisations respond. The organisations' decision-making processes too will dictate the speed and nature of responses.

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

The NHS for example has been criticized for its slowness of response. This has been blamed on bureaucratic decision-making processes that exist within NHS organisations, e.g. decision by committee. By requiring consensus building for decisions to be made, this makes decision-making inherently slow.

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 is also not clear, as raised earlier, what the value of pre-prepared plans in the emergency response phase are. There was a sense that the response occurred regardless of the presence of a plan and it is unclear how the plans influence actions:

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

c) External influences on decision-making in organisations

It was also apparent that decision-making did not occur in isolation but there are numerous external and internal influences at play. For example, the involvement and differing priorities of politicians can substantially influence emergency planning intentions.

... 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

Understanding the breadth, extent and strength of these influences on the process of decision-making and emergency planning may be useful. These factors may be the key drivers that influence the priorities and activities of the emergency management system.

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

d) Strategic versus operational

There were also tensions noted between frontline practitioners (i.e. at Bronze level) and those who were operating at the tactical or strategic levels (at Silver and Gold level respectively). In an ideal system, the three tiers would be mutually supportive and there would be complementary working between all levels. In practice, this does not always happen. It was reported that sometimes practitioners working at one level of the organisation were not fully aware of the role and remit of the next level. For example, one interviewee reported how frontline staff tended to be disinterested in higher level functions and roles as they did not see it as relevant to them in their current roles:

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

Conversely another interviewee reported how tactical plans and summaries were written by emergency planners with a particular perspective of the issues. This did not always make sense or address the informational and guidance requirements of frontline operational staff.

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

There was thus a need for better understanding of the role and function of the different levels, through training or the use of "link" persons able to bridge the different levels:

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

The different levels of practitioners within each organisation have specific roles and responsibilities and they tend to be focussed on their own task at hand. This may explain their apparent lack of understanding of how the different parts of the organisation operate. This may affect how emergency planning intentions are communicated and received within an organisation. In turn this could lead to differences in interpretation of the plan or understanding of the decisions issued. Indeed, frontline operational staff may not understand the rationale for decisions made at a strategic level. This may subsequently affect how plans or decisions are translated into action. It would be of relevance to explore how strategic intentions are translated into operational actions.

e) Business continuity issues

A further gap identified was the lack of consideration of business continuity by organisations involved in emergency management and response. Following major incidents, the health system response tended to be focussed on the response itself with little due regard to key aspects of business continuity such as logistical considerations and human resource management, e.g. how to maintain staffing and ensure staff are able to operate effectively during a major incident.

We don't do it (business continuity planning) in the NHS. We don't run business continuity professionally.

Health Emergency Planning Manager 2

In comparison, one interviewee noted that the military were much better at planning in considerable breadth and depth that included business continuity considerations. For example, when planning for situations involving many major casualties, the military appear to have a better grasp of the logistical and human resource considerations necessary to maintain an effective response:

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

Feedback from the interviews also gave the impression that business continuity was considered only in tokenistic terms within the health service. This may be because it is not perceived to be a priority or the perhaps staff lack of familiarity with this aspect of emergency planning. Alternatively, it could be due to human resource/skill mix constraints due to the lack of personnel with appropriate qualifications and skills who can perform business continuity planning. In the business context, business continuity planning is an integral part of business management. However, for the health services, this concept is fairly alien. More health-related examples perhaps need to be reported and identified that can be used to help illustrate and educate the wider emergency planning as well as health service management community.

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

4.6.2.4 Difficulties changing cultures and challenging conventions

Another challenge is the inherent difficulty of changing cultures and ways of practice within organisations involved in health emergency planning. This is especially relevant in the light of strong "traditions" and firmly entrenched ways of doing things. As reported earlier, "*change is very difficult for a lot of people to take on board".* The NHS was criticized by several interviewees for being unresponsive and criticisms were also made as to how prevailing NHS culture can disempowering decision-making. Another criticism of the NHS was that it did not do enough forecasting and horizon scanning for health hazards. Once again, it was illuminating to compare how the military set up differed with the civilian setting. Unlike the civilian health sector, it appeared that change was more easily implemented, was much more encouraged and more rapidly adopted in the military:

... 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 three years for the next version of a course to come along. If something needs changing we'll change it ...

Military Technical Expert

There was considerably more inertia to change in the civilian health sector that made change much more difficult to implement. For services to improve through learning, change has to be both implementable and implemented in practice. Resistance to change therefore can also equate to resistance to improvement. In the disaster context, failure to change could mean the persistence of the vulnerabilities that led to the disaster in the first place. As such, for the emergency management context, it would be of value studying further how change can be effectively, efficiently and rapidly implemented.

4.6.3 Outcomes

The outcome of any emergency is likely to be the product of both the effects of the underlying hazardous event and the results of the way it is addressed by the emergency management system. Similar incidents may have markedly different outcomes even when tackled by emergency services that are set up in a similar fashion. It would be useful to study how emergencies are managed, and then to subsequently measure the outcomes and identify the drivers that account for the different outcomes. 2 further questions that arise are:

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

4.6.3.1 Defining what is effective emergency management

One of the issues that emerged from our interviews was that there was no consensus or clarity as to what constitutes "effective" emergency management or response. Consequently, this is linked closely with the question of how one would objectively assess or measure the efficacy of emergency management. "Effectiveness" in this context is therefore a nebulous term.

That said there were various components alluded to by respondents that were considered as key ingredients for an optimal response. Firstly, *community empowerment* as part of building community resilience was voiced as a key part of this.

There are ways of empowering the public to be able to make a more effective response … 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.

Military Technical Expert

The *quality of the communication* within organisations and between stakeholders was also seen as another important element. This in turn raised a further issue as to how the "quality" of such communication can be measured.

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 therefor, 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

How resources as husbanded and efficiently deployed in an emergency was another key element identified. Once again, the military were seen to be exemplars in resource management:

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

The task at hand therefore is to identify the various components of what constitutes effective management and to devise ways of objectively measuring and assessing these components.

Linked to this idea of "*effective emergency management*" is that of the "*effective organisation*". Again this has not been defined. Core components were hinted at such as risk awareness, mitigation and risk management embedded throughout all levels in the organisation. Effective organisations

were seen to be “high reliability organisations”. They were proactive in their approach but also organisations that anticipated problems through “horizon scanning”.

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 summary, “effective emergency management” and “effective organisations” are poorly defined terms. There is a vague understanding voiced of the key elements that make it up: effective organisations have systems for internal communication that are efficient and effective. Business continuity planning is carried out. Organisational learning is actively promoted, and there is effective organisational memory. The organisation has put in place protocols to address routine issues, but also retains its ability to respond quickly and flexibly as the situation dictates. Command and control mechanisms are established and personnel are familiar with not just their roles, but also the roles played by others in their organisation as well as in partner agencies. Key personnel and leaders are also trained and empowered to make decisions particularly under duress, and the organisation is able to work collaboratively with other agencies. Future research needs to validate these elements and establish the relative contribution that each of these factors make.

4.6.3.2 Prioritisation in emergencies

The outputs of emergency management processes are partly determined by where emergency management efforts of the system are directed. This in turn is affected by how prioritisation of actions occurs. As noted earlier one major finding was the prominence of emergency response-related activities and issues that took precedence with markedly less consideration paid to the other phases of the emergency management cycle. Recovery related activities and issues were often neglected.

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 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

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

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

This trend seemed to be truer of 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

Various reasons could account for this. One possible explanation suggested was the occupational backgrounds of emergency planners and managers. Many of them have tended to come from an emergency services background, such as the police or ambulance service. They consequently reverted to the role they were familiar with that tended to be in emergency response.

Another explanation given was the observation that interest in an incident after the initial acute phase tends to drop off. In the UK, the responsibility for the management of the incident transfers at this stage from the emergency services to the local authorities and other agencies such as the NHS.

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 greater prioritisation and interest in the emergency response phase, less heed is paid to the other phases. Emergency management activity is also then limited to the short term peri-disaster period, and inadequately addresses the impacts that present later on.

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

Whilst the emergency response phase often took priority, there was an acknowledgement that emergencies may have delayed effects manifesting much later:

After the Torin floods there was a phrase coined as the "long tail" of the disaster, and it goes on for years …

Emergency Planning Academic and Technical Expert 1

Further study of the longer term effects after an emergency incident or disaster is clearly warranted as these effects will undoubtedly be a measure of the outcome of measures implemented in the response phase.

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 an 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

From the views expressed, it was clear that the response by the "system" has to be seen in its entirety across all four phases of the emergency management cycle. The neglected phases such as recovery and mitigation need to be considered more fully, especially as there are various issues that are specific to these phases. For example, in the recovery phase, aspects such as psychosocial trauma, community cohesion and rebuilding, are more prominent but poorly understood. The health consequences of emergency incidents that have been managed poorly are also not well reported or studied. Finally, it is not clear how on would define "a good recovery". Indeed, there are also conflicting views as to whether the goal of recovery efforts post-disaster should be to seek to restore the affected community to its pre-disaster state or whether it should seek to improve the local situation further.

4.6.3.3 Ethical issues in emergencies

Emergencies tend to be rare events but also unusual events either in terms of severity or character such that they are not routine. Consequently, routine ways of operating may not be appropriate and expectations (of practitioners, policymakers and the public) may need to be adjusted. Where expectations conflict these could manifest in ethical dilemmas. For example, civilian deaths can and do occur in disasters. However, for health organisations whose role is to preserve life there is less tolerance for accepting casualties will occur.

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

Similarly there is often little political or public acceptance of casualties. This in turn may influence decision-making and actions by responders. For example, 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, how priorities are set in emergency settings may have an ethical dimension, for example which population group should receive aid first? Indeed, these issues are rarely discussed openly or with the public.

We could reassure the public that plans are in existence without telling them you know that we're only going to do … 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 there are robust plans in place to deal with such incidents.

Health Technical Expert

Another example cited was how the variations in medical practices meant that there were variations in what medical care was delivered. This poses several questions: how much variability is acceptable, what regulation and accountability mechanisms are needed in order to safeguard the public, and how much emphasis and resources should these governance concerns receive in an emergency situation when there are other competing priorities. The situation in Haiti post-disaster was given as an example. Parallels can also be drawn with the UK setting where individual practice is not always scrutinized.

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?

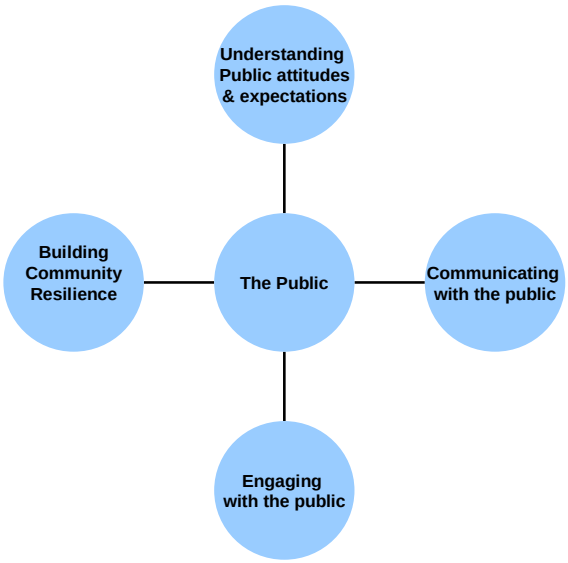
Emergency Planning Technical Expert and Policymaker

There may be considerable value in having a more open dialogue with key stakeholders including politicians, practitioners and the public. The latter group are paradoxically often excluded from these very discussions where they may have important insights to add. The issues here are how ethical dilemmas are identified, discussed and resolved, and where is the forum for these discussions to take place in the UK.

4.7 Thematic Category 4: The Public Dimension

The fourth category of themes dealt with issues that had a public dimension to them. These included aspects such as public expectations and attitudes, how the emergency management agencies communicate with the general public, how the public is engaged in emergency management, and finally issues to do with how community resilience could be developed.

Figure 20. The Public dimension



4.7.1 Understanding public attitudes and expectations

Firstly, the need to acquire a better understanding of public attitudes and expectations in emergency situations was judged to be a key priority by many respondents. The profile of the UK population, their attitudes and behaviours, is likely to be different to that of other countries. As such, there is a degree of contextual specificity with regards to how the population perceives to emergency management and how they respond to disasters. From the interviews, there was a sense that the British public did not understand emergency planning and preparedness. Indeed from interviews with the public representatives, it was apparent that their understanding was limited which is likely to affect their ability to engage with this agenda.

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 representative. So what I'm saying is yes you could have certainly found, … 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

Like many of the frontline emergency planners and managers, the public's understanding of emergency management was very much about the "response" phase and there was little

appreciation of the full breadth of emergency planning and management. There was also a sense that the public expected an external agency to protect and provide for them in emergencies.

... 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

This was described by some interviewees as a culture of "dependency", where the public expected "somebody else" to look after them:

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

Indeed, one interviewee described it as a situation of creating an "I'm a victim" mentality in the public. There was also a suggestion that this "dependency" was very much unwittingly created by the system. This dependency in turn could have serious repercussions when emergencies occur as it erodes individual and community resilience in adversity.

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 policymakers and practitioners interviewed also by and large felt 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

There is thus a need to better understand public expectations and attitudes with regards to emergency management. This requires an open discussion between the public and the emergency planning community to clarify what can reasonably be expected of public services in an emergency situation. There is also a need to study how a "culture of dependency" arises, and how it can be tackled in order to build community resilience.

4.7.2 Communicating with the public

Problems of communication between emergency responders and the public were frequently cited by participants:

I think the most consistent lessons learned from all these (emergencies) 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

It would be useful to understand why this breakdown in communication occurs and how it can be mitigated and rectified.

Another communication issue identified was how "risk" was communicated to the public. This was particularly a problem with regards to communicating more technical aspects of risk with members of the public. There were similar issues communicating such information to policymakers and politicians who may lack technical understanding.

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

The public's ability to accurately assess risk seemed to be tenuous and influenced by what was visible and reported in the media:

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

From the interviews, it was also clear that communication with the public is more than a simple exchange of information between two parties. There was an implicit need for "interpretation" of the information. For example, technical aspects about an emergency may be communicated by the scientific/technical experts to policymakers and politicians who in turn re-interpret, "filter" and communicate the information to the public.

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

How information is communicated to the public also reflects the different organisational cultures, presumptions and stereotypes that exist in the UK. As described earlier, emergency responders tended to adopt a top-down approach to command and control. In turn, it seems that this top-down approach was also applied to how the agencies dealt with the public. This translated into a paternalistic approach. The public were often only informed on a "need-to-know" basis. Consequently, emergency planning and preparedness, as one respondent described it, had been "mystified" and treated as "secret".

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

Public communication is therefore a complicated issue and there are several unknowns that remain to be answered such as:

- What information should be communicated by to the public?
- How much information should be communicated with the public?
- And, how should this information be filtered and communicated?

4.7.3 Engaging with the public

4.7.3.1 Why engage the public

The importance of public engagement in emergency planning has previously been stressed. One compelling justification for public involvement was that in the absence of a full understanding of how the public behaves in an emergency their involvement in disaster planning is essential and would at the very least help inform the planning process:

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

Public involvement in emergency management could also help planners identify potential issues that may not be readily apparent or thought of by planners:

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

However, this view of the utility of public engagement is not a universally held view. It was observed that the involvement of the public in emergencies can sometimes be unwanted, overlooked and ignored:

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

This then raises further questions: 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?

In reality, the degree of public involvement in emergency management appears to be minimal as one respondent reported:

(Public involvement in emergency 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 (to organisations) as far as I know.

Public representative 3

Part of the problem seems to be difficulties identifying a member of the public who was actually representative of the population:

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

There is also a presumption that the public want to be engaged. This does not appear to always be the case and the public may be unwilling to engage for a whole host of reasons. For example, one reason cited for lack of engagement in emergency preparedness exercises was perceived risk of some negative consequence such as injury to self:

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 suppose … physically hurt themselves.

Public representative 2

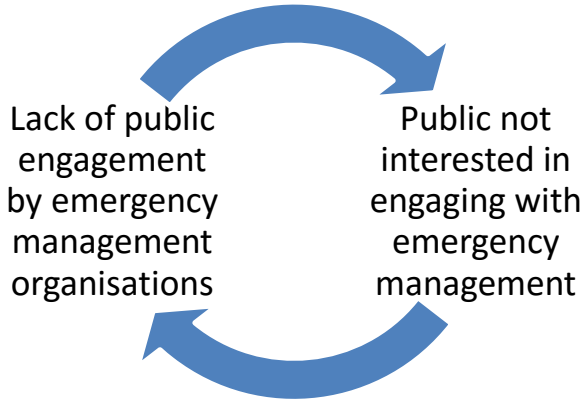
However, it was also acknowledged that emergency management organisations do not always endeavour to engage the public either:

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

Public representative 2

In summary, there is value in public engagement in emergency management. However in reality levels of public engagement are reported to be poor. The difficulty of gaining public engagement is often used as a reason not to involve them in emergency management. However, this is a cyclical argument here (Figure 21): does the absence of public engagement by agencies end up disempowering the public who then see no reason to engage, or is it that the public are disinterested in the first place that in turn discourages services from engaging with the public? As such there is a need to explore and better understand the reasons why the public may not wish to get involved in emergency management activities.

Figure 21. Public or emergency management organisation dis-engagement



4.7.3.2 How do we engage the public

How to engage the public

Even where there is interest in engaging the public, it appears that the UK emergency management system is unsure how it would engage and involve the public. Compared to other countries, there may be a knowledge gap here in this regard:

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 ... 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

Public engagement is likely to require several key ingredients. The emergency management agenda has to have personal salience for the public, and there is a need for some catalysing event or advocate in the community that "drives and motivates" others to get involved:

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…

Emergency Planning Technical Expert 1

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

When and where to involve the public

Related to the issue of how we involve the public is also questions of the where and when. Is public participation essential in all aspects of emergency management? Is it required in all phases of emergency management? If so, in what phase of the cycle would their input be most useful? Are there certain types of emergencies where public involvement is warranted and are there others where agencies may not want to involve the public? Finally, if public participation was required, what kind of involvement is sought?

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

How to maintain engagement

Following on from this, once public engagement has been achieved, this leads on to the next question of how to maintain this engagement. As one public representative surmised, maintaining public interest in emergency preparedness was likely to wane 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

Quality of the engagement

Another consideration is "how" the public should be engaged, i.e. what is the qualitative nature of that engagement. From the interviews, several interviewees felt that public involvement has to be meaningful rather than tokenistic. As one technical expert related, the contribution from the community into emergency response and recovery after a disaster is often under-estimated or even ignored to the extent that it is not "being embedded into the thinking about the emergency response".

(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

4.7.3.3 Barriers to engagement

Several barriers to public engagement were cited. These include current societal culture in the UK that has been described as being more individualistic and less community-oriented than perhaps in previous generations. It could be that a lack of public awareness of their role in emergencies, or the problem of non-meaningful involvement in emergency planning, discourages public involvement.

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.

Emergency Planning Technical Expert 1

Other reasons stated in the interviews include a lack of time and resources by the organisations involved to conduct public engagement, as well as a lack of trust in the value of community participation and belief that the public are not likely to make contributions to the planning process that is worthwhile.

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 observed that there is high degree of public disengagement and dependency that is difficult to change:

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

There are also striking differences internationally with regards to public engagement. Public engagement is considerably greater in some other countries such as Australia or Holland for example.

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

More research is needed to identify and understand these barriers to engagement better. International comparisons could be one way to elucidate these barriers and to seek possible solutions that could be translated into the UK context.

4.7.3.4 What is meaningful engagement

Participation

As observed earlier, meaningful public engagement was highlighted as an important requisite for raising public involvement. Likewise, it is essential to build community ownership of the emergency management agenda as this would help build community resilience.

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 knowhow, 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

However, defining what meaningful engagement is on the other hand is not straightforward. Another related consideration too is whether the public is sufficiently informed enough and able to participate in that activity.

Decision-making power

The balance of decision-making power held by emergency management agencies and the public is an important determinant of meaningful public engagement. Put simply, the level of public influence over the decision-making process affects their engagement. For example, there is the question of who leads emergency management in local resilience for a – is it agency-led or community-led? Meaningful engagement also suggests a need to ensure that the public is sufficiently informed so that they can make informed decisions.

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

In the emergency response phase the "power" hierarchy tends to be very much top-down and led by the emergency services. This is then followed later by an evolution towards a more horizontal bottom-up approach in the recovery phase. However, there are challenges with regards to how the balance of decision-making "power" is transferred from the emergency services to the local community. This transition can be tricky as power relationships in the post-disaster phase may be uncertain and unclear.

… 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

As noted earlier, the community makes 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". Research of the power-transfer interface may prove useful in establishing how we transit "from the formal command control at the front end to what is the more community-orientated recovery". Finally, more work is still needed to better characterise what meaningful public engagement in emergency management looks like.

4.7.3.5 Building community resilience

An important justification expressed for public engagement is the argument that it is necessary for building community resilience to emergencies. External input in an emergency response phase is only temporary, whilst the recovery phase is much more protracted and consequently dependent on local community involvement.

The community is its own expert in terms of resilience. Local knowledge is 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

Community "ownership" of the emergency management agenda is important and their engagement in the process may be one way of facilitating this. As one policymaker described, "*We need to get people much more involved but they need to own these things.*"

However, the importance of community ownership does not appear to be always fully recognized by the agencies involved. For the agencies involved, they may be especially focused on the planning process, and not actually appreciate the higher goal of seeking to build a "disaster-resilient" community.

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

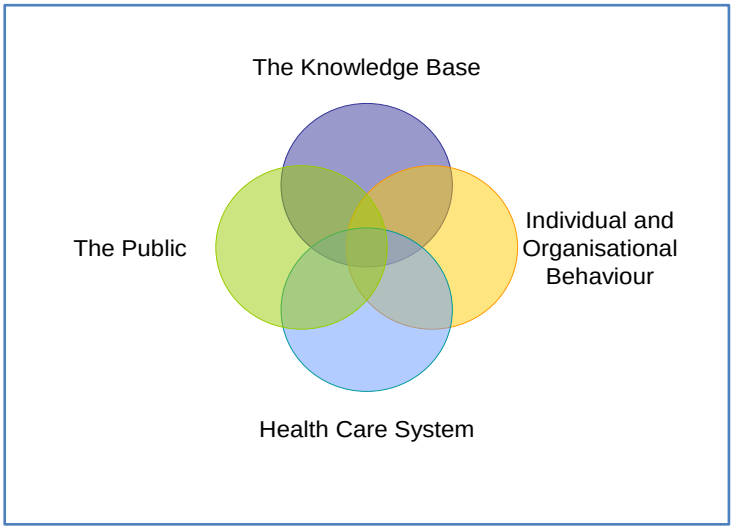
From the interviews, it was clear that public involvement is critical for various reasons, such as the utility of local knowledge held by the community, as well as the ownership that participation engenders, that all help to build community resilience. However, the actual process of building resilience is not well understood. As such, the key issues identified going forward that require further exploration include understanding what constitutes a 'disaster-resilient' community, and how community resilience is developed.

4.8 Discussion

The key informants provided many useful insights and helped to identify more possible research questions (see Table 15). An extensive list of themes emerged and some of these are more fully discussed and triangulated with findings from the rest of the thesis in Chapter 7. These themes could be grouped into four main categories of themes pertaining to emergency planning in health: the

knowledge (or evidence-) base for emergency planning and associated knowledge management issues, individual and organisational behaviour in emergency situations, emergency management system structure and processes, and the public dimension of emergency management.

Figure 22: Key dimensions



One thematic category pertained to knowledge management. This included how knowledge was acquired, shared, implemented and retained. Difficulties in "acquiring" the knowledge have been reported, especially with regards to challenges of conducting traditional research in this field due to the nature of disasters. That said it is possible to improve the disaster research infrastructure (e.g. anticipatory research funding and approval) as well as to adopt research methodologies that best fit the situation. As the earlier scoping reviews have shown, there are repositories of knowledge that exist currently. However, the general perception of the evidence-base for emergency planning was that it is fragmented and its robustness inconsistent.

There also appears to be a tendency to disregard 'academic' knowledge with greater credence given to professional experience and expertise. Paradoxically, practitioners may be uncritical at times in their acceptance of information. There is also a perception that sources of evidence from outside the UK are irrelevant to the local British context. This means that a substantial body of knowledge on emergency planning from around the world, and in particular the United States, may be overlooked. There could be considerable value in not just learning from UK sources, but also from assimilating knowledge from elsewhere that could help build up the evidence-base and address existing knowledge gaps. If practitioners disregard external sources of knowledge this risks diminishing the totality of the evidence-base.

Irrespective of the source, it is also clear that whatever evidence is available, this has to be adapted and tailored to the local context when implemented in practice. However, the evidence-base has been reported to be patchy, and highly dependent on individuals and organisational culture of the agencies involved. As noted earlier, emergency planning practitioners tend to "muddle through" situations using their personal experience and intuition rather than the evidence-base. Indeed, it has been previously observed from previous inquiries into disasters that lessons are often not learnt leading to mistakes being repeated.(Choularton, 2001, Pidgeon and O'Leary, 2000) What may therefore be needed is a radical shift in existing professional cultures in this field towards a much more evidence-based approach to emergency management. In addition, there is a pressing need to embed the learning from past events and existing knowledge into current emergency management practice. There is also a need to identify mechanisms to ensure organisational memory is not lost.

Interestingly, many informants tended to identify more gaps in operational rather than scientific aspects of emergency planning; i.e. how emergency planning operates in practice rather than factual knowledge on any particular aspect. There were also several issues identified that were system- and process-related. These included, for example, uncertainty as to the value of the emergency planning process or of their outputs, i.e. emergency plans. It was also not clear whether top-down approaches were more effective than bottom-up approaches, or whether generic planning was superior to specific planning for identified risks and threats such as pandemic flu, flooding or incidents involving deliberate chemical release. There were also conflicting views as to whether emergency planning should be more flexible or protocol-driven. At the systems level, the optimal configuration for an emergency management system is not known. Neither is there a universally recognized and robust means of assessing the performance of these systems. The predominance of operational and process concerns does not necessarily mean that these issues are greater or more important, only that they are more commonly perceived to be a problem. This could also reflect the fact that practitioners may have less awareness of the limits of what is known, i.e. the limits of the scientific knowledge around emergency planning.

Social aspects as well as individual and organisational behavioural knowledge gaps were also reported. The gaps identified included unknowns such as how individuals and organisations behave in crises, and how decisions are made by key personnel in emergency situations. It also includes aspects of communication (technical and human dimensions), as well as how risk is assessed and how it is communicated to others (including policymakers and the public). Assumptions may be made by practitioners in the emergency planning process as to how they anticipate individuals will

react. However it is likely that such assumptions are insufficiently grounded in a formal evidence-base. This in turn could have a significant bearing on how events unfold as well as the eventual outcome of the emergency situation. Public engagement was another key issue raised. This comprised aspects such as knowing how best to involve the public, and how to build community resilience to disasters. Once again, it is worth noting that the socio-behavioural and "public" issues identified reflect a fairly slanted professionals' or practitioners' perspective. It would be interesting to see if patient and public perspectives are similar or how they may differ. Unfortunately this aspect was not explored further in this study.

In addition to knowledge gaps identified by respondents, the themes emerging from the interviews in turn generated further research questions. These are listed in full in Table 15.

Table 15. Research questions and topics for further research identified from the interviews

• 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".
• 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.
• Explore and understand how individuals behave in emergency situations.
• Identify the specific competencies required for the different emergency management roles (policymaking, planning, and 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.

• 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?

• 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?

The four thematic categories found are inter-connected and are likely to influence one another. For example, the application of the evidence-base in decision-making by emergency managers is determined to an extent by the availability and accessibility of the evidence-base. It is also affected by the decision-maker's past experience and professional background. This in turn is influenced by the prevailing organisational cultures in those agencies where the decision-maker had previously worked in. The decisions made are likely to have an impact on the intended beneficiary, i.e. the public. However, the public is not a static and unreactive entity but a community of individuals who will each perceive and react in different ways to an emergency. The socio-political environment in which they inhabit may also influence their perceptions and behaviours. Consequently, emergency planning should not be carried out in isolation from the public, and would be ideally addressed at the systems level in view of the multi-sectoral multi-agency nature of emergency responses required.

4.9 Summary points

- Emergency planning takes place in a complex system.
- More operational knowledge gaps were identified rather than technical aspects of emergency planning.
- Social and behavioural knowledge gaps were highlighted. These included aspects such as how individuals and organisations perceive risk, as well as their behaviour and decision-making processes in emergencies
- Multiple organisational process and configuration issues were raised: Uncertainties around processual elements predominate, e.g. value of emergency plans compared to process of emergency planning, top-down versus bottom-up approaches; generic planning versus specific planning for identified risks, flexible vs. protocol-driven.
- Wider emergency management system issues were also raised: Public engagement is a key issue but there is lack of knowhow as to how community resilience is built. Optimal emergency management system configuration and means of performance assessment are also not known.

Chapter 5: Scoping review of published literature for low- & middle-income countries

The following chapter has been published in parts by the author in an article in the *Emergency Medicine Journal(Lee et al., 2014).*

5.1 Introduction

As stated in Chapter 1, current disaster trends indicate that both the frequency and impact of disasters globally is increasing. This is in part driven by global demographic trends toward greater urbanisation and industrialisation.(Quarantelli, 1999) In addition, socioeconomic deprivation, inequalities and poverty weakens community resilience, and it is recognized that community vulnerability can be a greater determinant of disaster risk than the actual hazards themselves.(Alexander, 2006, McEntire, 2001) Both of these phenomena tend to be common in LMIC settings and may as a consequence contribute to their vulnerability to disasters. As mentioned earlier, the necessity for a more proactive approach to planning and preparing for disasters has been articulated as a global priority as set out in the United Nations International Strategy for Disaster Reduction (UN/ISDR) and the 'Hyogo Framework for Action' 2005-2015.(United Nations Office for Disaster Risk Reduction, 2005, Matsuoka and Shaw, 2011)

In Chapters 2 and 3, it emerged that the evidence-base for health sector emergency planning in high-income countries (HIC), such as the United Kingdom, is patchy, not robust, and inconsistent. Likewise, the extent of the evidence-base for low- and middle-income country (LMIC) settings is unknown, and it is uncertain if findings for high-income country settings are generalizable to other settings. I therefore sought to carry out a scoping review of the evidence for emergency planning in health for LMIC settings to date. In particular, I was interested to explore how it differs from high-income country settings.

5.2 Methods

This study is a continuation of Chapter 2 and draws on the same database collated by the initial scoping review of the published academic literature focused on emergency planning from the health perspective.

5.2.1 Search strategy

This scoping review utilised the same search strategy to identify relevant articles that matched the scope of the review. (See Chapter 2). The same electronic databases were searched, i.e. Embase, MEDLINE, MEDLINE in Process and PsycINFO via Ovid SP, Biosis and Science Citation Index via Web of Science, CINAHL via EBSCO, the Cochrane Library via Wiley and Clinicaltrials.gov.

As with the HIC scoping review, the search was not limited to "human" and databases were searched using the same time period 1990-2011. In the case of non-health specific databases (e.g. Science Citation Index) I chose not to limit the search strategy to terms specific to the health sector at the initial sift. This decision was made with the awareness of the limitations of indexing and abstracting of the current literature and that emergency management is a multi-sectoral activity. Instead, articles that pertained to a single sector that was non-health related were excluded at the title and abstract filter stage. The articles identified were then downloaded into a Reference Manager database, de-duplicated and converted into a Microsoft Excel spreadsheet for coding.

As described in Chapter 2, the titles and abstracts retrieved were evaluated for relevance and then coded by a team of two pairs topic experts and information specialists (AL+PG, KC+AB). To minimize inter-observer variability in the coding process, we carried out regular cross-checks to clarify any ambiguities or contentious points.

5.2.2 Filtering for relevance

Each article was then filtered for relevance. The titles and abstracts were assessed and judged to be *relevant* (the subject matter is relevant to health sector emergency planning and/or management), *equivocal* (the subject matter may be of relevance to health sector emergency planning and/or management), *not relevant* or containing *inadequate information* for coding. The articles were subsequently coded on a Microsoft Excel spreadsheet using aggregative synthesis based on the predetermined IEMS thematic categories drawn up previously.

5.2.3 Coding framework

As per the scoping review of literature for high income countries, the same thematic codes based on the IEMS framework as developed by FEMA was used to categorize the published literature here.

5.2.4 Anticipated limitations

We expected that the articles on disasters from LMIC were likely to not be reliably classified due to the absence of an internationally agreed taxonomy for disaster planning. This heterogeneity in classification was therefore likely to make it very difficult to identify all the relevant articles from diverse database thesauri. It is therefore not possible to be fully certain that all of the relevant articles were identified and retrieved. To compensate for this, the search strategy utilised optimised sensitivity and used broad headings, as stated above.

Also of note, from experience carrying out the previous scoping review, I was mindful that the phases of the emergency management cycle were likely to not be as distinct as the IEMS model implies. For example, emergency response and recovery phase activities often blur. That said the

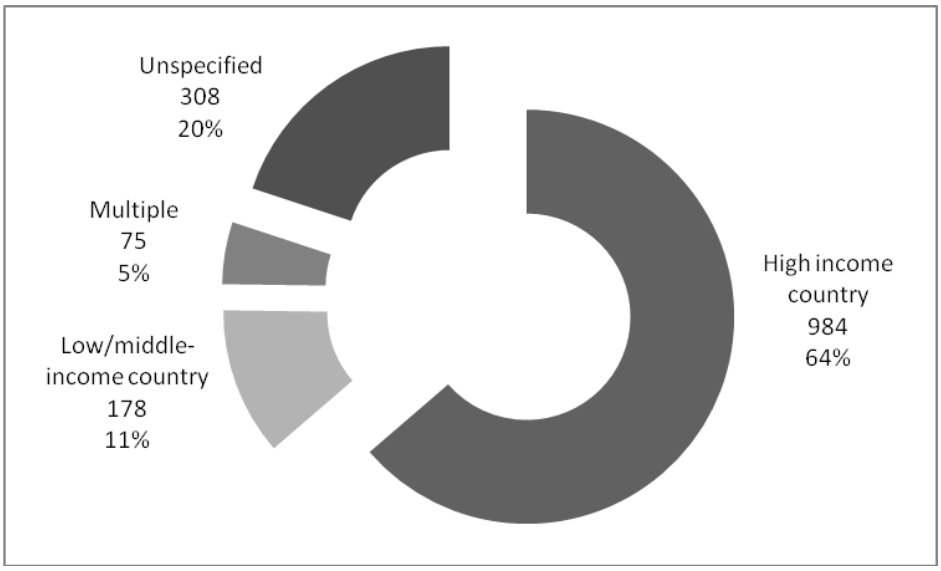
categorisation by phase in this scoping review was required in order for analysis to be undertaken of the articles identified.

5.3 Findings

5.3.1 Country of origin of articles

The initial search retrieved 2,652 articles of which 1,545 were deemed to be either relevant or equivocal after further assessment. There was greater than a five-fold difference in the number of publications on disaster management in high-income countries (n=984) compared to LMIC settings (n=178).(Figure 23) Of this number, almost two-thirds of articles were from high-income country settings, of which 69% were from the United States. 5% of publications covered multiple settings, i.e. both LMIC and HIC settings. The country setting was not specified or could not be determined for 20% of the articles.

Figure 23. Country setting of published articles on disaster management (n,%)



5.3.2 Type of report

For both settings, there was a predominance of less robust articles. These took the form of event reports and commentaries, and observational studies.(Table 16) However, in contrast to HIC publications, there were very few systematic or literature reviews for LMIC settings. There were also virtually no professional education type articles. Proportionately more of the publications from LMIC settings were event reports (44.9%) compared to publications from high-income countries (28.3%).

Table 16. Type and topic of publication on disaster management by country-setting

Setting	LMIC		High income country	
	Number	%	Number	%
Publication type				
Event report/review	80	44.9%	279	28.3%
Commentary/editorial/letter	27	15.2%	239	24.2%
Literature review	1	0.6%	20	2.0%
Education	0	0.0%	49	5.0%
Expert guidance	14	7.9%	51	5.2%
Systematic review	1	0.6%	4	0.4%
Randomized controlled trial	0	0.0%	2	0.2%
Other research study	55	30.9%	342	34.7%
Type of disaster LMIC				
Natural disaster	117	65.7%	204	20.7%
Industrial disaster	2	1.1%	26	2.6%
Chemical/Biological/Radiological/Nuclear	4	2.2%	99	10.0%
Conflict-related/War	2	1.1%	8	0.8%
Terrorism	4	2.2%	105	10.6%
Civil disturbance, riot, strife	3	1.7%	7	0.7%
Outbreaks, epidemics, pandemics	7	3.9%	68	6.9%
Major transport accidents	2	1.1%	27	2.7%
Generic	27	15.2%	355	36.0%
Multiple	8	4.5%	62	6.3%
Other	2	1.1%	25	2.5%
Total	*178*		*986*	

5.3.3 Type of disaster

Two-thirds of articles (65.7%) from LMIC settings dealt with natural disasters. This was proportionately higher than for articles from HIC settings (20.7%).(Table 16) By comparison, there were significantly more publications covering CBRN incidents from high-income countries (10.0%) than LMIC (2.2%). This could be due to the heightened concerns over terrorist threats in these countries, as reflected also by the greater proportion of publications on the topic of terrorism from these countries (10.6%) too. Surprisingly, publications on industrial disasters and major transport accidents were few, despite the latter accounting for a considerable proportion of mortality globally.(Peden et al., 2004, Ameratunga et al., 2006)

5.3.4 Thematic category of publication

When the articles were categorised by phase of the disaster management cycle, 60.8% of publications from HIC settings focused on *emergency preparedness* aspects such as emergency planning, capability assessment and maintenance, and development planning. (Figure 24, Table 17) Articles in this category covered for example descriptions and evaluations of the use of various drills and exercises, the development of disaster plans as well as of standard operating protocols and triage systems. By contrast only 29.2% of LMIC publications covered emergency planning issues.

More than half of articles for LMIC settings (52.2%) dealt with *emergency response* issues compared to 32.8% of HIC publications. These include for example reporting of anecdotal observations, such as the experience of the Israeli field hospital team in the Haiti earthquake disaster, of prehospital care of tsunami victims in Thailand, or the experience of Chinese nurses in the Beichuan earthquake. They also include discussions of emergency response difficulties encountered such as the identification of victims of the Asian tsunami, or transportation of victims after the Bam earthquake, or of the 'last mile' supply chain issues in humanitarian response.

The relative proportion of articles that covered *mitigation*, or both *mitigation* and *hazard analysis*, were low (11.8 and 11.3% respectively) in both settings. These included discussions as to the content of disaster preparedness/response training curricula, set up of disaster warning systems, evaluations of community coping strategies and application of technology such as Geographical Information Systems to aid hazard analysis.

Likewise, the proportion of publications that discussed *Recovery* aspects was low. Comparatively more articles were published on this topic for LMIC settings (19.7%) than high-income country settings (10.0%). This may simply reflect the fact that more disasters afflict LMICs than HICs. Most of the articles in this category explored the psychological and social impacts of disasters.

Cross-cutting issues such as *communication aspects in disasters* and *disaster informatics and intelligence* issues were covered in a substantial proportion of publications for both LMIC (27.0%) and High-Income Country (29.6%) settings. Many of the articles in this category looked more at the application of technology in disaster settings, e.g. telehealth, telecommunications, technology to assist training, computer-aided decision-making tools, and early warning tools.

Figure 24. Articles by disaster management cycle phase

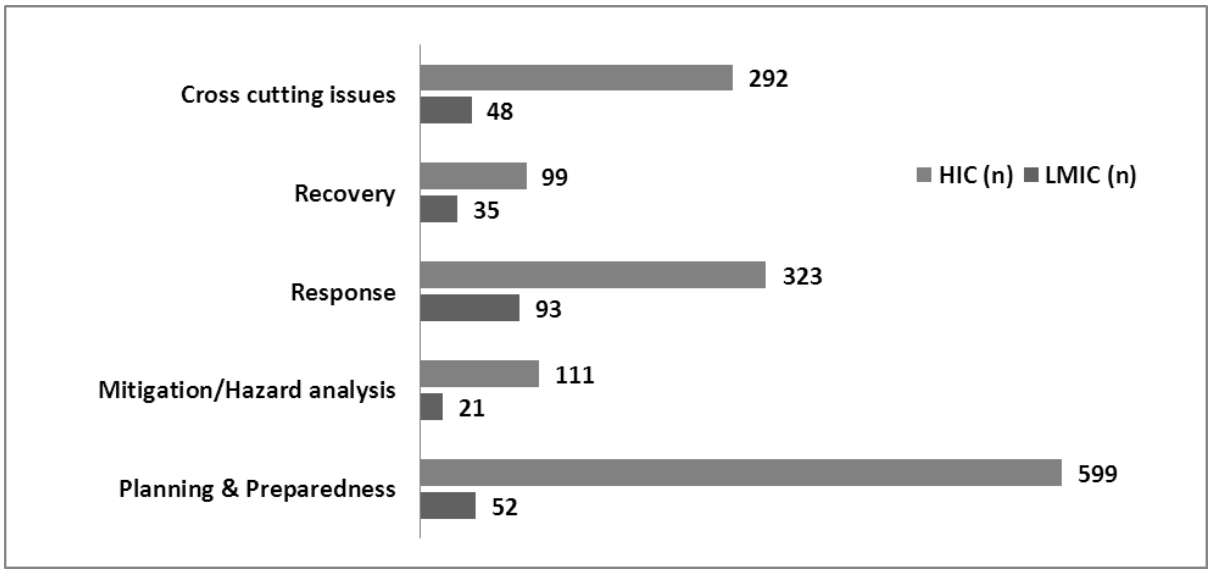


Table 17.Thematic category of publication by country setting

Disaster management cycle phase	Thematic category	LMIC		High income country	
		Number	%	Number	%
Mitigation	Mitigation	6	3.4%	33	3.3%
	Hazard Analysis	15	8.4%	78	7.9%
Preparedness	Capability Assessment	14	7.9%	132	13.4%
	Emergency Planning	18	10.1%	527	53.4%
	Capability Maintenance	9	5.1%	157	15.9%
	Development Plans	11	6.2%	53	5.4%
Response	Emergency Response	93	52.2%	323	32.8%
Recovery	Recovery	35	19.7%	99	10.0%
Cross-cutting issues	Communications & the Media	11	6.2%	98	9.9%
	Informatics & intelligence	11	6.2%	94	9.5%
	Other organizational issues	26	14.6%	100	10.1%

5.4 Discussion

This scoping review sought to map the extent of the academic evidence-base for disaster planning in the health sector for LMIC settings and to descriptively characterise it. It is unique in being one of the first attempts to do so. In the scoping review in Chapter 2, it was reported that the evidence-base for high-income country settings is lacking. Unsurprisingly, I found a similar dearth of publications for LMIC settings.(Challen et al., 2012) Articles on disasters in developing countries tend

to be not coded well bibliographically. The situation is further worsened by a lack of a universally agreed taxonomy for disaster articles. One possible explanation for this may be the different approaches to disaster planning and different understanding of disaster management worldwide. This study therefore identifies a shortage of LMIC-based research publications. It also raises concerns about the robustness of the evidence-base to inform disaster planning and management in this setting currently.

I found a distinct difference of approach between disaster management in HIC settings and in LMIC settings. In high-income country settings there is greater focus on emergency preparedness aspects. In comparison, in LMIC settings the emphasis is more on emergency response. This may reflect the frequency of natural disasters occurring in these settings that are in turn related to their increased vulnerability to natural disasters. This vulnerability is likely to arise from a lack of resources, infrastructure, knowledge or capacity locally that can be applied to help plan and prepare for disasters. As noted earlier, over the past two decades there has been increasing global policy attention paid to 'disaster risk reduction' activities in LMICs as tends to happen in high-income country settings. The experience and expertise from the two different settings is complementary and potentially offers learning and insights that may be applied in either setting.

Calls have been made for more standardized reporting and investigation of disasters that can help guide and inform future planning.(Carley et al., 1998, Zhang et al., 2002, European Union, 2003) This can also help consolidate post-disaster learning.(Rutherford, 1990) Various suggestions have been proposed for standardising methods of reporting,(Sundnes and Birnbaum, 2002, Leiba et al., 2009) and attempts at cataloguing incidents internationally have also been tried.(Lettieri et al., 2009) Despite this, the evidence-base is still fragmented and is held in different repositories by different organizations (many of which are not publicly accessible). The evidence-base is also not efficiently organized and consequently inadequately utilized.(Zhang et al., 2002) This is a persistent problem despite efforts to address this such as through the setting up of online knowledge repositories (e.g. Reliefweb)[29] for disaster management policymakers and practitioners.

I also found that there were significantly more articles published in academic journals on this topic from high-income countries. Moreover, most of the published literature disproportionately originates from the US.(Challen et al., 2012) It is possible that this is due to an indirect and unintentional publication bias as many of these academic journals are published in high-income countries. It could also be the consequence of greater availability of federal (US) funding for disaster research post 9/11. That said it is debatable whether or not such journals are the optimal vehicles

[29] *Reliefweb* website. Accessible at: http://www.reliefweb.int (last accessed 8 July 2013)

for bringing together and disseminating the disaster management evidence-base for LMIC settings. This is especially because emergency practitioners and policymakers from these settings frequently encounter difficulties accessing such literature databases and educational resources, and also have had little formal training or continuing professional education.(Siddiqi and Newell, 2005)

Practitioner-focused knowledge repositories such as Reliefweb do exist but they are not always organised in a way that enables easy identification and retrieval of relevant articles for a particular topic. For example, the documents are often unsystematically catalogued using generic, non-specialist terminology. Another limitation of this grey literature repository is that many of the articles housed in such repositories have not been subjected to stringent peer review and appraisal. This calls into question the quality and reliability of the articles found in these repositories.

In conventional clinical research, the "gold standard" for research is study types such as RCTs, systematic reviews and meta-analyses. However, there are considerable difficulties carrying out these types of studies in LMIC disaster settings as previously noted.(Lee et al., 2012b). The standard approach to research practice may be impractical if not inappropriate as it typically requires considerable time and effort for meticulous planning as well as copious resources for conducting research when both may be in short supply in a disaster situation. Likewise, rigorous 'experimental' investigation often necessitates a "controlled" environment. This may be unachievable in a disaster setting where the environment and infrastructure have been severely disrupted. Finally, every disaster is unique due to the specific context in which it occurs. This can make it difficult to identify common principles and insights that can be generalized elsewhere into different settings.

One possible solution to maximise the value of available data is to carry out a narrative synthesis of observational studies that have been reported. Although this is possible, it is limited by the lack of systematic and consistent data collection.(Rodgers et al., 2009) There have been reports covering multiple disaster incidents published worldwide. However, there were no meta-syntheses published in peer-reviewed journals on which to build an evidence-base on.

There is therefore an urgent need to encourage more disaster research as well as for more publications from LMIC settings in peer-reviewed journals. This would help boost the robustness and quality of the material reported. In the absence of sufficient robust literature on disasters from LMIC settings, international evidence review initiatives such as EvidenceAid[30] will flounder.

[30] *EvidenceAid* website. Accessible at http://www.evidenceaid.org (accessed 8 July 2013)

The heterogeneous nature of the published literature including the non-systematic methods of indexing makes the identification and retrieval of all relevant articles difficult. The identification of all relevant publications by the search strategy cannot be assured as a consequence. In order to address this limitation, the search strategy employed was deliberately inclusive in order to capture a sample of the published literature that would be representative. More importantly, I found that much of the literature on disasters from LMIC settings is likely to be grey literature, or house in repositories other than the traditional academic repositories. As such, it is possible that this scoping review does not reflect the totality of the evidence-base.

Another limitation of the methodology is the choice of thematic coding model used. This was based on the US Integrated Emergency Management System (IEMS) framework. The applicability of this model in LMIC settings is contestable. However, I noted that the framework is substantially similar to other commonly used disaster management cycles, and as iterated earlier this model provides a wider choice of thematic codes that can be used.

The main finding of this review is the relative scarcity of robust literature to provide the evidence-base with which to inform disaster planning and management in LMIC. The focus of this scoping review was from a health sector perspective. That said, it is likely that the insights gleaned may also apply to disaster planning as a whole. Much of the literature dealt with emergency preparedness and response aspects. This suggests a relative dearth of published literature that addresses mitigation and recovery aspects. Future research and disaster reporting may need to focus more on the latter aspects.

Likewise, the majority of publications relate to the US. It is debatable whether insights and findings from US disaster research can be applied elsewhere in the world. This is especially because of the contextual specificities for each country that have unique legal frameworks and emergency management systems in place.

Going forward, there is value in getting practitioners and policymakers to identify and prioritise key research topic areas for further research, especially in LMIC settings. It would also be beneficial to encourage more publication of LMIC disaster research in academic journals. The benefits of this are greater quality assurance that peer review brings, as well as better accessibility of the research.

A final consideration is the disaster research infrastructure in LMICs. There is likely to be currently limited research capacity and expertise in LMICs for conducting robust research on disasters. Local disaster research capacity has to be developed if we want to better capture learning from disasters that occur in these settings.

5.5 Summary points

- There is a paucity of published academic literature on disaster planning and management in LMIC settings. This may possibly reflect publication bias favouring articles from high income countries.
- The evidence-base is fragmented with multiple grey literature repositories that hamper the accessibility of the knowledge base.
- Inconsistent definitions are used, especially between high- and low-/middle-income country settings.
- There is insufficient disaster research infrastructure, capacity and expertise in LMIC settings.

Chapter 6: Qualitative interviews with key informants in Nepal

6.1 Introduction to disaster management in LMIC

Most disasters afflict poorer nations that lack the resilience and means to respond to disasters. In addition to the human toll, disasters damage property and infrastructure, heighten risk of infectious disease outbreaks, threaten food security, cause social and economic disruption, and lead to population displacement.(Watson JT, 2007, Noji, 2005) Disasters also delay or even reverse the development of these nations.(Asian Disaster Reduction Centre, 2005) To minimize the adverse consequences of disasters, these countries require effective disaster risk reduction action to mitigate their vulnerability and effective emergency responses when disasters occur.

This implies that there is an optimal "best practice" approach to disaster management. However, the implementation of "best practice" in disaster management particularly in low- and middle-income country (LMIC) settings is hampered by the paucity of the evidence-base as described in Chapter 5.(Lee et al., 2014) There are also considerable uncertainties with regards to how disaster resilience is best achieved.

The reviews of the evidence-base for high-income countries (Chapter 2 and 3) identified various determinants and barriers to developing disaster resilience. (Lee et al., 2012b, Challen et al., 2012) However, it is unclear whether these determinants are identical in developing countries. As such, this chapter sets out to uncover the determinants of evidence-based best practice for disaster resilience and response in a LMIC setting using Nepal as a case study.

6.2 Methods

6.2.1 Background to setting

In choosing a study site, the criteria used were: a LMIC that was vulnerable to and had experience of disasters. Nepal was chosen as it met these criteria. It is one of the poorest countries in the world with an estimated GDP per capita of US$735 in 2011/12. Its 23.5 million inhabitants are spread across three main ecological zones: Mountains, Hills and Terai (lowland plains). Agriculture is the mainstay of the Nepali economy with more than three quarters of its workforce engaged in this. Of these, smallholders and subsistence farmers predominate.

Nepal is a diverse country with various language, ethnic, caste and religious groups. The characteristics of these different subpopulations differ quite considerably ranging from the highly-educated, wealthier high caste Brahmins, to the mostly illiterate, poorer Dalit caste (a.k.a. 'untouchables'). The Hindu caste system and gender are the two main social institutions that have

clearly defined norms, rules and values. This in turn has a significant influence over the individual's behaviour in response to shock and stress.(Jones and Boyd, 2011)

Each year, Nepal experiences on average nearly 300 natural disasters such as lightning strikes, floods, earthquakes and landslides.(Government of Nepal and DP-Net, 2013) Between 1971-2012, there were over 28,000 casualties from these natural disasters. Nepal's vulnerability to major disasters was clearly demonstrated by the recent earthquake in 2015 in the Kathmandu Valley that killed more than 8,600 persons.

The various activities of disaster management in Nepal are carried out in accordance with the Natural Disaster Relief Act (NDRA) of 1982. The NDRA sets out the responsibility for the formulation and implementation of disaster-related policies and programmes to the Ministry of Home Affairs (MOHA). MOHA therefore is the focal agency for all matters-related to disaster relief. There is a national level Central Natural Disaster Relief Committee (CNDRC) led by the Minister of Home Affairs responsible for strategic level issues including the resourcing disaster relief. There are in turn lower level committees at the regional and district level that are tasked with the more operational elements of disaster relief such as rescue operations and emergency relief assistance.(Chhetri, 2001)

There has been no revision of the NDRA in recent years, in part due to the political instability that has plagued Nepal. For over a decade there has been a revolutionary insurgency in Nepal that only recently ended when a comprehensive peace agreement was signed in November 2006 between an alliance of seven political parties and the rebel Communist Party of Nepal-Maoist. This then led to several years of a fragile peace and failed government as the political parties jostled for political power.(Joshi, 2014) The democratic process is fairly new and unfamiliar to Nepal as it rapidly emerges from a previously feudalistic monarchy. The constitutional limbo meant little in the way of effective legislation has been passed in recent years.

Whilst numerous other Low- and Middle-Income countries could have been chosen, e.g. Pakistan and Afghanistan, the other key reason for my selection of Nepal was pragmatic: I had institutional links that would enable me to access target key informants that were in very senior positions in the government or NGOs who were involved in disaster planning and management. Had another country been chosen, it is highly likely that access to such high-level key informants would have been difficult if not impossible.

6.2.2 Participant sampling and recruitment

A qualitative study was carried out involving key informant interviews with academics, programme managers, disaster management practitioners and policymakers involved in disaster management in

Nepal. Of note, this study was carried out in 2014 and reflects the pre-disaster views of the participants interviewed. The key informants were purposively selected on the basis of their expertise, senior role, knowledge and/or experience in this field. An initial written invitation (Appendix 9) was sent to four key informants that had been identified and recruited to the study. These informants then assisted through snowballing to identify and invite a further seven key informants to interview. All invited participants were provided with a detailed participant information sheet (Appendix 10).

In total 11 key informants were invited to participate, and all 11 agreed to be interviewed. The participants included (Table 18): five senior government officials/politician, two senior programme managers from UN agencies, and four from non-governmental organisations. Two participants were academics in this field as well.

Participation was entirely voluntary and not remunerated. Signed informed consent (Appendix 11) was obtained and their responses were anonymised to protect their identity. Interviews were conducted in English.

Table 18. Background of key informants

Background of key informants	Senior Government Official or Member of Parliament	Academic Researcher	Inter-governmental organisation (e.g. UN agency)	Non-governmental organisation
Participant 1	√	√		
Participant 2	√	√		
Participant 3	√			
Participant 4	√			
Participant 5	√			
Participant 6			√	
Participant 7			√	
Participant 8				√
Participant 9				√
Participant 10				√
Participant 11				√

6.2.3 Key informant interviews and data analysis

Hour-long interviews were conducted face-to-face using a pre-tested set of questions (Appendix 12). Interviews were recorded and subsequently transcribed. Interview data were then analysed using standard qualitative methodology using thematic analysis. This involved developing a hierarchical framework of themes in order to categorise interview data into key themes and concepts, with

successive levels of sub-themes as they emerge from the analysis. The thematic framework were then organised into a mind map from which patterns and linkages were identified. Analysis was carried out concurrently with the interviews which allowed some questions in the later interviews to be iteratively adapted to explore emergent themes. Thematic saturation is likely as by the penultimate two to three interviews no new themes emerged.

6.2.4 Anticipated limitations

It was anticipated that language could be an issue but this did not occur as all of the participants were high-level professionals working with the government, intergovernmental and non-governmental organisations. Consequently they all had considerable proficiency in spoken English. Another anticipated limitation was respondent bias but there was little evidence of this during the interviews as participants spoke openly and with candour. The key limitation was that community representatives were not interviewed although attempts were made to address this by including two key informants with extensive community engagement experience. That said I am mindful of the potential for slanted perspectives of the "experts" interviewed.

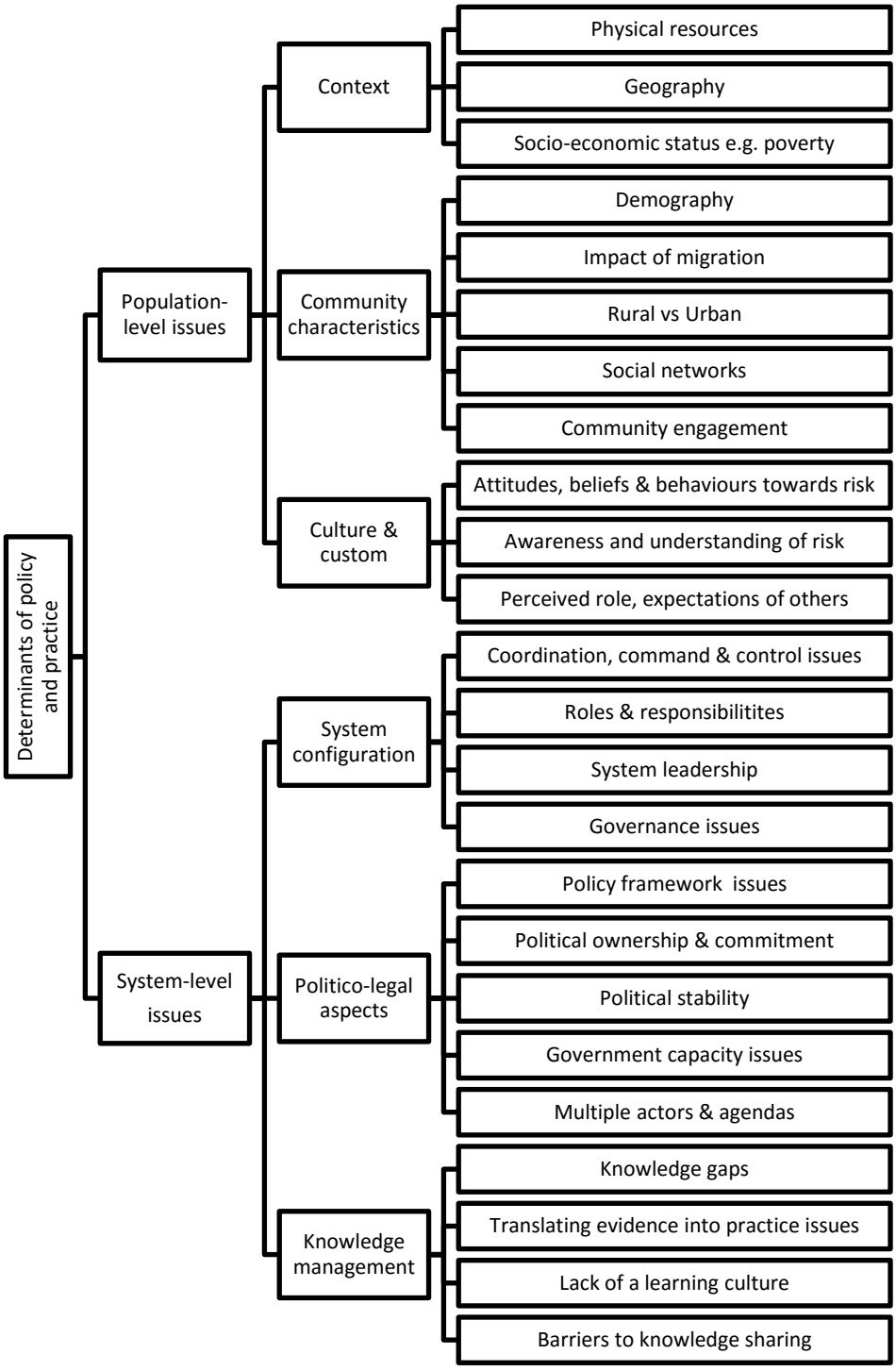
6.2.5 Ethical approval

Ethical approval for this study was sought and received from the School of Health and Related Research (ScHARR) Research Ethics Committee, University of Sheffield on 15 October 2013. (Ref: 0690)

6.3 Findings

The themes and subthemes from the interviews are summated into two categories: population-level and system-level determinants of disaster management practice. System-level determinants included subcategories of disaster management system issues, knowledge management aspects, and political/legal factors, whilst population-level determinants included culture, context and community factors. (Figure 25) These are described further below:

Figure 25. Map of themes and subthemes from the interviews



6.3.1 Population-level determinants

6.3.1.1 Contextual determinants

Vulnerability: Physical situation, resources and geography

The context in which a community is situated influences their vulnerability in terms of what local hazards are present as well as the physical resources available to that community to respond to these threats. These in turn are dependent on the physical geography of the region and climatic conditions.

Nepal is very risk in terms of disasters. Not only earthquakes, not only floods, not only landslides. This is because of the physical diversity: Nepal starts from 60m to 8848 m. The difference of relief, there are within the 100 metre area distance, there are lots of differences like gorges, plateaus, hills and plains. So in the north if there is heavy rain, within an hour it will affect the southern terai area - flash floods. And in some areas there is heavy rain and in some areas there is drought also. Forest fires and domestic fires. Avalanche (occurs) here. Everything is here … Also the geographical conditions of the country: Nepal is a landlocked country. If there is a mega-disaster, we have to rely on our neighbouring countries for their assistance. Since it is a hilly region, there may be after earthquake there may be many induced landslides, so no accessibility because of the terrain. Lot of landslides and you cannot access easily. Like in the Kashmir earthquake, that is also the challenge in this country for the response, for the accessibility.

NGO Manager 1

Socioeconomic status and financial resources

Similarly, the socioeconomic profile and livelihoods of the community dictates the availability of financial resources locally and their options for addressing the threats posed. Several respondents described a situation akin to a "poverty trap" that prevents vulnerable communities from relocating to safer areas, in full knowledge of the attendant risks.

There was flooding of the river and some fishermen were swept away and killed. We evacuated them and then we built some small houses for them far away from the riverside. They went, lived there for a few weeks, and then they went back to the riverbank again. How can they survive there with (just) a small house? There is no farmland for cultivation, there is no job, no other livelihood option. They have to go there and catch the fish and sell it in the market and make their living.

Government official 1/Academic

6.3.1.2 Community characteristics

Population demography, impact of migration and urbanisation

Disaster resilience is also determined by a multitude of community characteristics, including its demographic make-up, the impact of migration as well as the degree of urbanisation. It is also influenced by the extent and quality of social networks that provide some degree of safety-netting.

Maybe his or her relatives and friends may provide a loan but not for each and everyone. If somebody has become poor, nobody will trust that he will pay back the loan. There is no way out. It happens … There are some (social) networks among the people to help each other. Some small networks, some religious networks, some social networks and some relative networks and some professional networks like that. May be they provide (some) small help, but that kind of help is not adequate enough for their livelihoods.

Government official 1/Academic

Level of community engagement

Several interviewees voiced the need for community involvement and engagement in the disaster management agenda for developing community resilience to disasters. This was based on the recognition that the community had their own local knowledge of hazards and risks in their area, as well as local coping mechanisms.

The things that we have to tell (the community): what are the criteria or the parameter that they should consider for risk assessment - this is one part. But from their own sort of indigenous knowledge they can sort of identify their own risks. And then they can plan and then they can implement (mitigation measures) themselves. And at the end of the day it will be successful because they own it ... So when knowledge is transferred to them, then coping capacity has been enhanced, coping capacity strengthened, then the result is right there. Many losses can be minimized. Disaster in a way can be mitigated. Preparedness can make a lot of sense when the community themselves are involved.

UN agency manager 1

Community engagement was also reported to be vital in order to boost community ownership for disaster risk reduction in their locality. This was recognized by some interviewees as crucial in view of the fact that the initial disaster response is likely to be a local response.

In the community also nowadays we support and develop the volunteers. During the rescue (phase), outsiders will not reach in time. That is why local volunteers will (provide) support immediately in the community ... Two or three years back we can establish in the main river systems an early warning

system to inform the community through the community radio and they will (evacuate) immediately. Like this type of practice is also starting now and it is engaging with the community. We can't do this only from the outside. The community people should engage - they should watch the level of river, they should inform (others) in their own language, and then they will organise and they will (evacuate) to a certain place…

NGO Manager 4

However, community engagement was not easy. A key pre-requisite for community engagement was the need for trust. External agencies had to build up trust with the community before further community development work could take place.

We actually talk with the communities. We come up with what actually are their vulnerabilities and capacities. So that is what we do so before that. In a community, you need to do social mobilisation and that also takes time. Before the community can understand what we are bringing in, before they understand, unless they understand what this project is about they do not have that trust. In order to build that trust we need to have social mobilisation in those communities that are at risk.

NGO Manager 3

In addition, whilst community engagement was universally seen as essential and beneficial, problems with their involvement was also widely acknowledged such as low levels of community understanding that limit their involvement in disaster management planning and policy.

Yeah, the community is being involved because we have tried a lot of participatory tools, participatory vulnerability assessment and mitigation planning. In all that, these people they get involved … They are involved in the local level planning and implementation. And sometimes they are also invited to give feedback on policy but these were not very, how you say, effective, because of the community's understanding and sometimes there are limitations.

UN agency manager 2

6.3.1.3 Culture and custom

Prevailing attitudes, beliefs and behaviours, and public awareness

Community engagement with the disaster management agenda in turn was also noted to be influenced by the prevailing attitudes, beliefs and behaviours, as well as the degree of public

awareness and understanding of the disaster management agenda. There was a culture of "living with risk" in part driven by the poverty trap as mentioned earlier that meant some communities could not relocate.

If there is a fisherman community, living on the banks of the rivers to catch the fishes, and if there is a disaster and some people are killed and washed away by the floods, then again the remaining people who are alive they go back again there because that is their livelihood, their way of living, their source of income. Even if you go there and tell them, "It is hazardous, it is dangerous, don't live here, go somewhere else", they ask how they can make their living as the government cannot pay them an unemployment allowance or something like that and the NGOs/INGOs cannot provide them any money or food for every day, for every month. So they go back there. They know the consequence but still they are forced to … They know the risks but they take the risk for their livelihoods, their survival ... If they have a better option certainly they will not go back there.

Government official 1/Academic

Fatalism

The socioeconomic circumstances that force the poor to live in hazardous areas in turn were also associated with lessened risk perception and in turn considerable fatalism.

The victims, the sufferers, the affected populations, sometimes they think that this is their fate - this was done by nature, done by the divine, or God.

Government official 1/Academic

This fatalism appears to be pervasive and affects all levels of the community, including practitioners and policymakers. Fatalism coupled with a lack of awareness of disaster risks can disempower action.

We are not aware of disasters - they are not a priority. We think disasters are an act of God when disasters occur.

Government Official 3

Fatalism may also be a barrier to engagement in disaster preparedness and risk reduction activities. This situation is not helped by the fact that disaster risk reduction is an alien concept for many Nepalis:

First of all DRR is, by concept, new for many Nepali citizens and also for the government and many actors, policymakers and all. You know, basically the mind-set of our whole planning system and perception towards disaster is that it is natural, God given. Whatever will happen is because of bad deeds that our ancestors did in the past or our mistakes in the present life. It is about a God given kind of stuff. God's will really. People have that mind-set … The main issues again here is we have to have a system to change the people's perception, to think about disaster risk issues. Because if you think it is about God's will, then again people wait for God's action on that and they won't go for any preparedness. And at the end they will have to face with a bigger situation like we are facing now in the mid- and far west.

NGO Manager 2

This fatalism also in part reflects poor public understanding of how and why disasters occur. It therefore raises the need for interventions to boost public awareness and understanding of disasters.

Basically, in many areas a disaster has been considered as the wish of the God. They think this is God's wish so that's why we had this disaster. We did something wrong so we invited the disaster. This kind of understanding has not been addressed in many places and, secondly, it means awareness … is not adequate.

UN agency manager 1

NGOs, INGOs and also the government are trying to make the community aware through education, training, through simulation exercises and other things. But again there is still a large number of people who still (ignore) the risk because (they) are not educated. The literacy rate in Nepal is only 66% so 34% are still illiterate.

Government official 1/Academic

Barriers to change

It was clear that pre-existing community perceptions regarding their personal risk and self-efficacy in addressing that risk hinders behaviour change. Other challenges to getting community engagement were related to their understanding of their own role, expectations of other actors (particularly the government), as well as whether they felt any personal relevance and ownership of the disaster resilience agenda. Whilst education initiatives seem intuitively to be the solution, one interviewee

cautioned that they were unlikely to succeed without some form of incentivisation to motivate the community to engage.

So even if you teach them, they don't understand, they don't follow you ... Even if you invite them to learn something they may not come, they decline to come, because they are not interested and they will ask - they will think "What is the benefit"? They need direct benefit.

Government official 1/Academic

That said, on a more positive note, it was observed that perceptions and attitudes were not concrete but evolving. Over time there have been some gradual changes in public attitudes in Nepal particularly in urban areas:

If you think 10 years back, the people even in the urban areas they didn't realize that they're doing mistakes so that they are at risk. Like we had many surveys (where we asked) if the building collapses during an earthquake then who is responsible? They simply used to say that that is because of God. Because God shook the whole world, the earth, (causing) the earthquake and that collapsed my building. But nowadays if you ask they realize themselves that shaking may be everywhere but I am the one who constructed the building weak and it collapsed and killed my family and ruined all my things. That is my responsibility. This kind of perception it is changing but it is mostly in the urban areas.

NGO Manager 1

6.3.2 System configuration

6.3.2.1 Coordination, roles and responsibilities

How the disaster management system operates and behaves is determined by existing processes (i.e. how things are done), and the roles and responsibilities of the various stakeholders. These reflect how the system is set up and governed. Problems with coordination, clarity of roles and responsibilities and fragmentation of the system were cited as a major problem.

So somehow (the system) is working but it still needs to be improved because it is fragmented, not coordinated, not clearly defined technical area or administrative roles of any institutions. So this is (the cause of) some of the confusion and the gaps which we are facing … (There is) fragmentation at

the working level, policy level and institutional level, and a blending of the administrative and the technical sectors each time.

Government official 2

Another aspect of disaster management ... is the managerial part. Ok if there are these earthquakes and landslides, how do we manage after that? How do we respond. Who are the response agencies? And how should they be coordinated with each other? … What is the coordination mechanism in case of emergencies? Are they able to coordinate? Is that really going to … operate, the communication mechanism? Is it tested so far? Yeah they have developed their SOPs[31], but there are different SOPs. The Nepal Army has a different SOP, Nepal Police has a different SOP and the Armed Police Force has a different SOP. How do they match each other? (Are they) compatible with each other in case of a mega disaster ... And also how are the other stakeholders who are coming to that situation, how can they be coordinated and how can they help each other? Otherwise (one agency is) doing one thing and (another agency is) doing another thing in the same area and sometimes duplication occurs there. And sometimes (some areas) are deprived of (aid) and it is not well managed.

NGO manager 1

6.3.2.2 System leadership

Another vital factor is that of system leadership in determining how disaster risk is perceived, prioritised and addressed. I found for example that the disaster management system in Nepal was very much short term "response" focused with far less attention paid to disaster mitigation and recovery. In part this could be attributed to an "immediacy" effect as to what took priority for the disaster response actors.

Because we don't tend to create a (disaster management) system, rather we always try to solve the problem for that particular timeframe. The system should be intact and it has to be exercised. It will change a little bit over time but that system has to be in place. And that system has to be tried, mock drills or something like that, to see if it works. But we don't have a system. And we have to rebuild the system whenever a new disaster comes. For example recently in Sindhupalchowk what we found was er the problem of the coordination in the district itself: coordination with the national government, coordination with the different agencies , coordination with the local communities who are still alive and coordination with those who are affected. And then do we have a mechanism, because (a similar) disaster occurred there in 2008? Did we have any coordination mechanism that

[31] SOPs – Standard Operating Procedures

we tried? We might have tried then but that wasn't exercised! We just forgot! We solved the problem then and … now we start trying to reinvent the wheel. This is the case.

UN agency manager 1

6.3.2.3 System governance

Deficiencies in the governance of the disaster management system were cited as a major concern by several respondents.

(Currently), there is no good mechanism for monitoring, good mechanism of evaluation, good mechanism of giving punishment, good mechanism of giving reward. None. Nothing.

Senior Politician

Oversight (is needed), otherwise … there is a chance they will hide the bad stories or they can highlight the good stories only or if there are some wrong doings they will hide it ... Oversight has to be by the government body because that is why they are there, monitoring this kind of thing. Again I would say the system is important. There should be a mechanism of the government that keeps an eye on them.

UN agency manager 1

The governance issue has important ramifications in terms of clarity of roles and responsibilities, lines of communication, hierarchy of authority, and how the various agencies co-ordinate their actions with one another. Put simply, the weakness in system governance manifested itself through a lack of accountability:

But the problem is that they meet, they have a very good meeting, they make very good decisions but the implementation part is always very poor because they don't ensure resources for the implementation … There is no system to punish or to make them responsible for implementing those decisions.

Government official 1

6.3.3 Political/legal component

6.3.3.1 Policy framework

The disaster management system in turn does not operate in isolation but is strongly guided by the prevailing policy framework in the country. Strikingly, this "policy gap" was highlighted by most of the key informants as a major weakness in the Nepali disaster management system as they are currently working to an outdated policy document.

At this moment we have the old 1982 act that we are working with. We have the National Strategy of Disaster Risk Management of 2009. The strategy is from 2009 and the Act is from 1982. You can see the contrast. It doesn't work. And that Act is rescue and relief focused only, nothing more. Preparedness, mitigation, adaptation - these … are not addressed by the Act.

UN agency Manager 1

Nowadays, in the past 5-6 years, because of the initiatives of the INGOs and the donors, the community are starting to engage (with disaster risk reduction). But even at this time we don't have laws which are focused on preparedness and mitigation. Still we do not have that type of law and policy. We have a policy gap. The government's priority is always for rescue and response when the disaster happens.

NGO manager 4

The consequence of this has been a lack of harmonisation of institutional agendas and coordination of activities.

Unfortunately there is no concrete disaster management policy approved by the government right now. We are only working under the legal basis of the Disaster Act 1982. … There are so many fragmented institutions not coordinated but trying to be coordinated … many cross discipline issues. So the main challenge is how to bring and mainstream these cross disciplinary issues. So it is still fragmented and not back-stopped by the high level authorities.

Government Official 3

However, devising a new policy framework to better fit current needs is not easy. It requires government action to devise the necessary legal instruments and for this to happen due process has to be adhered to.

When the parliament is convinced on this subject matter, then the parliament will be active. Then this policy sometimes becomes law, sometimes policies, sometimes directives, sometimes strategies and other things ... All these initiatives have to be taken by the government. When the government takes the initiative on this policy matter, then they will draft it or they make the policy, they make the directives, they make the draft of the bill. Then (the bill) goes to the parliament to be adopted ...

Senior politician

6.3.3.2 Political ownership and commitment

In order for government action to devise and implement the appropriate policy framework, this in turn requires political ownership and commitment of this agenda.

The first priorities, from my perspective because I am a politician, so from the politician's view … I would say, are acts, policies and plans. Acts, policies and plans. Then there will be strategies, there will be programmes, there will be projects and so on ... It has to be (led) from the top. It has to be done from the top to the bottom. Not bottom-up. For instance, (politicians) like me should be champions, should be leaders (for disaster management), to protect the life of the people and to protect the property of the nation.

Senior politician

Unfortunately, political ownership and commitment was reported by several respondents as lacking.

I feel that the whole government machinery has not paid due attention to disaster risk reduction. They don't realize … may be they know, many of them they know this is a question of human life and physical properties. Each year due to flood, landslides, fires and various other disasters we have loss of human life and physical properties. The politicians, the leaders, the government high officials, they know it but it still they don't take responsibility. They are not serious in investing in disaster risk reduction - I don't know why.

Government official 1/Academic

This meant direction and leadership to drive forward the disaster management agenda was non-existent. There is evidently a need for leadership in the system, a point that was repeatedly stressed by various respondents as one of the key priorities for disaster risk management in Nepal.

(We need) policy direction and commitment from the top to implement it.

UN agency manager 2

6.3.3.3 Political stability

The explanation given for the lack of political leadership, ownership and commitment was due to the lack of political stability in recent years.[32] As a consequence of the political instability, much of the political priority and focus has been on constitutional matters over the disaster management agenda.

Partly it is because of the political instability. Our parliament has the priority of costing and drafting and many other things. So disaster risk management could not come to the (fore) because we had an election and the parliament always prioritises constitution-related things. So (disaster risk management) could not come up and if we talk to the different politicians they say it should be a priority but in reality it doesn't.

UN agency manager 2

There are some arguments that this should be under the chairmanship of the Prime Minister and not only the home ministry who cannot deal with this because they are not the technical wing. So there are so many arguments. Still there is Disaster Management Strategy and Act. A new act is being drafted but not materialized yet by the parliament ... Yeah right now progress is very little. The government is pushing the DM policy and a new institutional framework, early warning system development, gradually this is emerging. This is good for us. But still (we are in a) political transition phase in Nepal - the main priority is the constitutional build up rather than these minor things.

Government Official 3

That is one thing I will say, we don't have any political commitment. Always there is a coalition government. We don't have a one party government. If there is a one party government, they can decide everything by themselves. If we have a coalition government, the PM has to (address) the concerns of all parties. And every party in every level they have their cadres. Vulnerable people they are affiliated to some parties. Now that is the problem with the Nepali government. If the vulnerable people are in that party they will get more support. And all parties they make some obstruction also

[32] For much of the 1990s and 2000s, no political party achieved a majority in national elections in Nepal resulting in a hung parliament for much of that time.

you know, we are not getting (our way) then they won't get their way. There has not been a stable government here in a long time. That is the problem.

Government Official 4

What is evident from the respondents is that political ownership of this agenda is crucial in order to mainstream disaster risk management into the work of the line ministries. Without this ownership, disaster risk management tends not to be prioritised or acted on.

6.3.3.4 Government capacity for implementation and enforcement of legislation

The lack of political ownership of the disaster management agenda has also translated into inadequacies in the legal framework or its enforcement on key aspects such as building codes to ensure buildings are earthquake resistant. Inadequate government capacity was cited as one possible reason why there has been such difficulty with regards to enforcing existing legislation.

The activities that we do at the lower level will have an effect at the lower level. But unless we influence the policy (level) there will be very little of what we can (achieve) at the community … For example, I just like to mention the building code issues. If the government is strong and strongly enforces the code … then it will be easier, it will be very faster to reduce the risks. If the government enforces (disaster risk) policies then it will be easier to reduce (these disaster) risks.

UN agency manager 2

The other reason cited for the lack of enforcement of relevant legislation is because disaster risk reduction is not seen as a priority by the government.

Enforcement and implementation is also poor because (disaster management) is not a priority.

Government official 3

6.3.3.5 Multiple actors and agendas

Another key factor to consider is the fact that there are multiple actors involved in disaster preparedness and response in Nepal.

Different institutions and different ministries are responsible for dealing with the different kinds of hazards and disasters. And many international organisations like UNDP, DfID, and many other institutions are working in different sectors of disaster (management). Many international organisations, especially NGOs/INGOs are working in the soft components: capacity building,

awareness-raising, and things like that in disaster-related areas. And government institutions … we have different institutions. For example, Department of Soil Conservation and Water Management mainly deals with watershed catchment protection, preparedness activities, especially for landslide and stream bank control. There is another different institution, Department of Water-induced Disasters, under a separate ministry whose main task is flood control or flood mitigation. There is another Department of Mines and Geology also, to some extent working in the field of landslide mapping, some things like this. So … there is after incidents, a disaster response. After any disaster the Ministry of Home Affairs is the focal ministry for the disaster (management). There is a major division, Disaster Management Division, under the management of the ministry. This is not a technical wing, not a technical department but basically this department becomes activated after the disaster event's occurrence. This means rescue and response where they mobilize the army, police, security forces, rescue and response activities.

Government official 3

This leads to considerable fragmentation in how the system is coordinated and is able to respond. Of note are the roles played by external actors such as intergovernmental organisations (e.g. UN agencies), non-governmental organisations and aid donors, all of whom have different agendas.

The objectives of different agencies are different right? For example some organisations, faith-based organisations, who actually carry out response (activities) only as they have certain amount (of funds) that are allocated for response. So whenever a flood happens, they provide aid, they distribute these things to the communities directly. They go directly, they don't go through the government. Even though there is a District Disaster Response Committee and there are distribution mechanisms that have already been identified in the district disaster response plan, they still don't go through that mechanism. They actually provide (aid) themselves because that is what their objective is. Because they have to answer to their donors and organisations which are providing that fund. So they go to the community and do that by themselves.

NGO Manager 3

Worryingly, these agendas may be external driven and are not necessarily harmonized with the national agenda or necessarily attuned to local needs.

We are being driven by our (programme) log frame which is developed somewhere else, and we have received money from somewhere else, and we are going to impose those log frames in the community without understanding their need in particular. So that is the main barrier.

NGO manager 2

Consequently, how the disaster management system behaves is not necessarily driven by the "evidence-base" but by a mash-up of agendas of all the stakeholders involved, both local and foreign. It is also evident that the "evidence-base" on its own is insufficient in making the case the case for disaster management to policymakers, but it is nonetheless important as a means to support and justify its priority.

If you have some data-based analysis you can present (it to the government) and you can debate it based on your data. It will be more convincing of course … If somebody comes with the facts and a concrete plan and policy supported by the data, then policymakers will consider this. I hope they will listen. But without any supporting data, and the realities, it will be very difficult to convince (the policymakers).

Government official 2

Other questions arising from the interview data were "who" defines what counts as the "evidence-base" as well as who has sanction to interpret that evidence-base. These are political considerations, and the existing deficiencies in the existing policy process mean that even if an evidence-base was available, it is unlikely to be utilised. There is therefore a need for both the political process and evidence-base to be developed in parallel.

6.3.4 Knowledge management

The final component is that of the evidence-base for disaster management and how it is utilised. It is perhaps here where deficiencies appear greatest.

6.3.4.1 Knowledge gaps

First and foremost are gaps in the knowledge base that hamper the design and implementation of effective disaster reduction measures.

We have a lot of gaps ... For example we don't have the data we need … Let me give an example of landslides. We are working in area (prone to) landslides. In order to understand what kind of mitigation measures to put in place on the slope … you have to understand what is happening on that slope. So you have to understand what (effect) the rainfall is having on that slope, how the (rainwater) is travelling in that land, whether it is infiltration, percolation, surface run-off, and what level of degradation it is causing to that slope. We need to understand this … All this info is necessary in order to design a mitigation measure. We do not have that info.

NGO manager 3

Sometimes, especially in the case of landslides, people settled in a place that is vulnerable to landslides but they don't know this place is vulnerable. And responsible agencies, like the government, they are also not able to make them aware. This is because the government has not good data or good research on which parts of the country are vulnerable for different disasters … People also don't know if this place is safe or not.

Government official 4

There were also reported difficulties experienced by those working in this field to access relevant information.

These days, some of the information is on the internet we can find, but sometimes it is very hard. What actually we need is not available there … We don't have an adequate information base.

UN agency manager 2

6.3.4.2 How knowledge is acquired

There were also considerable challenges observed with regards to the acquisition of knowledge: there is an apparent lack of demand for the evidence-base contributing to knowledge gaps in this field. It was apparent that one has to create the awareness and demonstrate its relevance to stakeholders in order to create the interest and demand for the evidence-base.

If you talk about the local community, they are not interested in what is the reason behind this (disaster). They want to know what needs to be done next … But for certain sectors of the people, like maybe government decision-makers, … at least they should about it …. The community, they don't really care about it because they don't understand the whole sort of thing. (Need to demonstrate)

linkages with their livelihoods, linkages with their daily things how these things are getting affected. Then you may make them interested in those things.

UN agency manager 1

There were also challenges to carrying out research in this field in order to build the evidence-base. For example, several respondents reported the lack of robust and reliable data, or the means with which to collect data for research purposes.

Data is the key here. How do we really make the basis for research? We don't have hydrometric station data! How do you predict, how do you model if you don't even have any stations that collect you the data? For any research you have to have the basics for data collection ... For example, for drought related research: … How much productivity has been affected by climate change? What is the trend, what is the correlation of long dry spells and productivity, or what is the correlation of erratic rainfall and landslides? What is the flood return period, increment or decrement of the return periods ... For research we need this sort of data and then lots of research can be you know carried out.

UN agency manager 1

The data required for GIS[33] (for hazard assessments) is not up-to-date ... we don't have an adequate information base. For example, if we are to assess the flood risk we have to have meteorological data, hydrometrical data for the last twenty - forty years … Sometimes the (instruments) are not very reliable ... So in the case of disaster risk assessment, there are some gaps in the data. And in other areas, the information is not available.

UN agency manager 2

6.3.4.3 Learning culture

There is also a need for a learning culture and processes to embed organisational learning in the system. Learning appears to occur in ad hoc manner through the "past experience" of organisations and individuals personally rather than in a system-wide manner done systematically.

[33] GIS – Geographical Information System

You can try and implement (a project) to see whether it works or not. Then if it works, then only can we say it is good practice … The thing is it is not just about how much you gain by studying a bachelor's or masters, but the thing is you also learn from looking, from trying, from doing … Some (situations) where it works, some where it doesn't work. So that iterative process also helps not only the communities to understand but also the (disaster practitioners) … So it is like always 'learning from doing' kind of thing and this is how we are actually trying to address (the emergency) situation that we have right now. May be there is an intention of learning but then the (organisational) culture and mechanism is such that they cannot overcome (these barriers to learning).

NGO manager 3

Maintaining organisational memory was another key issue identified that is probably hampered by the lack of learning practice and processes.

(The organisations) always tend to learn from one to the next disaster but the problem is the next disaster that again becomes a brand new disaster. It seems like that. For example - we had the Koshi flood in 2008. This was a big disaster where more than 5000 people had to be evacuated. Though there were no casualties, still the evacuation had to be managed. The problem was how to coordinate with the agencies with the relief distribution or post recovery sort of things. We should have learned a lot. At the time we learned a lot but when we had a new disaster, recent disaster, in Sindhupalchowk - mega-landslides killing more than 200 people and there were floods in Surkhet - again we still had similar problems of coordination, material distributions, some are not getting a penny, those who are really in need may not be reached even for the rescue and all. We tend to learn every time and I am very surprised that we haven't any system that starts working from day one. That is the problem.

UN agency manager 2

Another contributor to organisational memory loss identified was high staff turnover.

For example in the Ministry of Home Affairs also some people come up without any experience in disaster risk management and become expert through with work (experience) … over one or two years and then later they then transfer to another department. A new person comes and it takes some time for them to learn. So this is usual and in other institutions this is not as common as in the

government … People get transferred from one (department) to another, from one kind of responsibility to others. So it is sometimes a little difficult to institutionalise the learnings.

UN agency manager 2

The lack of a learning culture in the system is likely hamper system-wide improvement and implementation of evidence-based practice.

6.3.4.4 What constitutes evidence

There are also different interpretations of what constitutes the "evidence-base" and who is considered to be an expert. There were at least two categories of expertise and knowledge voiced: that of the external expert and local knowledge. At the decision-making level, the "evidence-base" is just another competing voice in the political arena where there are conflicting interests and agendas held by the different stakeholders.

That is one of the barriers here: the focal agency for disaster risk reduction in Nepal is the Ministry of Home Affairs which is an administrative ministry where there are bureaucrats who are not from technical backgrounds. But other ministries such as the Ministries of Agriculture, Ministry of Environment, Ministry of Science and Technology, and Ministry of Planning and Works, Ministry of Mines and Geology, they are from technical backgrounds. So their way of thinking is different. They think their work and responsibilities is more important than the administrative ministries. And the administrative ministries they think they have more power and more resources, and they think "they are technicians, they are not nothing else but we have the resources and power and they should obey what we say". So this is the kind of conflict you see, misunderstanding and lack of cooperation and collaboration. It is a very big problem in our country. But here the situation is much worse and serious. The lack of coordination and collaboration and trusting each other is a very big problem and they work in their own way in isolation.

Government official 1/Academic

Indeed "evidence" is interpreted differently depending on its purpose – some saw it as information used to support and back up their policies and programmes. Often it was not valued.

Decision-making should be backed up by the technical inputs … They didn't even realize we need technical people. They thought this is an easy thing, just try it. This is not the case. The realisation came later.

UN agency manager 1

Worryingly, there are some apparent weaknesses in evidence appraisal and the stakeholders interviewed seem less able to discriminate between opinion and fact. Expertise and the evidence-base tended to be associated with past experience and technical know-how. Experts were seen as individuals who could provide solutions to local problems.

The Ministry of Home Affairs is an administrative unit. They are administrators, bureaucrats, civil servants. There are no engineers, no doctors, no technicians, no geologists. Whereas if you want to manage disasters in a country you must have various kinds of human resources. You must have engineers, you must have doctors, but they don't have them ... We have the Ministry of Physical Planning and Works where we have different types of engineers … who are very well experienced, trained abroad, educated in India, UK, USA, Russia and like that.

Government official 1/Academic

In my opinion, the person who … can learn from existing problems and provide some kind of solution, lasting solutions, could be the expert.

UN agency manager 2

Knowledge that originates from high-income countries abroad held greater currency. 'Experts' from these countries were held in high regard and there appears to be less critical appraisal of this knowledge source.

We seek information from different agencies and we do have interactions with them. And if we don't know we seek advice from those people with that type of knowledge … And if we don't find expertise here, sometimes organisations like ours hire international consultants to learn from them.

NGO manager 2

There is also a shortage of skilled human resources in this field which meant that decision-makers often had to rely on a single source of advice and information, regardless of the veracity of the source.

There is no way out. You see if you are working in a district or community you have only one engineer. If you (need) his advice, you have no option but to follow his advice. Because of the time factor and resources, you cannot wait or you cannot think of replacing him with another guy. We follow his or her advice and sometimes it works, and sometimes it doesn't work. I think this happens everywhere.

Government official 1/Academic

In addition, many of the practitioners appear to have moved across from the development sector with little in the way of formal training or qualification in disaster management. In addition, the retention of expertise is a problem in part due to turnover of staff. As noted earlier, this has a knock-on effect on organisational memory for disasters, as well as affects local access to the evidence-base.

Primarily in the Nepal context, most of the disaster practitioners learn from their work because they don't come with the real education background (in disaster management). It is a global trend. People are moving from the development to disaster risk reduction sector. This is because all the funding will come from the DRR sector, and to stick only in development work would not be helpful for those development workers. That is why they are gradually shifting or moving towards DRR. But they don't have a real grounding in DRR … If you look at their backgrounds, the majority of DRR practitioners in Nepal they do not come from a DRR background. That is the problem.

NGO manager 2

6.3.4.5 Translating the evidence-base into practice

The need for evidence and practice to be contextualised to the local setting, needs and understanding of the community was identified repeatedly. This adaptation was seen as essential in order to ensure that the intervention works. Local adaptation was also essential to facilitate both the ease of implementation of interventions by agencies and its adoption by the community.

So the (disaster response) courses that we are imparting to the other countries now we have requested them to change to adapt to their local context. So that means it is flexible - they can change it for their conditions, for their needs… Local knowledge, indigenous knowledge is very important (for us to) study. If we carry out some research, and if we are giving them solutions then we have to respect that also so that the ideas, the outcomes, whatever we give them are easily accepted. Otherwise whatever you give them, if they don't understand, if they don't accept it, it does not work. So that is very important.

NGO Manager 1

And we have to be very flexible in understanding and changing those (programmes) based on the need, the community's need ... Yes we need that (local interpretation). That is why DRR[34] in many areas is failing. It's failing … It is not difficult (to get community involvement in DRR) if you could understand their need, if you could really understand their culture. And we have to work on that. If we work on imported ideas, imported thoughts, that does not work. We have to work on their thoughts to be able to change their minds if it is not in (keeping with) their own lives.

NGO Manager 2

Best practice was seen not just as being evidence-based, but also as practice that is adapted to the local context. There was also a need voiced for practical solutions adapted for the local context rather than just theoretical solutions.

And often we have to customize the information to fit our conditions. We cannot copy and paste anything … The problem we are facing could be very different to what actually the person who puts the information, providers the information, is.

UN agency manager 2

Research was seen as one possible means of finding solutions, but again it too needed to be contextualised.

[34] DRR – Disaster Risk Reduction

Research is very site specific. It should be contextualised. Action research would be really appreciated by the community so that they can get benefit out of it. And implementing agencies can quickly grab the research finding … they can then design the project and then implement it.

UN agency manager 1

The studies and research should be focused on giving solutions for the local context. May be this should come through er from the ground. For example, if you are talking about Nepal, you have to know the actual problems, disaster risk related problems in Nepal like the source hazards first. You should know the details of the hazards in Nepal ... And next is the social aspect - How they are living with those hazards? How are they tackling the risks of those hazards? You have to analyse that so that from those experiences and analysis you can give solutions. Otherwise if you don't understand the real source of the hazard, and if you are not analysing the social aspects of what they are doing so far then may be your outcome will not work. Maybe you have totally forgotten that real aspect. … That will give different results, different ways of response, ways of mitigation, ways of assessing the vulnerabilities. And this social aspect will include even the vulnerabilities … Sometimes the researchers are focused more on the science only. But that doesn't work in my opinion. If you don't consult the local people and community, people who are really affected, if you don't consult them … that doesn't work. You can give solutions but it may not work.

NGO manager 1

Also of note, it was not enough to have the evidence and know-how, but this information had to be disseminated across different organisations. This then introduced additional challenges for implementation as the different organisations understood and interpreted the evidence differently. They also had varying capacities for understanding and being able to implement and translate the evidence into practice. These differences seem starker when comparing international and local NGOs.

The thing is that organisations like ours cannot go and implement by themselves. We have to have an implementing partner in the district in the form of an NGO. So the level of what (our organisation knows), and the level of the NGO that is an implementing partner is different. To have that capacity built into the implementing partner takes time. That is one challenge. The way that we want to implement is not the same way of thinking as the implementing partner. So having that level of same

understanding is one of the challenges. Why? Even if a lot of funds have been provided, what we can see is that it is not being translated or is not being reflected in the communities. So that is where the (knowledge) is lost between the implementing partner and the international partner. They think this knowledge has gone out and the projects are being implemented accordingly, but then they are not walking the walk.

NGO manager 3

Another barrier to the dissemination, uptake and implementation of evidence-based practice reported was the lack of awareness and understanding amongst key individuals in the system such as decision-makers.

For example, I went to participate in a world conference to learn how to mitigate earthquake risk, how to reduce earthquake risk, how to prepare, how to respond. But when I came back to Nepal, replicating those ideas is the difficult part because I am the only one who knows about those things. So to convince (people) here at the decision-making level is difficult. It's difficult ... There is a lack of awareness, lack of awareness and understanding. Because for example if you want to convince me, you have to try to convince me. But if I don't understand it at your level then I am not easily convinced.

NGO manager 1

In summary, for the translation of evidence into practice to happen, this requires knowledge that is contextualised to the local setting, shared between the various organisations, and accepted and adopted particularly by key decision-makers in the system.

6.3.4.6 Dissemination of evidence

Several barriers to disseminating best practice in this field were reported. Firstly, there was the issue of the degree of willingness of stakeholder organisations to share learning.

Right now the information that we have (our NGO) keeps for ourselves. We have our own website. The UN has its own website within the Flagship 4 initiative they have started. Most of the documents have not come in probably … May be there is an intention of learning, but then culture and the

mechanism for this is such that it (does not happen). The evaluations that NGOs do are not shared much.

NGO manager 3

There was also a lack of an appropriate mechanism for the dissemination of learning to all stakeholders, including to decision-makers. Furthermore, differences in how information was gathered and reported meant that collating them into a more accessible form was difficult.

(The) limitations of sharing of best practice is still there … There is no government or you know universal mechanism that can help to spread (this knowledge) … Whether (the NGOs) will be really interested or not to share is a question. I realize there should be a national level government body which really makes them share the information on a regular basis. Then they would be bound to do that ...

UN agency manager 1

Different organisations, different NGOs, work literally in different ways and sometimes the information they have they do not share with each other. Or the methods or the formats that they used are different so they cannot combine the information.

UN agency manager 2

As noted in the last section, the lack of information sharing between organisations meant that the adoption and implementation of best practice in the system is difficult. Where there was some dissemination of knowledge, this tended to occur internally within organisations or professional network settings.

(Learning) is from the incidents of course, and trainings and also exchange programmes and sharing of information. They have formed networks and this year all the information (is shared) on the network ... we have a disaster prevention network and an association of NGOs network also. And if there is anything new this year in the organisations they also frequently organise trainings on the new areas also.

UN agency manager 2

6.3.4.7 Identification of lessons

A further weakness that emerged was that whilst lessons were identified after a disaster, they were rarely learnt. They were not translated into any meaningful changes in individual practices, organisational behaviour or system responses. As was eloquently described by one respondent:

At the end of every monsoon there is a district evaluation meeting where people come in and say that "We have supported the government on this and this issue". It's a workshop where people come in and share the information but it is not very effective is all I can say. The things that have been learned from that are not taken in by the government and by organisations, and that has not been addressed in the new project design. If that had been the case then it would not be every year that we have to provide (an emergency) response.

NGO manager 3

Despite repeated similar hazards recurring on an almost annual basis, little is done to mitigate them. The vulnerabilities that produced the emergencies in the first place are recreated year in year out. This description fits 'single loop learning' and is probably explained to a degree by the lack of effective reflective learning culture in the system.

6.4 Discussion

6.4.1 Summary of findings

I sought to explore with interviewees the determinants of "best practice" in disaster management. A multitude of factors were reported and it was apparent that realizing "best practice" in disaster management in Nepal is challenging and complicated. Central to this is the availability and accessibility of the evidence-base. The evidence-base is patchy with gaps, and there were difficulties reported acquiring, accessing and disseminating it. The lack of demand for the evidence, and different understanding as to what constitutes as evidence, further hampers the use of what is available. The importance of the local context was reiterated as were the influences of local culture and custom. The translation of evidence into practice is also determined by the disaster management system configuration, its internal processes and how it is led and driven by political agendas and legal framework. Indeed the importance of political ownership and leadership of this

agenda was oft stressed. Also evident was the need for greater interdisciplinary and inter-sectoral working between the stakeholders involved in disaster management.

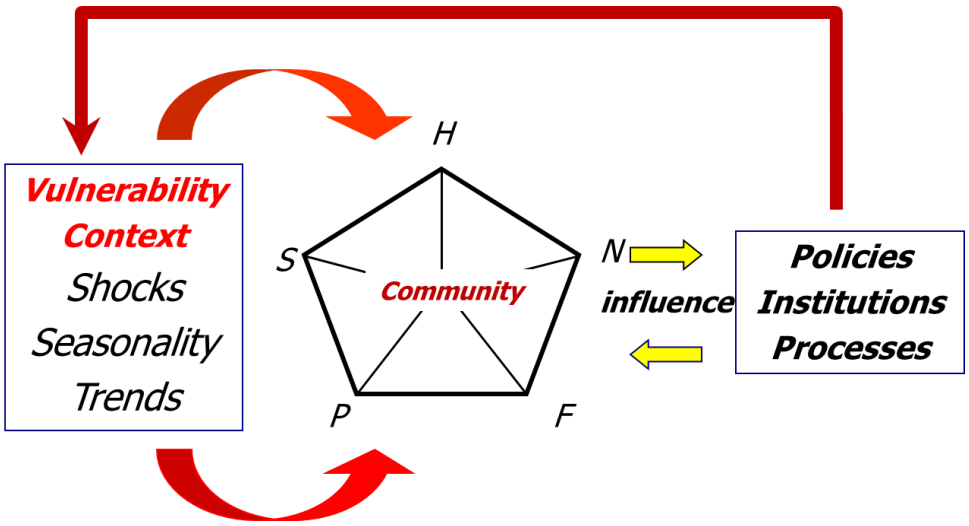
6.4.2 What is already known

The findings reported support existing understanding of the determinants of population vulnerability and disaster resilience.(Manyena, 2006) One such model previously articulated is the Sustainable Livelihoods Framework.[35](Scoones, 1998)(Figure 26) In this model, 5 dimensions are identified which affect a community or individual's vulnerability:

- Human capital: e.g. health, education, coping strategies, ability to work
- Natural capital: e.g. the availability and access to land, water, wildlife, animal resources
- Social capital: e.g. the presence and strength of social networks and relationships
- Financial capital: e.g. the dependability of income and availability of savings
- Physical capital: e.g. the availability of transport infrastructure

Interventions that address these 5 dimensions can help reduce vulnerability to crises. Also of note, the population does not exist in isolation but are affected by governmental and extra-governmental policies and processes. The adverse consequences of disasters can be exacerbated through poor governance and weak coordination between agencies. This tends to be characterized by the lack of clarity of roles and responsibilities, resource constraints and poor management. The lack of proactive disaster management policies and other legal instruments therefore can potentiate the disaster vulnerability of populations.(Chhetri, 2001)

Figure 26. Sustainable livelihoods framework



[35] http://www.livelihoods.org/info/guidance_sheets_pdfs/section2.pdf

6.4.3 What this study adds

What has emerged from the interviews is that what is perceived to be "best practice" in the field of disaster management is a contested term. Best practice in medicine has often been equated with an evidence-based approach to inform medical decision-making.(Sackett, 1997, Rosenberg and Donald, 1995) However, this approach is not easily transferable to disaster management due to the considerable variability of disaster contexts. The contextual specificity of the evidence therefore means best practice in disaster management is not a concrete construct but will vary from situation to situation. Instead, best practice for each local situation may have to be identified, and this is likely to involve a rationalized marriage of both the evidence-base and adaptations required to match local needs and circumstances. Neither is the implementation of "evidence" into the population simple. Evidence exists in a complex socio-political arena influenced by local attitudes, culture, and customs, and has to compete against often conflicting agendas and priorities.(Bakewell, 2000)

If the purpose of best practice is to realize the best possible outcomes in disaster management, the situation is yet much more complex. In addition to individual and community-level determinants, as well as the institutions and processes that interact with the community, there are other significant determinants of disaster management outcomes.(Manyena, 2006) In Nepal, these included the set-up of the disaster management system locally, the presence and efficacy of system leadership, oversight and governance. The fragmented multi-agency nature of the disaster management system often leads to problems of coordination as well as ineffectual and inefficient disaster responses which characterize numerous disasters worldwide.(Zoraster, 2006, Lee, 2005, Lee, 2008) The striking finding of this study was the demand echoed by respondents for strong policy direction and leadership, as well as a supportive legislative framework that is implemented and enforced. These politico-legal aspects are key components of the disaster management system, acting as both catalyst and facilitating agent. The availability of an evidence-base alone would be insufficient for improving either disaster management practice or outcomes.

6.4.4 Limitations of this study

As highlighted earlier, this study lacks input from the general public. Whilst the community perspective would be invaluable, that said the focus of this study was an examination of the policy and practice of disaster management practitioners which often occurs behind the scenes. Consequently, the general public may neither be aware of what goes on nor be best placed to provide insight into the processes. Another possible limitation was the fairly small number of persons interviewed. However, the interviewees were drawn from a range of organisations involved

in this field, and from senior positions. In addition, there was thematic saturation and therefore further interviews would have been unlikely to yield significant new insights.

6.4.5 Implications for practice, policy and research

The study identified difficulties with conducting research in this area but also reiterated the need for research in order to build the fairly limited evidence-base available currently. Currently, whilst disaster management is increasingly data driven, this does not equate it to being evidence-based.(Bradt, 2009) There is a particular demand for research that would find "practical" solutions tailored to local contexts. Similarly, at the practice level there is a need for the empirical evidence available in the academic literature to be sought, contextualised and applied. At the policy level, the need for political advocacy, ownership and leadership was also highlighted, without which the disaster management agenda would not be able to gain traction.

6.5 Conclusions

Currently, there is a lack of demand for the evidence-base in disaster management in LMICs such as Nepal. What is available is meagre and not well applied, and there are significant hurdles to be overcome including contextual and system issues as well as political barriers. The relative influence of these various determinants will vary between countries, with the latter being especially prominent in countries where the system of governance and leadership is weaker. It is often too simplistic to see evidence-base practice solely in terms of individual interventions without recognition of the contributions made by the wider societal determinants.

6.6 Summary points

- There were various knowledge management issues such as patchy evidence-base and considerable difficulties reported accessing this, as well as a lack of demand for the evidence.
- Contextual factors such as community characteristics and resource constraints were a key determinant of practice.
- Disaster management system-level issues such as its configuration and processes are also influential.
- Politico-legal concerns, especially around governance, ownership and leadership, were especially significant determinants in the Nepali context.

Chapter 7: Developing evidence-based practice in disaster management

Parts of the following chapter have been published in the NIHR report on emergency planning by the author(Lee et al., 2012a).

7.1 Integration of findings

In the first chapter of this thesis, I set out to describe the current state of emergency planning and management practice as well as the policy context both in the UK and globally. Recent emergencies and current anxieties about present and future threats continue to keep emergency planning and management on the agenda of policymakers. However there are concerns as to how well emergency management systems function in view of the diversity and high number of stakeholders involved as well as the complexities of these systems. I also described how humanitarian aid for example is not perfect. It has been beset with delivery problems and unintended adverse consequences. It is also not clear whether practitioners involved in this field are "doing the right thing" or are drawing on existing knowledge.

The current state of affairs supports the case of encouraging evidence-based practice in the field of emergency planning and management with the ultimate goal of achieving the best possible outcomes in emergency situations. But this in turn raises yet other questions: What are the limits of our knowledge of this field? Is what we know useful? What do we not know that we really need to know? For this reason, I set out to conduct scoping reviews of the existing published academic literature as well as grey literature to try and ascertain the limits of existing knowledge and to map out what is current known. The qualitative interviews were subsequently carried out to triangulate the findings from the scoping reviews and to glean a more in depth understanding of where the gaps in the knowledge are, as well as of how this knowledge is used. The interviews provided a rich seam of insights that will be discussed further below.

7.2 Key themes and findings

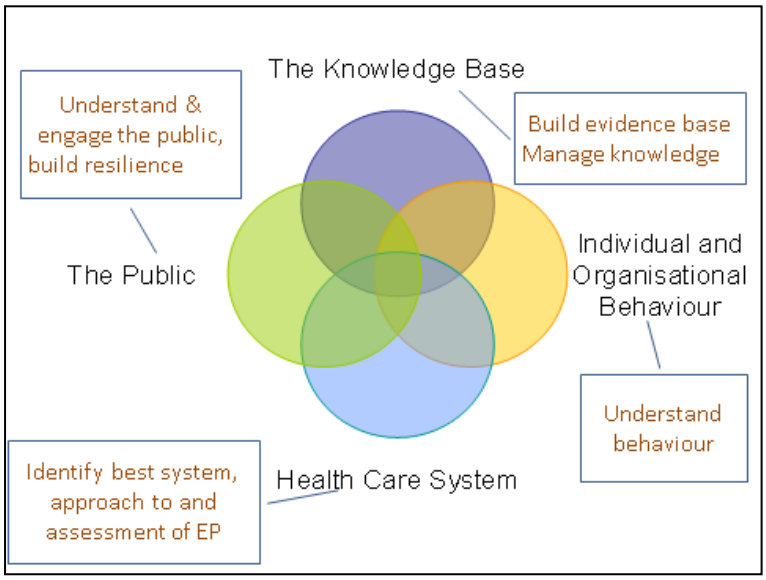
7.2.1 Overview of themes

For both HIC and LMIC contexts, the three literature scoping reviews revealed a preponderance of low quality commentaries and event reports. The articles mostly pertained to response phase issues and there were startlingly few articles published on key aspects such as disaster mitigation, hazard analysis, development planning or recovery. There was lack of robust peer review of these articles and the depth of analysis in these articles was also questionable. Within the literature there was little evidence of synthesis of individual reports into more generalizable principles. To compound matters, there was significant fragmentation of the evidence-base with a diverse range of

repositories that were not always systematically indexed or accessible. Indeed the search of the British grey literature identified just two repositories of evidence, one of which was not publicly accessible.

The key informant interviews identified several knowledge gaps and possible determinants of evidence-based practice. The common themes that emerged pertained to knowledge management issues, system-wide aspects such as the configuration of the system and its processes, as well as a various operational-level concerns.(Figure 27) From the UK interviews, socio-behavioural knowledge gaps at the individual, organisational and population level were flagged as priorities. On the other hand, for Nepal, contextual factors such as community characteristics as well as politico-legal concerns were especially significant determinants of practice.

Figure 27. Evidence gaps



The themes are described in greater depth below, together with questions requiring further research arising from them:

7.2.2 The Evidence-base

7.2.2.1 Knowledge creation: Challenge of acquiring the evidence

- *Limited evidence-base at present*

The scoping reviews revealed a dearth of published articles on emergency planning and management in peer-reviewed journals. What evidence is available is not always robust or peer reviewed and tends to be difficult to find.(Bradt and Aitken, 2010) Furthermore, the published literature in emergency planning tends to be descriptive rather than analytical. For literature from high income countries, there were only 11 systematic reviews identified (less than 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.

One reason to explain the lack of a robust evidence-base has to do with what we define as "robust" evidence. Traditional evidence-based medicine sees this as knowledge derived from randomized trials, systematic reviews and meta-analysis. However, the key informants interviewed drew attention especially to the unsuitability of "traditional" medical research methods of hypothesis testing (such as by means of a randomised controlled trial) in the field of emergency planning. Carrying out research in disasters and emergencies is challenging due to their complexity and unpredictability in timing, scale and location.(Benight and McFarlane, 2007, Mukherji et al., 2014) Furthermore, conventional research study designs cannot be easily applied in disasters and emergencies. Research methods tailored to studying disasters therefore need to be developed.

It also raises the issue as to what constitutes "best available evidence". The observational event reports that form the bulk of the published literature represents the currently available evidence. If these were to be discarded this would have the adverse effect of diminishing further the evidence-base rather than necessarily strengthening it. The aim of improving the decision-making and therefore management of emergencies by basing it on evidence can be undermined by overzealous restriction on the basis of quality and scope of what counts as ''best available evidence.''(Feinstein MD and Horwitz MD, 1997)

A further issue is the question of how research is commissioned. Traditionally, the commissioning of disaster research tends to be reactive and carried out after the disaster has occurred. This leads to considerable delays in setting up the required research infrastructure to study the disaster as events unfold. Delays are likely, exacerbated by prolonged ethical and governance approval processes at present. One possible solution is to adopt an accelerated research approval process, as was undertaken during the 2009 H1N1 pandemic in the UK.(Walley and Davidson, 2010) Another alternative would be to proactively provide anticipatory funding and ethical approval of emergency planning research pre-disaster so that research resources can be more quickly deployed when an emergency occurs.

- *Maximising the utility of grey literature*

The difficulties of conducting studies in disaster settings in reality may explain to a large extent the relative paucity of published academic literature on emergency planning and management. There is a sizeable body of grey literature that could contain relevant information that can be used to build up the evidence-base. In the UK context, there is a growing collection of "grey literature" that

include post event reports, after event/exercise debriefings, lessons learnt documents, and public inquiries into various emergencies. The main criticism of this literature is the predominance of observational studies that are potentially compromised by questions regarding their validity and the reliability of their data. That said, these concerns are not insurmountable and could be potentially remedied by adoption of standardised reporting templates such as those proposed by WADEM and CONFIDE[36]. (Sundnes and Birnbaum, 2002, Bradt and Aitken, 2010) Alternative methods of meta-synthesis could also be used that would facilitate more productive examination of this data set.(Rodgers et al., 2009) This secondary data source could be useful in testing hypothesis and it may be worth further research to explore how the grey literature could be more meaningfully employed in this regard. The more challenging issue then may be the lack of indexing of the grey literature that will undoubtedly limit its accessibility to researchers.

- *Issues with the validity of the international literature*

Globally, there is a sizeable body of literature on this subject. However, the diversity of systems and contexts mean there are marked differences with regards to how these systems are set up and operate. As a consequence, the international literature tends to be disregarded by some practitioners in both the UK and in Nepal as being irrelevant. The main justification used is that emergency planning and response is contextually bound by the national policy context, priorities and circumstances. On the other hand, a few have argued for the need to draw on whatever knowledge that does exist and to then adapt the evidence to the local context. This is not an easy task due to the heterogeneity of the international literature. As with the grey literature, the predominance of observational studies makes it difficult to carry out meaningful meta-analyses due to issues of validity and reliability of the international literature.

- *Humanitarian aid literature*

Uniquely, in the LMIC context, there is a separate collection of grey literature used predominantly by the humanitarian aid sector. These are mainly web-based resources such as Reliefweb(OCHA), the Overseas Development Institute(ODI), 3ie(3ie), the SPHERE Project(The Sphere Project), and others. These resources are unique as they cater more specifically to the (international) non-governmental organisations rather than agencies of the state. However, they are limited by a shortage of submissions from agencies – many reports are not published or publicly accessible.(Mills, 2005) Similarly, academics are disinclined to publish in such forums as there is little academic kudos in

[36] CONFIDE stands for *CONsensus Guidelines on Reports of Field Interventions in Disasters and Emergencies*. It is a list devised by Bradt and Aitken of key components to be reported from disasters including topics on the disaster context, funding, access to the disaster site and the data environment. Bradt and Aitken propose that CONFIDE allows for a more systematic way of data collection and presentation.

doing so. The information in these resources is also not systematically documented, indexed or disseminated. There is therefore a need to develop a comprehensive, publicly accessible evidence repository. This is a particularly pressing priority due to the paucity of evidence relevant to humanitarian aid settings.(Banatvala and Zwi, 2000b)

The UK, international and humanitarian aid grey literature are distinct and separate entities with fairly little overlap particularly for the latter. These 'evidence-bases' however all share in common the need for more systematic collation, indexing, and rigorous peer review and appraisal. Much more work needs to be done as well to synthesise the grey literature findings into more coherent narratives that can in turn be used to formulate evidence-based policies and guidance for practice.

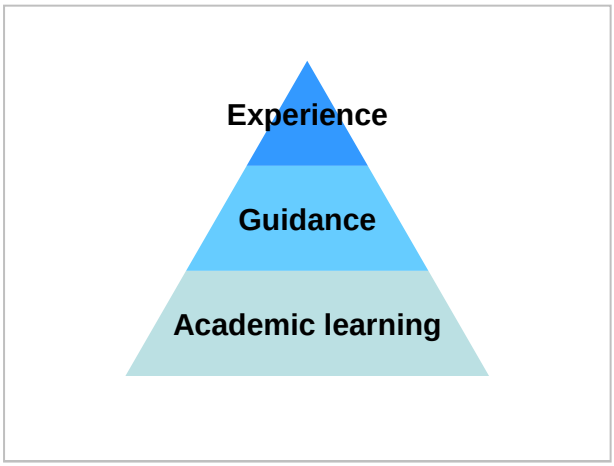
7.2.2.2 Knowledge review: Valuing the evidence

- *Different evidence hierarchy used*

The scoping reviews of the literature identified little published work that would be regarded as high quality if a traditional hierarchy of evidence were to be applied.(Harrison, 2002) However, the key informant interviews in the UK revealed that practitioners valued different types of evidence differently to academics, i.e. an alternative evidence hierarchy may exist (as illustrated in Figure 28). This tended to depend on their individual professional background and organisational cultures. The practitioners were more likely to give credence to experience-based knowledge and guidance. 'Experts' were seen as those practitioners with "experience". This was especially the case for those from the "blue lights" services[37] background. There was also a similar trend observed based on the Nepal interviews where technical expertise (e.g. through training or education or experience) was valued more. In addition, "international" experts were seen to have greater credibility than local practitioners. This may reflect a heuristic bias of "representativeness" inherent amongst practitioners, i.e. that the 'experts' and their 'experience' more closely conformed with the practitioner's expectations and perceptions of 'expertise'.(Tversky and Kahneman, 1974)

[37] 'Blue-lights' services: i.e. emergency services

Figure 28. “Evidence” hierarchy for practitioners



From a scientific-bureaucratic perspective of evidence-based practice, the existing ‘evidence-base’ for emergency planning and response could be perceived to be quite limited and there may be justifiably real concerns as to the “quality” of the evidence used. That said the reports of practitioner experiences, consensus views and “after action” reports form the bulk of the existing evidence. However anecdotal this may be they are an important archive of experience gleaned from disasters. In the absence of more empiric research, it would be folly to disregard these completely.

The compromise perhaps may be to develop a different evidence hierarchy using a different yardstick to gauge the quality of the evidence. Indeed, the criteria and standards used to assess the acceptability of evidence from disasters (and especially complex humanitarian emergencies) are likely to be different from the benchmarks used to assess evidence for therapeutic medical interventions.(Mills, 2005) Such a hierarchy has not yet been devised and further work is required to build a robust consensus as to how such “evidence” is reported and appraised.

- *Limited evidence appraisal by practitioners*

It was also clear from both the UK and Nepal interviews that practitioners tended not to critically appraisal the evidence available. Some tended to be uncritical with information, accepting it at face value. Others perceived the evidence in a very concrete way, as ‘black and white’, ‘right or wrong’. One explanation given by interviewees was that practitioners may lack either the time or skills for appraising information. As a consequence, information such as material from other agencies or countries may be disregarded on the basis that they were not generalizable to the local setting. Indeed the need for contextualisation of knowledge was oft cited.

Whist there is an element of truth as to the need for adaptation of the evidence-base to fit local circumstances, there is a real danger that this is used as an easy excuse to ignore the evidence-base completely. A more considered approach to information may therefore be required. For example,

whilst international evidence may not always be immediately transferable to the UK or Nepal health context, the international evidence-base could help address existing knowledge gaps and signpost researchers to other possible avenues for further investigation.

- *Demand for evidence*

There may also be different appetites for evidence. Our UK key informant interviewees reported health practitioners as tending to be open towards looking for and using evidence. This probably reflects the growing culture of evidence-based medicine that has evolved in recent decades. On the other hand, non-health practitioners, such as those from the police and fire services were less concerned about the empirical "evidence-base" but looked instead much more for concrete "data". A similar situation was reported by the Nepali interviewees where meteorological or seismological data were in greater demand than actual "evidence-based" recommendations on which to base programmes on. This in turn may reflect the different heuristics used by the different practitioners for assessing the validity and reliability of "evidence". Put simplistically, a police or fire officer may understand "evidence" in an emergency setting as concrete data that is factually related to that incident. Such data is seen as relevant and therefore demanded. On the other hand, "evidence" that is more academic in nature may appear less relevant. Such evidence may also be less available or accessible to practitioners and therefore in turn is less sought after by practitioners.

7.2.2.3 Knowledge distribution

- *Communication failures*

One commonly reported issue in emergencies is that of 'communication failures'. This may be a 'catch all' term used for several related but distinct issues to do with the exchange of information. Communication issues include how knowledge is transferred, transacted and disseminated within organisations, between organisations, and with the wider public as well as policymakers. Communication failures may therefore arise out of technical issues, human or organisational failures. How information and knowledge is transacted may be particularly significant as they may be modified in the process. These 'packets' of information are not an immutable entity but a malleable one. A better understanding of the receiver-transmitter relationship and the process of transmission, particularly in emergency settings, may be an important knowledge gap worth exploring further.(Reynolds and Seeger, 2005)

Another related issue is how research knowledge is disseminated and communicated to its end-users, i.e. frontline emergency practitioners. At the present time, there does not appear to be an effective mechanism for this either in the UK or Nepal. Disaster research activity appears to operate

independently of both the practitioner and policymaking spheres. This may explain why research "evidence" is neither valued nor sought, and therefore unlikely to be implemented in practice. This raises the question as to whether the current expectation of research- or researcher-led practice is the right approach. It may be more effective to engage the actual end users of evidence from the outset to identify questions that are meaningful and important to them for researchers to address. This may make it more likely that there is then demand for evidence, and that such evidence gathered empirically is utilised.

- *Barriers to knowledge sharing*

The key informants interviewed in the UK and Nepal also reported multiple barriers to the transfer of knowledge. These included breakdowns in the transfer of knowledge internally within organisations and organisational memory loss arising from factors such as staff turnover. Knowledge sharing between organisations could also be constrained as the organisations involved may be protective of their information: this was certainly suggested from the Nepali interviews. The promotion of knowledge sharing in the field as well as the development of mechanisms for knowledge sharing (such as online repositories such as Reliefweb and ALNAP) are clearly required. From the interviews, it also emerged that there is a lack of universally agreed terminology and understanding of definitions used in emergency planning and disaster management 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. There is thus a pressing need to devise a universally agreed lexicon of emergency planning and disaster management terminology internationally.

7.2.2.4 Knowledge adoption: Organisational learning

- *Barriers to knowledge adoption*

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. The barriers included poor awareness of the evidence-base by practitioners, as well as evidence that is available being disregarded as irrelevant by practitioners. This was felt to be significantly affected by prevailing organisational cultures. Practitioners currently appear to base their decisions on intuition and past experience, and not on the available evidence-base. There is therefore a real challenge to promoting more evidence-based decision-making in practice as the prevailing culture is unreceptive to this. This then raises the question of how can we change existing organisational culture to help embed the evidence into practice. There could

potentially be a role for information technology in making the evidence more readily accessible and easily transmissible. This is one possible area worthy of further research.

- *Lessons identified not learnt*

As has previously been reported, organisational learning is an issue. It is difficult to promote the uptake of good practice by this sector for a host of reasons including rapid staff turnover, a belief that 'there is little time to learn lessons given that there is always another emergency', as well as a 'scarcity of resources available for encouraging evidence-based practice'.(Banatvala and Zwi, 2000b) Little was found in the scoping review on *development planning* to address issues identified pre-disaster, or on mechanisms for improving emergency management organisations based on past experience (i.e. *adaptive learning*).(Thomas and Allen, 2006)

Similarly, whilst the term "lessons learnt" was oft repeated in the grey literature review there was actually not much evidence that this actually happened. Where these lessons were identified by organisations there was no further mention in the literature as to whether they were revisited later to confirm that changes in organisational or individual behaviour had subsequently taken place. The key informants interviewed confirmed the observation that lessons tended to be '*identified*' rather than '*learnt*'. They also observed that organisational learning was poor amongst health organisations involved in emergency management. This finding triangulates with findings of the Pollock Review which reported problems in the UK emergency services sector that include the lack of a system to ensure lessons are learned, failure to learn lessons, and that previous lessons and reports tend not to be acted on.(Pollock, 2013)

The lack of organisational learning is of concern as this is one key mechanism for rectifying organisational weaknesses that in turn would potentially reduce the likelihood of recurrence of adverse events or minimize its severity. Organisational learning is also a part of preparation for potential threats and hazards. The realization of evidence-based practice is contingent on various key conditions including organisational learning.(Ferlie and Shortell, 2001) The interviewees intimated that prevailing organisational and professional cultures were felt to be partly responsible for the lack of organisational learning. There is therefore a need for more exploratory work to identify the barriers and enablers of organisational learning.

- *Maintaining organisational memory*

The other challenge is how to acquire and strengthen organisational memory in this field such that the cumulative experience and knowledge acquired by organisations over time is retained and, when required, recalled and disseminated. Certainly in the Nepali context, staff turnover was detrimental

to the retention of organisational memory. This may partly be an information technology issue, but it does require organisations to develop a culture where organisational learning is promoted as mentioned earlier. 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. Although this learning does appear s to be taking place in the health emergency planning sphere, it is unclear to what degree and just how effective these efforts are especially with regards to the retention and application of the learning.

Another related issue is training and education in health emergency planning and management. From the HIC scoping reviews, around one in 20 published papers addressed various issues related to this topic. Due to the unpredictability of major incidents occurring, it is difficult to assess the effectiveness of training and education on outcomes in major incidents. Instead, a proxy outcome measure such as a knowledge-based examination or a simulation is used to assess the efficacy of these educational activities. A few papers have tried to relate the actual behaviour of emergency practitioners in an incident to training received previously, but these are rare.(Welling et al., 2005) As such, it is not known whether pre-disaster training and education translate to "evidence-based knowledge" being used in practice when disaster strikes.

- *Knowledge/Evidence repository*

Both the scoping reviews of the published literature and grey literature review found a high number of event reports, debriefings and public enquiries relevant to health emergency planning. However, as key informants in the UK confirmed, these documents are not collated in recognized repositories, nor are they reported or indexed in a standardised way. This makes it difficult for such documents to be easily accessed. A similar situation exists in Nepal that is compounded by organisational reluctance to share internal documents. There is therefore a need to collate and retain these documents in a repository accessible to the public, practitioners and policy-makers. This will however require a significant shift in organisational attitudes and openness to information sharing.

7.2.3 Social and behavioural science gaps

As reported in Chapter 4, it was interesting to note that most of the key informant interviewees were less concerned about research into scientific aspects of emergency planning and management but were more interested in the wider system- and process- issues as well as 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.

7.2.3.1 Individual and organisational behaviour in emergencies

In the business sector research into crisis management is not new and the psycho-social roots of disasters have previously been identified.(Turner, 1994) However, in the health sector, our understanding of individual and organisational behaviour in crises 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 unclear how much of this knowledge has permeated into health emergency planning. The multitude of agencies involved in emergency settings adds to the complexity. As such, one research priority that was very clearly articulated was the "social and behavioural science gap" with regards to how individuals and organisations behave in emergencies. This applied to practitioners as well as policymakers and the public, and covered various aspects (described below) including decision-making in crises and how risk was perceived and managed:

a) How decisions are made in crises

As noted earlier, there appears to be poor understanding of how individuals behave in emergencies. For one key group of individuals, i.e. those who hold key positions of power in a crisis, understanding their decision-making behaviour is particularly important. The decisions that they make may ultimately translate into organisational behaviour and responses in such settings. In turn their decisions may have significant impact on the wider community. As such good decision-making is a key component of effective crisis response and a key aspect of leadership. However, what came through from the interviews was a concern that such decision-makers (and therefore their organisations) may be ill-prepared to deal with uncertainty. Indeed, as one informant lamented, "the NHS deals poorly with uncertainty". Empowering individuals with the necessary confidence to make (and change) decisions in a situation of incomplete information is a real challenge.

b) Defining and developing good leadership

On the topic of leadership, there are several unknowns in this regard. Firstly, how does one define good leadership particularly in a crisis situation? What are the key competencies of good leaders? And how do we train individuals to become good leaders?

There is some literature regarding educational interventions in health emergency planning such as the use of role play, table top exercises, and educational "games" (such as STOP Disasters game produced by UNISDR). However, there was surprisingly scant information of the educational competencies sought of emergency planners and responders through these educational interventions.

There are also a number of educational programmes delivered at various higher education institutions (from continuing professional development through to Masters level courses)(Gebbie and Qureshi, 2002, Markenson et al., 2005, Van Wart and Kapucu, 2011) and by organisations such as the Emergency Planning College. However, the educational competencies for these courses and programmes are not always publicly accessible.(Challen et al., 2012) Neither is there a universally agreed list of core competencies that have been validated.(Daily et al., 2010) Indeed, one criticism has been that 'many currently taught practices are neither evidence-based nor standardized'.(Hsu et al., 2006)

It is also unclear how the training objectives for health emergency planners are best realized. For example, in the UK, emergency planning is taught nationally by various higher education institutions as well as accredited emergency planning training organisations such as the Emergency Planning College. Some are delivered as continuing professional development events, others as postgraduate certificate courses, and yet others as Masters courses. Differing curricula, training methodologies and duration exist.(Daily et al., 2010) From the Nepali interviews, it was evident that the situation for training for emergency practitioners and policymakers in LMICs such as Nepal is even more limited and disorganized.

These issues equate to a worrying gap in the evidence-base – we do not know what the optimal training solution for disaster practitioners and policymakers is, nor is there an internationally agreed view as to what core competencies are required to best equip these individuals to make decisions in difficult circumstances.

7.2.3.2 Approaches to risk

Another socio-behavioural aspect is how individuals, populations and organisations perceive and manage disaster risks.

a) Risk assessment and perception

The scoping review found some literature (124 papers) on *risk assessment* that was mainly from an organisational perspective, and mainly pertaining to high income country settings. These tended to be hazard analyses and technical articles that covered techniques such as modelling which is increasingly being used in this field. Within the grey literature there was a significant body of expert technical articles, mostly around chemical incidents and plume modelling. These tended to be single event-specific hazard analyses and once again predominantly for high income country settings. In comparison, there was little in the way of such articles for LMIC settings.

From the interviews, it was reported both in the Nepali and UK setting that emergency planning is predominantly reactive to incidents as they occur rather than proactive in their mitigation. This reactive approach to risk may in part be due to the professional backgrounds of the individuals involved and the organisational cultures in which they operate. These are predominantly responding organisations. Furthermore there are lots of competing priorities and limitations of resources that may mean a focus on the present and what is happening now, rather than on the future and what may happen.(Banatvala and Zwi, 2000b)

As such disaster risk assessments are not standard practice, but done on an ad hoc basis, and limited in scope and detail. This situation is unsurprisingly worse in the Nepali context where there is a paucity of information to feed into any risk assessment, let alone analytic capability to assess them thoroughly and accurately.

In addition, it could be argued that the principles that underlie hazard assessments should be ascertained first as this may influence the assessors' risk appetite or sensitivity, as well as help articulate what the priorities are e.g. precautionary principle basis, or cost-benefit basis such as BATNEEC (best available technology not exceeding excessive cost). The counter argument to this is that these principles may disproportionately bias the focus on a particular set of hazards over others (e.g. increased political concern about the risk of terrorism for example may displace focus from other more likely and hazardous risks).

The accurate *perception* of risk is dependent on an accurate *assessment* of the risk posed by a hazard. It was reported by a few respondents that they felt that emergency planning and management practitioners often based their practice on a number of assumptions, which may not always be right. Indeed in the Nepali context, there is often a reliance on advice from "experts" whose expertise is derived from technical qualifications or job post but not necessarily rooted in any evidence-base. These assumptions are fed into the emergency planning process and introduce potential vulnerabilities and risks into the system. As Tversky and Kahneman previously observed, the failure to accurately assess a hazard could lead to significant errors in the perception of the risk with the risk of a disaster being seriously under- or over-estimated.(Tversky and Kahneman, 1974)

The awareness and perception of risk by persons in positions of power, and in particular policymakers, is also a serious issue. Where the risks are not perceived to be real or pressing, as was the case in Nepal prior to the 2015 earthquakes, there is little political ownership of the agenda, little prioritisation given to it, and consequently little in the way of resources committed to tackling

the risks. This lack of political risk perception can severely diminish political (and therefore system) leadership for tackling the risk.

In terms of knowledge gaps, the issue of risk perception raises several key research questions that warrant further follow up. Firstly, is there a common definition of risk in the health emergency setting that can be expressed? Secondly, how can health hazards and their attendant risks be assessed objectively? And finally, are there possible tools or interventions for both policymakers and practitioners that can be developed to aid accurate assessment and perception of risk?

b) Risk sensitivity

In this context, I define sensitivity as the 'responsiveness' of individuals or organisations to a particular risk, i.e. what threshold level of risk perception elicits a response by individuals or organisations. The key informants reported inconsistencies in sensitivity to various risks in both the UK and Nepali setting. Similar risks are perceived differently by different individuals, be they a member of the public or an emergency response organisation. There were correspondingly differences in their responsiveness to these risks.

Public risk awareness tended to be especially low. Where there was some awareness of risk, there seemed to be little public reaction to it. Indeed in the Nepali setting, there was some degree of fatalism regarding risk, in part due to the poverty trap that limited the poor's capacity to address the risks. Similarly in the UK setting there appeared to be a public expectation that the mitigation of risks was devolved away from them to the authorities to address, i.e. there was minimal public ownership of risk. In both settings, this seems to translate into a "victim mentality" and this may in turn adversely affect community resilience.

This variation in levels of risk sensitivity governs the organisational reaction (or lack of) to various hazards. It was felt that UK emergency planners and policymakers were more concerned and focused on "big bang" incidents. These are single events, usually dramatic and large scale, that occur rapidly such as flooding incidents. In contrast, there appears to be a relative neglect of other hazards, such as those threats that were more nebulous, or of slower onset and chronicity, such as heat waves or excess winter deaths. One explanation for the differences in risk sensitivity may be due to the levels of awareness of the risk itself, and the perceived risk of the hazard. In the UK context for example, all the emergency services were much more alert and sensitive to risks of terrorism or CBRN incidents. In contrast, the NHS was noted to be surprisingly slow to react. There was a similarly expressed lack of sensitivity to disaster risks in Nepal in 2015, a charge especially levelled at the political class. This phenomenon may once again be explained by the *availability*

heuristic principle(Tversky and Kahneman, 1974) – hazards that are apparent, or have occurring in recent memory, may be perceived to be a greater threat, and therefore there may be greater sensitivity to addressing them.

The emerging research areas from this include a need to gain a better understanding of inter-agency variations in risk sensitivity, as well as to 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 appropriately to various threats.

c) Risk communication

The accurate communication of information about the risk posed by a hazard was also flagged up as a major issue. The implications for the target receiver/audience of this information can be considerable, be they the public, practitioners, or other decision-makers. Around ten percent of published papers identified the topic of communication as a key issue, but many of these articles were not robust, consisting mainly of narrative event reports. There were also similar problems identified through the grey literature review with regards to the accuracy of public information communicated. Some of the key research questions that emerged on this topic include:

- How can disaster risks be effectively communicated to policymakers?
- How can disaster risks be best communicated to the public?
- How much information do policymakers, decision-makers and/or the public need?
- And related to this, how does on define and measure “effectiveness” in communication in disasters?

Another consideration here is not just what information on risk is communicated to the public, but also to what extent should uncertainty be communicated to the public. This may be dependent to a degree on the level of public understanding of science (i.e. would they understand uncertainty?) as well as the wider intentions of public communication (e.g. the aim of reassuring the public to mitigate public panic versus information to keep the public abreast and informed of a particular situation or threat.)

7.2.3.3 Organisational issues

Thus far in our discussions on how emergency management organisations are set up and respond a presumption may be made that these organisations are fairly homogeneous and respond in a similar fashion. However, in reality there are marked variations between the different organisations. This may be in terms of their understanding of risks, how they assess a situation, how they communicate,

react and respond to incidents, as well as how they review their actions subsequently and learn from incidents. Even within organisations there may be differing professional cultures and subcultures. These differences can have adverse impacts in disasters, as was previously identified in the Pollock Review(Pollock, 2013) and has led to ongoing work in the UK to try and reduce differences in how these organisations operate. The latter include initiatives such as the *Joint Emergency Services Interoperability Principles*[38]. The situation is far more complex in the Nepali context compared to the UK, due to the large number of stakeholders present such as intergovernmental organisations (e.g. UN agencies), international NGOs, local NGOs, the military, in addition to other state actors. A better understanding of these professional and organisational cultures would therefore be indispensable in understanding how the various organisations function and relate to one another. There would also be value in studying organisational culture clashes and their consequences.

The scoping review of the published literature for HIC found that a third of the articles published covered some aspect of organisational processes such as communications (9.8%) and informatics and intelligence (11.5%). Similarly, inter-agency issues or problems were commonly cited in the thematic analysis of grey literature as well as key informant interviews in both the UK and Nepal. These issues included, for example, problems with inter-agency coordination in emergencies, a lack clarity of roles and responsibilities for the stakeholders involved, as well as fragmentation of the emergency management system. Also identified was a need to more fully understand the process of information transfer within and between organisations. Whilst there were commonalities between the UK and Nepal, it is also worth noting that there was a large degree of contextual specificity with regards to how the various agencies involved are configured within each system and how they relate and work with other agencies.

Although organisational aspects were frequently raised as key issues in the scoping reviews of the published literature, the articles appear to lack adequate analysis. For example, many of the articles presented the issues in a descriptive manner in event reports with little attempts at further analysis to explain the observations. There was not much exploration of organisational factors or behaviours that might facilitate or hinder effective emergency management responses. Also of note, most of the key informant interviewees were less concerned about research into the more scientific aspects of emergency planning and management but were more interested in individual, population and operational aspects of emergencies. There is clearly a need to encourage more rigorous analysis to be carried out in the event reports. Some of the more significant organisational aspects reported in the interviews are covered below:

[38] Joint Emergency Services Interoperability Principles website is accessible at http://www.jesip.org.uk/

a) Planning versus Plans

The emerging themes regarding *planning* in and for emergencies could be organised into three main categories:

- the process of planning,
- the output of planning (i.e. plans)
- and the implementation of plans in an emergency situation.

Some interviewees felt that the actual value of emergency planning was in the *process of planning*, where the key actors worked through the issues. However, I noted that those who write plans are not necessarily the same persons who would implement the plans. Indeed, some respondents admitted that plans made were rarely implemented or referred to in emergency situations. An alternative view that some others claimed was that the outcomes of emergency responses could have been better had there been *plans* or had the key responders *adhered to plans*. If the latter was the case, how would one actually assess how well a plan is implemented? Neither is there a universally agreed measure of "quality" of planning.

What is not known is which of these three elements (planning, plans or the actual adherence to plans) has the greatest bearing on the outcome of an emergency response. Indeed, from the scoping reviews of the literature, there appears to be little in the way of evidence to back any of these positions. Perhaps more significantly, what the interview findings does do is highlight the fact that there is a 'disconnect' between planning intentions and actual action. We therefore need a better understanding of the process of planning and its relationship with actual outcomes.

b) Top-down versus Bottom-up approaches

It was also clear that there are two conflicting approaches to emergency management. In the UK a predominantly top-down model reflects the command and control structures in place for responding to emergencies. This is clearly exemplified by the Gold-Silver-Bronze command hierarchy that is adopted by the emergency responders and other state agencies involved in emergency response. This contrasts with Nepal where there was a greater degree of emphasis on community engagement in the process. This may partly reflect the development context where bottom-up approaches are more the norm. That said, it is not a purely bottom-up system and there is still a degree of top-down control in the system (e.g. via the government and military structures).

This raises the question as to which of the two approaches (or what mix of the two) is linked with better disaster outcomes. Current conventional wisdom favours a more community-based approach to disasters, where community involvement in planning and training for disasters is advocated.(Auf

der Heide, 2006) Indeed, as argued by Quarantelli, "*planning should take into consideration how people and organizations are likely to act, rather than expecting them to change their behaviour to conform to the plan."(Quarantelli, 1985)* However, in humanitarian aid situations dyscoordination between agencies is common leading to duplication of effort, unaddressed needs and many other problems that could potentially have been avoided had there been greater system leadership and control.(Zoraster, 2006)

The balance therefore may be that in the acute phase of the emergency, a top-down structure is required, whereas in the recovery phase, a more 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 to manage the transition, who should be involved, and how the roles and tasks are transferred across. More work is needed to ascertain what the mix of top-down control and bottom-up engagement will deliver the best outcomes.

c) Reactive versus proactive

The current emergency planning stance both in the UK and Nepal is predominantly reactive to incidents as they occur rather than proactive in their mitigation. As noted earlier, this likely reflects the organisational cultures of the responding agencies involved. At the system level, the health service appears much more geared up towards response rather than proactive longer term approaches to hazard mitigation. This could reflect the pressures on services that lead to prioritisation of current work over what could or has yet to happen. It may also reflect a lack of risk awareness.

The lack of a proactive approach to emergency planning may lead to the creation of blind spots. For example one blind spot identified was that mundane issues such as business continuity planning and management tended to be ignored by the health system. Neither is there adequate forecasting of potential emergency needs or the development of surge capacity to absorb potential workload arising from emergency situations. Intuitively a proactive approach to emergency planning seems to be needed. However there does not appear to be sufficient evidence from the literature to support this view. In the real world where services are constantly under pressure to cope with the existing workload, it may be that what is needed is to find ways to develop a reactive service that can effectively deal with unpredictable and fluctuating emergency demands.

d) Generic versus specific planning

The other emergency planning unknown was discerning whether generic emergency plans were superior to specific single-event/hazard plans. Whilst nearly a quarter of the published papers were

related to emergency planning, most were reports or narrative reviews that provided little evidence to support either generic or specific planning strategies. Generic plans may be more easily recalled and implemented by practitioners, whilst specific plans may provide for a more optimally adapted response. It could be that certain hazards require more tailored plans whilst for others a more generic plan would suffice. For example in the UK many hospitals have generic major incident management plans that cover a host of incidents ranging from transport incidents to flooding incidents. They may also hold specific plans for pandemic influenza, SARS or plans for managing specific chemical incidents. What is less clear is in what situations and for what hazards would generic plans suffice, and in what situations are specific plans required. The latter could require some form of objective criteria-based assessment to be developed to assist planners with making this judgment. Unsurprisingly, the key informants interviewed were divided in terms of favouring "all risk" generic plans versus those specific to particular situations. In some cases, such as in certain areas of Nepal, there were no plans in the first place.

The concept of generic versus specific planning could also be viewed from a different angle. The creation of emergency plans presumes that it will be implemented when an emergency arises. There is an implicit expectation that the plans will dictate how individuals and agencies named in the plan will operate. This then raises a further issue as to how emergency responders should function in an emergency. Some interviewees interpreted (and favoured) plans that adopted a more rigid "standard operating procedure" approach where everything is done in a standard manner. Other interviewees favoured a more flexible response, whereby the emphasis was on having key personnel trained and able to make appropriate decisions in difficult circumstances. In the latter situation, plans were only seen as a guide or aide memoire, and were likely to be ignored in practice. These conflicting views raise the following questions:

- What is the function of an emergency plan and how does it relates to disaster outcomes?
- Which approach would produce better outcomes - a flexible approach to emergency management guided by an emergency plan, or a more rigid approach dictated by an emergency plan?

7.2.4 Emergency management system issues

7.2.4.1 The organisation of the emergency management system

UK

In the UK, the Civil Contingencies Act 2004 requires responding organisations to work collaboratively in major incidents and disasters.(Cabinet Office, 2004) There is a clear expectation for a 'joined up'

and ‘whole systems’ approach. Currently, the various agencies involved do tend to respond to emergencies in a multi-agency manner. However, what is less easy to ascertain is the degree of integration and how effectively do the organisations function as an emergency management system. This raises two main question: Firstly, what is the optimal configuration of the emergency management system that will deliver the best outcomes? And secondly, in order to achieve the best outcomes not just in the emergency response phase but across the whole emergency management cycle, do the configuration and processes need to change and if so, how?

The findings of this study indicate that currently the emergency management system in the UK is more focused on the emergency response phase compared to the other phases of the disaster management cycle. There was also a sense that the health sector in the UK has a very narrow view of emergency planning: there is a prevailing view within the NHS that emergency management is the responsibility of the emergency services. Consequently, the broader ramifications of emergency planning and management for the wider health community (such as emergency preparedness or recovery issues) tend to be ignored and poorly addressed by the health sector. The knowledge gap here is to identify and delineate the roles for the health sector in all phases of emergencies. It would be useful to find ways to improve wider health sector engagement with this agenda.

Nepal

In Nepal, the legislation in place was a fairly outdated Disaster Act of 1982. This act was primarily focused on facilitating the response by agencies of the state to emergencies. It is therefore unsurprising that much of the government infrastructure is set up to react and respond to emergencies as they occur, and less with the forecasting, mitigation and preparation for emergencies. This legislative issue was cited by many of the Nepali interviewees as the major stumbling block to the development of a more comprehensive approach to disaster risks. Legislative issues were much more a feature for the government agencies. Interestingly, legislative issues were not mentioned in any of the UK interviews. This may perhaps reflect the fact that there is a supportive legislative framework in place, i.e. the Civil Contingencies Act of 2004, that provides an overarching basis for emergency planning to take place.

In contrast to the pre-occupation of the interviewees from government agencies over legislative matters, the international NGOs have in recent years been much more focused on the wider aspects of disaster risk, including its mitigation as well as development of community resilience. This may be because of the focus on disaster risk reduction championed by international donors and the UN agencies (and also perhaps due to the availability of donor funding for disaster risk reduction activities). There is thus a lack of coherence in policy, strategy and programme activity between the

state agencies and non-state actors in Nepal. Emergency management functions are split across many different actors leading to potential confusion regarding organisational roles and responsibilities. Consequently, the emergency management system is fragmented, disorganized and lacks the system leadership and direction required.

Challenge of devising an ideal emergency management system

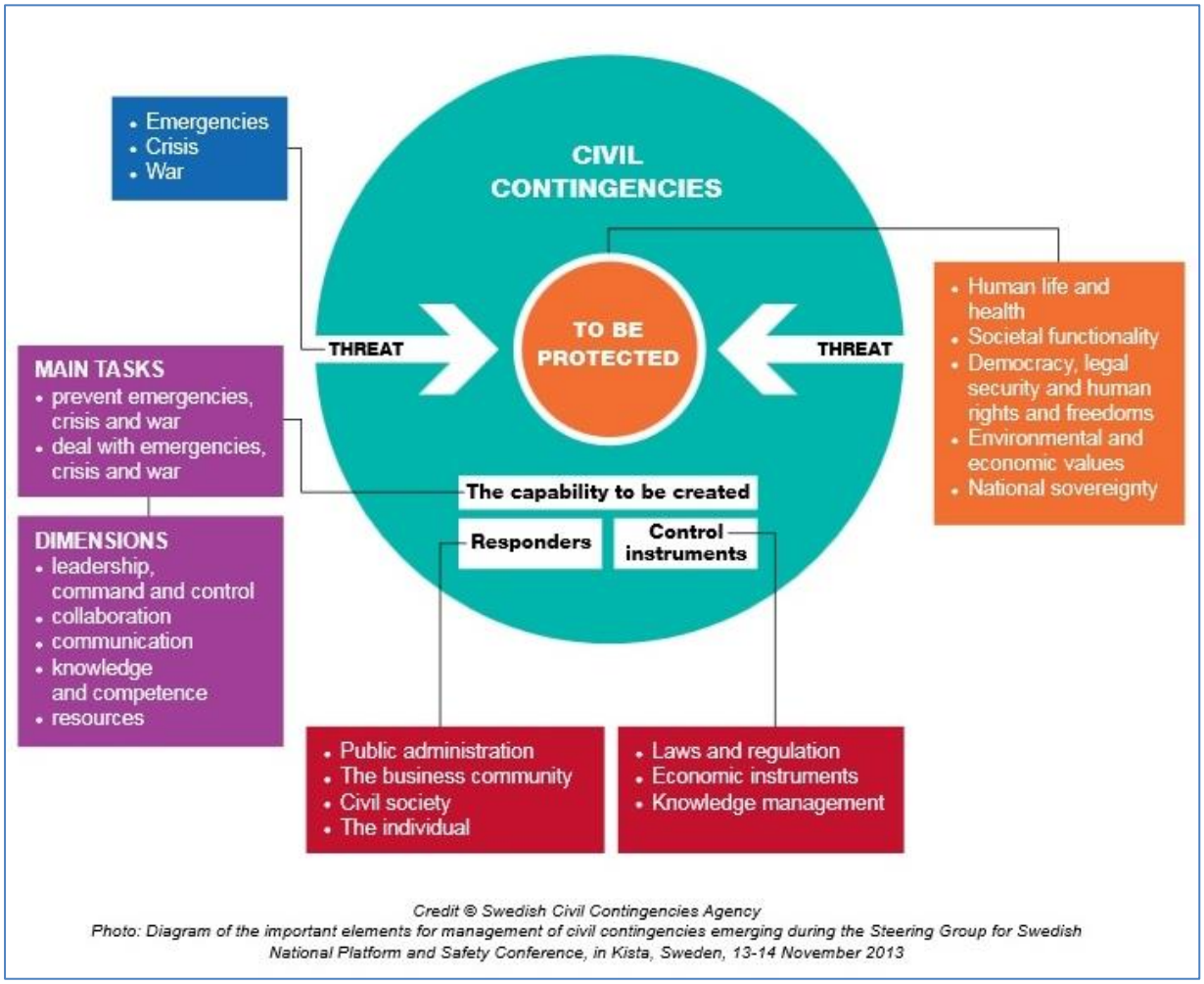
One possible solution to the system fragmentation is perhaps for the stakeholders to agree and adopt a universal framework for emergency planning and management. One framework currently in use that may be helpful in ensuring a broader approach to emergency planning and management is the US Integrated Emergency Management System (IEMS) model. However, I found that the IEMS model does not include all relevant themes, notably omitting fairly major cross-cutting issues such as business continuity management, disaster informatics, internal and external communications, and surge capacity planning. Also of note, this is a more technocratic model that disregards wider determinants including policy framework and community aspects such as culture and socio-economic characteristics.

There are other models, such as the disaster management cycles (Figures 2 and 3) favoured in the UK as mentioned in Chapter 1. These are much simpler than the IEMS model and map out emergency management according to the main operational phases. These operational phases however are fairly broad headings that do not elaborate on the various emergency management activities. For example, under the 'Emergency Preparedness' phase heading are multiple associated tasks ranging from business continuity planning, emergency training and exercises, development planning, to capability assessments, that may be less apparent to the uninitiated. They may therefore not be as useful as a conceptual framework for emergency planners. A more detailed framework such as IEMS may help facilitate emergency planning and ensure all elements are addressed by emergency planners and managers.

Further afield, emergency management is organized differently in other countries and often is termed differently, for example in some countries it is termed as civil protection or civil defence. The following figure for example describes the Swedish Civil Contingencies Agency model which adopts a broader of view of emergency management. It encompasses various dimensions such as leadership, command and control, collaboration, communication, knowledge and competencies, resource requirements.(United Nations Office for Disaster Risk Reduction, 2014) Interestingly, it includes amongst its responders wider stakeholders such as the business community and civil society. This model is perhaps more holistic than the IEMS model as it incorporates societal and community

aspects to be protected such as national sovereignty, environmental and economic value, societal functionality, human rights and democracy.

Figure 29. Swedish Civil Contingencies Model (United Nations Office for Disaster Risk Reduction, 2014)



Credit © Swedish Civil Contingencies Agency
Photo: Diagram of the important elements for management of civil contingencies emerging during the Steering Group for Swedish National Platform and Safety Conference, in Kista, Sweden, 13-14 November 2013

The WHO have also devised a toolkit for assessing the disaster preparedness capability of health systems.(World Health Organisation, 2012) In this document, it examines the health system according to the following functions: leadership and governance, health workforce, medical products, vaccines and technology, health information, health financing and service delivery (see table 19). From a health systems perspective, it comprehensively covers the key components required for a functional health system response to disasters from appropriate legal frameworks, strategies for health system financing, business continuity to logistics considerations and the management of hospitals in an emergency situation. However, as is evident by its functions-based structure, this is a 'technical' document that reflects a 'technocratic' approach to emergency planning and preparedness. Like the IEMS approach, it does not take into account key contextual

issues such as culture, community beliefs and behaviour, as well as the degree of community vulnerability and resilience to disasters.

Table 19. Key components of the WHO health-system framework, by function

Functions	Key Components
Leadership and governance	Legal framework for national multi-sectoral emergency management Legal framework for health-sector emergency management National multi-sectoral institutional framework for multi-sectoral emergency management Institutional framework for health-sector emergency management Health-sector emergency-management programme components
Health workforce	Human resources for health-sector emergency management
Medical products, vaccines and technology	Medical supplies and equipment for emergency-response operations
Health information	Information-management systems for risk-reduction and emergency preparedness programmes Information-management systems for emergency response and recovery Risk communication
Health financing	National and subnational strategies for financing health-sector emergency management
Service delivery	Response capacity and capability Emergency-medical-services (EMS) system and mass-casualty management Management of hospitals in mass-casualty incidents Continuity of essential health programmes and services Logistics and operational support functions in emergencies

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. There is some contextual specificity to the various systems as such. For example, the Swedish model is tailored to their national context and as a model may be less transferable to other contexts in view of its explicit ideological and value-based priorities. Similarly, more technocratic approaches as has been adopted in the US and the UK do not capture community aspects relevant to emergency preparedness, planning and response. They may be less relevant in settings where emergency management is less of a state response (e.g. in countries where state agencies are weaker) and more a function of community resilience, as the initial emergency response in these settings are more likely to be local responses.

It cannot be assumed that the existing UK emergency management system is the ideal and optimal system solution. Nor can this be assumed for other systems worldwide. Indeed, 'system' differences make it difficult to assess how well the different systems perform relative to each other. There is therefore a need to develop robust methodologies for comparing national emergency management systems for health. Whilst the pre-existing WHO toolkit offers one means of assessing the emergency preparedness of national health systems, as noted above it adopts a fairly technocratic approach that does not completely capture the population response to emergencies that includes not just the health system but also other actors and the public. More comprehensive, robust and validated means of comparing the different systems need to be developed. In particular, there would be a need to identify factors contributing to or hampering organisational as well as population resilience in the context of a disaster.

7.2.4.2 Problem of silo-working

As stated earlier, there is often an unstated assumption that the different emergency management organisations are fairly uniform in their composition, capabilities and manner of response. However, in reality there is significant diversity in practice, attitudes and culture. This diversity leads to various problems that arise especially when individual agencies act autonomously in emergencies. For example, the emergency response in a disaster may be mounted by a hotchpotch of formal state responders (e.g. ambulance, police, fire service and military) as well as other non-governmental organisations, all of whom tend to work in silos. This is neither optimally effective nor efficient for a situation where a unified response is desired.

Issues with roles and hierarchy were frequently reported in the grey literature review, occurring in 44% of documents. These problems of silo-working have been reported elsewhere, including previous research amongst PCTs.(Day et al., 2010) The key informant interviews also identified barriers to implementing an integrated system, not least because many of the emergency services operate independently and are fiercely protective of their independence and autonomy. The hierarchical configuration of the emergency management system, with top-down command and control, as well as stringent enforcement of protocol-based responses to emergencies can reinforce this situation. Bureaucratic decision-making processes were another recognized barrier.

Organisations can be highly resistant to change, and it can be difficult to challenge existing conventions and change cultures within organisations. There is therefore a need to explore further these organisational cultural differences and better understand how these affect inter-agency working. It would also be useful to identify the enablers of effective inter-agency working.

7.2.4.3 Engaging the public

When the emergency management system was discussed in interviews, the perspective taken by interviewees tended to focus mainly on the 'blue lights' services. The role of the public and community organisations tended to be overlooked. However, it is clear that the response to any emergency is not just limited to the formal emergency responders but also includes the wider health economy (including hospitals and primary care) as well as wider civil society. In an ideal situation, there would be greater inclusivity in the system. Societal resilience to disasters incorporates both emergency management resilience as well as community resilience and vulnerability.

Currently the relationship between practitioners, the emergency management system and the public in the UK and Nepal appears to be less than ideal. Public engagement tended to be dismissed by the key informants interviewed as they were concerned that the public had unrealistic expectations particularly with regard to what could be provided in an emergency by the state. In the UK, from the interviews there was a sense that the public were somehow seen as peripheral to the emergency response. In striking contrast, lay interviewees clearly regarded themselves as having some personal responsibility and candidacy even during a crisis. Indeed, they often reported feeling under-engaged by the emergency responders and planners.

Similarly, in Nepal the public tended to be perceived as 'helpless' and 'victims' by disaster planners, practitioners and policymakers. They were ignored in the planning process as they were perceived to be 'ignorant' through their lack of Western scientific knowledge. That said, a few more enlightened interviewees did acknowledge that sometimes local knowledge about their community and the disaster risks present can be invaluable.

In the UK, there have been attempts to incorporate wider civil society in emergency preparedness through local and regional resilience forums. Similarly in Nepal, public participation in disaster preparedness is encouraged by donors and government agencies. However, from the interviews there was a sense that public involvement for both UK and Nepali contexts tended to be minimal and tokenistic. One possible explanation is that the status quo is reinforced by an emergency management system and culture that disempowers the community.(Shaw and Maythorne, 2013) 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.(Pearce, 2003, Lee, 2008, O'Sullivan et al., 2013) The research needs here are to identify factors and interventions that help develop and strengthen community resilience, as well as to explore how public involvement in emergency planning can be enhanced in a meaningful way.

A further related 'Cinderella' topic where public engagement is vital was identified: the ethical dimension of issues that occur and how these are resolved. The ethics of disaster response is an interesting and fairly unexplored area of research. Examples include exploring public views on the acceptability of casualties in a disaster (i.e. will the public accept that some will die in disasters or will they expect everything to be done to save every life), and the ethical principles by which triage decisions are made. 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.

Similarly the use of 'control' populations in the study of disaster interventions may raise similar ethical dilemmas – would it be ethical to deny a humanitarian intervention on the grounds of research? That said, in large scale disasters, it may be possible to identify 'control' areas simply by virtue that aid cannot and does not get to all affected areas simultaneously. Consequently, this could result in a 'natural experiment' situation that disaster researchers could exploit to study case and control areas for interventions. The real challenge however is likely to be how one minimizes contamination effects from various interventions being delivered by multiple actors at different times to a target population (as tends to happen in disaster affected areas) that would muddy the observed outcomes.

7.2.4.4 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. The current systems that exist in both countries appear to have evolved through chance rather than design, driven by the occurrence of disasters and other events such as constitutional challenges. As respondents put it, things tended to happen more by chance, through resources being thrown at a problem, and of decision-makers and practitioners 'muddling through'. Respondents from both countries were critical of their own systems and were able to see weaknesses and deficiencies. Whilst it is easy to spot the problems, identifying solutions is trickier. It is not known what the ideal system setup for health emergency management in the UK or Nepal should be. Indeed there is no universal metrics by which to measure the effectiveness of the different systems worldwide. It is also not known what constitutes an effective organisation or team, and neither is it known what an 'effective' response is or how it can be assessed objectively.

These judgments of effectiveness have tended to be fairly subjective, and influenced by various external factors such as political, public and media perceptions. One research need here would be to devise a validated means of assessing the effectiveness of emergency management systems in responding to major incidents and disasters. In order to do so, we would first need to develop a

much deeper understanding of the process of emergency planning and management, and how it translates into outcomes.

7.3 Developing evidence-based disaster management

7.3.1 Why evidence-based practice?

One of the goals of evidence-based medicine was to encourage a more systematic and scientific approach to decision-making. Conversely, EBM set out to minimize non-evidentiary decision-making in practice.(Tonelli, 1998) This has led to substantial effort in medicine to improve clinical decisions so that care provided is safer and more consistent.(Greenhalgh et al., 2014) Conversely EBM also facilitates the gradual extinction of medical interventions of no medical value, thereby improving health system efficiency through reduction of wasteful endeavours, but also improves patient protection from potentially harmful interventions of no benefit.

The potential for evidence-base practice to transform and improve disaster management is an attractive aspiration. In a field where relatively few decisions can affect the lives of thousands of persons, for better or for worse, the need for better programming and decision-making is essential. The goals of disaster management are to prevent and mitigate disasters from occurring, to respond to events in order to minimize human and other losses, and enable a speedy recovery of the affected populations back to normality. The central aim for promoting evidence-based disaster management practice therefore is to expedite and achieve these goals.

However, from the interviews it was strongly suggested that decision-making in emergencies more often than not was based on the individual's own reasoning, personal experience, or drawing on group consensus of that particular branch of the emergency services. This echoes observations by others, such as Bradt (2009) who noted that *"decision-making in disaster management currently places a premium on expert or eminence-based decisions".* There is also a misperception by practitioners that there is a need for more "data", and that having more data equates to evidence-based practice. Once again, Bradt was critical of this view; "*disaster relief operations may be data driven, but that does not mean that they are soundly evidence-based".*

7.3.2 Developing the science of disaster management

So what needs to be done? Firstly, one priority is to strengthen evidence-based activities such as adherence to evidenced-based interventions and using evidence-based tools to help diagnose and treat disaster management issues. Evidence-based practice needs to be mainstreamed as the new normal for practitioners and policymakers alike. To achieve this, there will be a need to create

demand for evidence by practitioners. There is a crucial role here for evidence-based practice champions to advocate its use by practitioners in the field.

The paucity of the existing evidence-based also needs to be addressed. It was clear that evidence is hard to come by in this field, as demonstrated by the challenges of conducting research in emergency settings. Randomized controlled trials, the gold standard research method for clinical medicine, cannot be easily done in emergency settings. It would also be folly to ignore the existing evidence-base even though it may consist of mainly observational event reports.

This raises two key priorities: firstly a need to develop a new hierarchy of evidence specific to disasters where evidence synthesis probably would be the gold standard. There are alternative novel review methods such as realist synthesis that could help unpack the mechanisms for how disaster events unfold, or emergency management interventions work in practice.(Pawson et al., 2004). That said, observational studies are likely to provide the bulk of the evidence. Consequently, the standard of these studies needs to be raised: articles and event reports that form the current bedrock of the evidence-based must be more robustly written, reported and peer reviewed.(Norris, 2006) There is a pressing need to nurture disaster science through systematically recording, identifying and appraising approaches that work.((Bradt and Aitken, 2010, Lee et al., 2014)

The second priority is for a more flexible research infrastructure to be established that allows rapid deployment of research teams and initiation of studies in a disaster area. This will require leadership from policymakers as well as national research councils and funding bodies to agree and foster.(Abramson et al., 2007) Linked to this is a need to develop mechanisms for effective dissemination of evidence garnered. Such evidence kernels will need further interpretation to ensure that they can be implemented in reality. Indeed, an oft reported issue has been the real difficulties translating guidance and policies into practice.(Elrod et al., 2006) There have been calls for disaster research to adopt a more interpretive approach to 'locate the study of disasters within broader theoretical frameworks, including in particular those concerned with risk, organizations and institutions, and society-environment interactions.'(Tierney, 2007)

7.3.3 Evidence into practice

However, questions have also been raised as to not just how the 'evidence' is derived but also how it is to be subsequently implemented in practice.(Harrison and Checkland, 2009) Evidence does not exist in a vacuum but a complex socio-political arena with competing voices.(Bakewell, 2000) All of the different stakeholders involved, be they the rescue services, public, non-governmental organisations or the state, will have differing agendas and values. These influence and affect

decision-making and outcomes. However, one limitation of evidence-based practice that has been previously identified is with regards to how values are incorporated into practice.(Tonelli, 1998)

From a purist point of view, the evidence represents a body of knowledge that has been empirically acquired (e.g. through robust research studies) and tested through critical review. As such it provides an objective statement of what is known, i.e. intervention 'A' will lead to outcome 'B'. However, decision-making in practice often has a degree of subjectivity in it, i.e. to what degree is outcome 'B' sought? This is a value judgment that may be informed by the values of the decision-maker, other stakeholders present in that decision-making forum, or influenced by external factors such as the media, government ideology and policy, religious beliefs, economic considerations, etc… For example, the evidence-base may indicate that cholera vaccination would reduce the likelihood of a cholera epidemic occurring in a population and therefore ultimately save lives. However, what the decision-maker will have to consider is to what extent is protection against cholera desired by the population or government, how much of a priority it is given, and whether this intervention could be afforded.

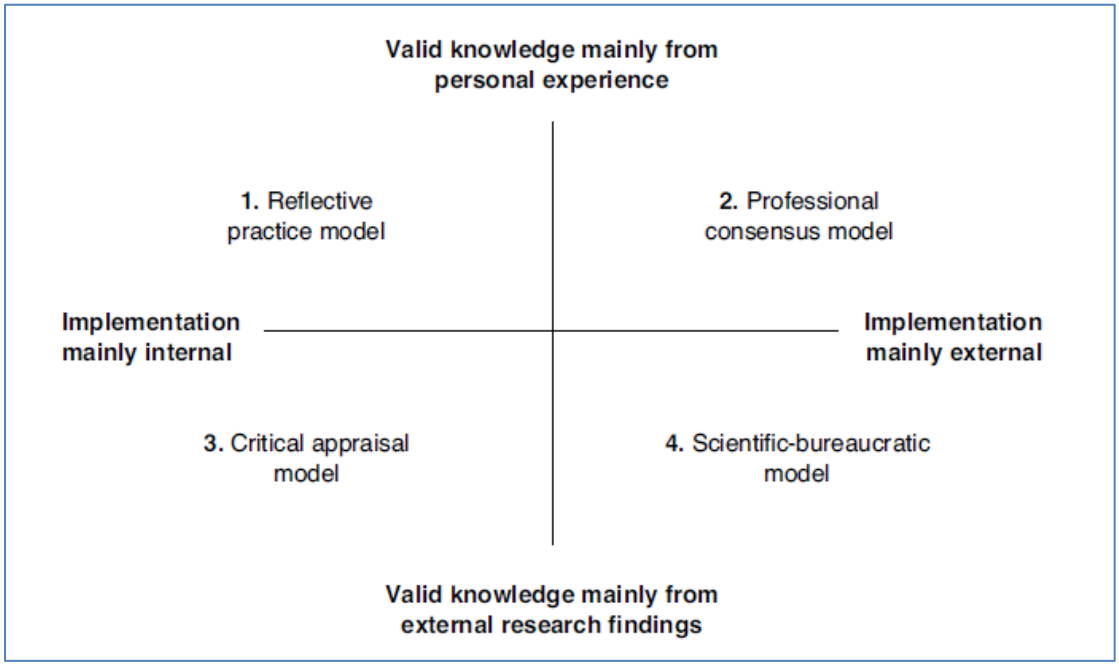
There is also a need that the emergency management organisations, policymakers and practitioners see the purpose and value of having an evidence-base themselves. Without this, there will be little demand for the evidence (and therefore disaster research), let alone implementation of the evidence into practice. For these key stakeholders to value the evidence, they need to own the research agenda, and be closely involved in setting and shaped it more in order to meet their own research needs. The existing separation between research production and knowledge mobilization hinders the pace and scale of diffusion and adoption of the evidence. A fundamental priority therefore is the need to better integrate research into current practice and organisational routines. This will require greater co-production of the evidence-base and efforts to promote organisational take-up of the evidence generated. (Walshe and Davies, 2013)

The experience from the evidence-based medicine movement is also instructive. Four models of EBM have been previously proposed by Harrison. (See Figure 30) Originally EBM was based on the 'critical appraisal model' and was driven by the medical profession. In recent years it has evolved to become increasingly more bureaucratic, a.k.a. '*scientific-bureaucratic model'.* It has been asserted that the adoption of this model may be more politically driven as it has served as the defence and justification of rationing decisions in healthcare. Indeed, EBM practice has become much more doctrinal in approach leading some observers to criticize:

'Evidence-based medicine is not "cookbook" medicine. Because it requires a bottom-up approach that integrates the best external evidence with individual clinical expertise and patients' choice, it cannot result in slavish, cookbook approaches to individual patient care. External clinical evidence can inform, but can never replace, individual clinical expertise, and it is this expertise that decides whether the external evidence applies to the individual patient at all and, if so, how it should be integrated into a clinical decision. Similarly, any external guideline must be integrated with individual clinical expertise in deciding whether and how it matches the patient's clinical state, predicament, and preferences, and thus whether it should be applied'

(Sackett et al 1996 p72)

Figure 30. Four models of Evidence-Based Medicine (Harrison)



In disaster management on the other hand, much of the practice to date has followed the '*professional consensus model*' with insufficient emphasis on other aspects such as reflective practice or critical appraisal of knowledge and information. There may therefore be value for the field to develop a much more holistic approach to evidence-base practice to incorporate these elements. Fears of a bureaucratisation of emergency management have been raised in this study, so the challenge may be to find the right balance of these four elements. Indeed, as per Sackett's criticisms above, there needs to be an approach that allows for the robustness of empiric 'evidence' to be combined with reasoned judgment and flexibility in decision-making by emergency management practitioners and policymakers. Indeed, there is a real risk that an unthinking 'slavish' adherence to 'cookbook' protocols could lead to detrimental outcomes if misapplied in practice.

7.3.4 Potential limitations of EBP

There are potential drawbacks to adopting an overly technocratic approach to evidence-based practice. For example, 'evidence-based' interventions could be implemented into settings where they have not been adequately adapted to the local context. It could end up ignoring local specificities that may crucially determine whether or not the intervention will work. It may be also unwise to discount the technical skills and past experience of existing emergency practitioners and policymakers, whose decisions may be the right ones but it may not always possible to demonstrate this objectively. And thus far we have also only discussed evidence-based practice in terms of efficacy with little regard to the cost element – what is efficacious may not necessarily be affordable or practically possible in a certain disaster context. Consequently, a more nuanced approach to evidence-based practice should be adopted where what is sought is an integration of the practitioner's expertise and decision-making reasoning with the scientific evidence-base that is tailored for a specific context. (Tonelli, 1998)

7.3.5 Parallels with the field of patient safety

In this thesis I have explored the scope of the evidence for emergency planning, as well as the qualitative determinants of evidence based practice. Interestingly, there are many similarities with another field; that of the study of medical errors, patient safety and patient safety culture.

7.3.5.1 Medical errors and Patient Safety

Medical errors and patient safety incidents may and do result in adverse outcomes for patients including death and disability. As a consequence, there is real desire to minimize the occurrence of medical errors and to mitigate the negative impacts should they occur. Much of the focus of patient safety interventions has been around latent errors arising from failures and flaws within healthcare systems. Medical errors are seen as the consequence of poorly designed systems more so than individual errors. These flaws manifest at different levels: individual, team and structural. For example, structural issues include how the system is organized and coordinated, the use of technology, the level of standardization (e.g. of terminology, procedures and protocols) within the system.(Hoff et al., 2004)

At the team level, it may be strongly influenced by team dynamics, skill mix, communication and culture. A review of teamwork and patient safety by Manser (2009) highlighted how poor coordination among providers across different levels of each organisation and within teams affects the outcomes of care.(Manser, 2009) Teamwork issues and problems with communication were found to be the most commonly reported issues from the retrospective analysis of incident and adverse event reports.

At the individual level errors and patient safety incidents may be the outcome of poor leadership, or issues with education and training of practitioners involved. Manser's review also identifies other key factors including leadership styles and behaviour, and the need for clarity of roles and procedures and greater levels of standardization.

These findings echo findings from both the emergency planning grey literature review we carried out as well as key informant interviews I had conducted with UK emergency management practitioners.

7.3.5.2 Patient Safety Culture

Many different levers for safety improvement have been suggested such as clinical training, protocols, use of information technology, regulations, and organizational structures. However, it has been argued that in order to improve patient safety, there is a need to address the underlying culture. A common definition of safety culture used is that derived from the Advisory Committee on the Safety of Nuclear Installations definition of safety culture:

"*The safety culture of an organization is the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization's health and safety management. Organizations with a positive safety culture are characterized by communications founded on mutual trust, by shared perceptions of the importance of safety and by confidence in the efficacy of preventive measures*."(Health and Safety Commission, 1993)

Both professional and organizational cultures in healthcare have to undergo significant transformation towards a system that supports learning from experiences.(Nieva and Sorra, 2003) Developing blame-free cultures that are more open and reflective towards errors however is not easy.(Wagner et al., 2013) It needs leadership involvement, as well as engagement by practitioners who are key stakeholders if safety interventions are to work.(Nieva and Sorra, 2003)

A review of patient safety culture (Sammer et al., 2010) has identified commonalities across different articles and studies covering a variety of different healthcare organisations. The key characteristics of a patient safety culture include: leadership, teamwork, evidence-based practice, communication, learning culture, a just 'no-blame' culture, and actions centered on the patient. The review found that engaged leaders directly affect culture through the design and implementation of strategies and structures that influence safety processes and outcomes. Safety culture permeates all levels of the organisation. In complex organizations, teamwork is essential and there is a deference to expertise. Practice is based on the evidence and is translated into standardized processes such as protocols, checklists and guidelines. Communication is both clear and open. There is a learning

culture in the organization, which is open to learning from mistakes, and integrates learning as part of a wider performance improvement process for the system.(Nieva and Sorra, 2003) For this to happen, reporting is transparent, and it is handled justly in a non-punitive, blame-free atmosphere. Finally, the organization's activities are focused on seeking the best outcomes for the intended beneficiary (i.e. the patient).

7.3.5.3 Limitations from the patient safety field

Gaps also remain such as the need to work out how leadership can be developed to assure a safety culture, and uncertainty as to whether government regulation or financial incentives and penalties would be sufficient for enhancing patient safety culture in the system. The link between leadership behaviour and team effectiveness still needs further examination, and there is a need to identify leadership functions and traits associated with effective team performance.(Künzle et al., 2010) Other unknowns include how patient safety can be measured and assured, and ascertaining whether safety improvements made actually translate into safer systems. Indeed, there is a reported lack of evidence of the linkage between patient safety culture and positive outcomes such as error reduction.(Nieva and Sorra, 2003) There are also significant contextual variations between hospitals, systems and indeed countries worldwide that make the conduct of comparisons on safety culture between countries challenging.(Wagner et al., 2013) Key issues include devising universally agreed methods as to how safety culture is assessed, evaluating the effect of safety interventions and tracking change over time, benchmarking both internally within organisations and externally with other organisations and indeed countries, as well as how these complement regulatory requirements. Evidence as to how to effect cultural change remains limited.(Nieva and Sorra, 2003)

Evidence reviews carried out in the field of patient safety have also uncovered similar problems and issues to what my scoping reviews have found. For example, in Hoff et al's review, they found that there were a relatively small number of robust empirical studies in patient safety. There were inconsistencies in terminology and definitions used in the field. Many studies had a narrow scope focusing on a few possible determinants of medical errors. Few examined interrelationships of various determinants of safety and error at the 'systems' level.(Hoff et al., 2004) The lack of universally agreed definitions and terminologies can affect error identification and reporting, and comparability across studies. They also note that there is an issue of 'observability' of errors: where an adverse effect is evident, such errors are more easily identified, studied and rectified. Less easy to deal with are those 'diagnostic' and 'prevention' errors where the effects may never be apparent or take years to manifest. This is certainly homologous to disaster risk reduction interventions for example where it is more difficult to ascertain their effectiveness.

Contextual problems have also been identified in the field of patient safety that are similar to disaster management. For example, local systems for reporting and recording patient safety incidents tend to be poor and not robust, and there is a lack of universally agreed 'safety indicators as well as means of measuring harm and other safety issues'.(Vincent, 2007) Such reporting and recording systems for patient safety incidents were felt to be essential as they allow problems to be identified and their root causes to be understood. Likewise emergency event reports and incident reviews offer similar benefits.

7.3.5.4 What we can learn from patient safety movement

From the patient safety literature there are many insights gained that are pertinent to disaster management. For example, there was a need identified for more explicit yet flexible and adaptive approaches to leadership especially in unfamiliar and critical situations, particularly where roles, task requirements and team membership changes.(Manser, 2009) Engaged leadership and teams committed to safety, continuous learning and improvement, with built in redundancy in safety measures, were also identified as key components for safe and effective systems.(Künzle et al., 2010) Indeed, these are cited as characteristics of high reliability organizations that operate in complex and risky fields, but yet remain safe and effective. This also characterises disaster and emergency situations and it is likely that these same determinants identified from patient safety studies are applicable here too.

It has also been proposed that a safer system can be developed through designing a system to prevent errors, implementing procedures that make errors visible when they occur so that they can be intercepted, and building in procedures that nullify or mitigate the adverse effects of errors should they occur. (Nolan, 2000) Tactics that could be employed to reduce errors include reducing complexity, optimising information processing, the use of automation where appropriate, use of constraints to restrict actions that can result in error, and anticipatory mitigation of unwanted adverse effects. These approaches may also be valid and applicable in disaster preparedness and response activities.

There are admittedly differences too between patient safety and disaster management that may make direct comparisons difficult. For example, disaster situations may not always manifest in predictable ways that would allow standardization of responses. Imperfect knowledge is likely, i.e. full knowledge and information in disaster situations is not always available, easily accessible or timely. Neither is it always possible to predict with accuracy in advance which organisations or individuals will present at a disaster scene.

7.3.6 Summary

In conclusion, numerous issues have been identified where there is value in exploring further. There is a need to build a UK and international evidence-base founded on robust research of individual, organisational and system-level themes in emergency planning and management. This evidence needs to be translated into action and embedded into organisations with the aim of developing a health system and community that is resilient to disasters. What is emerging from the findings of this thesis is the need for a shift in emergency planning and management culture towards adopting a more evidence-based approach than currently exists.

Finally, from studies of high risk industries, such as the aviation and nuclear industries, various organizational factors have been previously identified that make these high risk industries 'high reliability organisations'. These organisations are characterised by having strong safety culture and supportive leadership, levels of centralization and simplification, and built-in redundancies within the systems for key processes. There is also greater use of feedback and team-focused approaches to handling errors. Crucially, a broad-based approach to safety is adopted, where this range of organizational factors is addressed at various levels within the industry, rather than a focus on single factor approaches to reducing error.(Hoff et al., 2004) In a similar vein, there is a strong case for emergency responders and disaster management organisations to aspire to become "high reliability organisations". Useful insights and lessons can be drawn from the existing patient safety field.

7.4 Methodological issues and limitations

7.4.1 Terminology issues

In interpreting the data, the terms disaster, emergency and major incident have been used interchangeably in this study and taken to be synonymous. In the UK context, the emergency services sector tends not to perceive significant distinctions between these terms and the approach to responding to emergencies are fairly similar.(Stuart-Black et al., 2008) This may in part be due to the fact that the UK experiences a fairly limited number of types of disasters (e.g. flooding, chemical incidents, fires, and multi-vehicle accidents). Indeed, for health emergency planners and managers, an even narrower definition of disasters, emergencies and major incidents, is adopted that refers to incidents where there are casualties and requirement for extra mobilisation of medical resources. (de Boer, 1990)

On the other hand, outside of the UK, other countries, may encounter emergency incidents of greater severity and complexity such as catastrophic earthquakes in Nepal, or typhoons in the

Philippines. This difference in scale requires a different approach to tackling them, especially due to the complexity of its effect on the environs, community and wider social fabric. However, globally there are ongoing debates around the definitions used for the terms used to describe these emergency events.(Shaluf et al., 2003) There is a need for a universal lexicon that provides accurate and explicit definitions of these terms, particularly for researchers, in order to enable a more discerning exploration of these phenomena.(Al-Madhari and Keller, 1997)

By assuming these terms are synonymous, it is possible that this thesis may lack a degree of granularity. Certain observations made by the key informants interviewed could refer to a more limited major incident situation, but may not necessarily hold true for a more severe and complex catastrophic event. For example, the views expressed by the UK informants refer to common major incidents that they will have encountered. Often these are fairly limited (both geographically in extent, as well as in terms of scale of impact on loss of human life or physical damage) and tend to be effectively managed by the emergency management system. However, in catastrophic situations that occur elsewhere such as in post-earthquake Nepal, the scale of the disaster far exceeds the capacity of the emergency management system there. Consequently, insights from the UK may not necessarily hold for Nepal. Also of note, the interviews in Nepal were carried out pre-earthquake in 2014 and the views and perceptions of the key informants could quite reasonably be anticipated to have changed post-earthquake. Similarly, less severe major incidents in Nepal may be handled differently compared to catastrophic incidents. As such, in retrospect it may have been beneficial had the study more explicitly defined and distinguished these terms, particularly for the interviews.

7.4.2 Positionality of the researcher

The other methodological issue that emerged over the course of the study, on reflection, has been the positionality of the researcher. As Amartya Sen succinctly describes: “What we can observe depends on our position vis-a-vis the objects of observation. What we decide to believe is influenced by what we observe.”(Sen, 1993) Likewise, unless the researcher is fully aware of his positionality, the objectivity of the analysis can be compromised. This is particularly important for the qualitative aspects of the study where the researcher’s past educational background as well as current professional background can significantly influence his interpretation of the data. For example, much of the data collection and analysis has been focused on a predominantly UK-centric perspective using technocratic and ‘medical’ perspective.

The technocratic bias of the researcher has meant that the analysis adopted a more systems- and process-based interpretation with less attention perhaps paid to the nuances of culture, custom and ideology. It also meant a bias towards positively valuing and interpreting evidence-based practice

through the 'scientific-bureaucratic' lens practiced in UK public health medicine. Similarly, the cross-cultural element of this study, where opinions from Nepal were analysed, could be subjectively

(mis-)interpreted through Western eyes without a full understanding of the contextual specificities of Nepal.

It is acknowledged that other paradigms exist and the topic of evidence-based practice in emergency management could have been explored through a different lens, e.g. sociological or anthropological perspective, or via policy analysis. These approaches are equally valid. The health systems/process approach adopted for this thesis is just one angle on the wider topic and will probably have greatest resonance for practitioners and policymakers directly engaged in operationalising this agenda.

Whilst it may not be possible to fully mitigate the positionality of the researcher, it is hoped that possible subjective bias may have been moderated through the researcher's efforts at self-reflection during the analytical process, awareness of the issue, as well as cross-triangulation of his views with those of his research collaborators (in the UK) as well as research colleagues active in Nepal.

7.4.3 Limited literature from LMICs?

As noted in the scoping review of the published academic literature, only around 11.5% of articles pertained to low- and middle-income countries. This may be due to problems such as publication bias by academic journals that are from mainly based in high income countries that directly or indirectly favour articles written by academics from these high income countries. Consequently, the scoping review of the published academic literature for LMIC probably only captures a small proportion of the overall evidence-base.

What is also missing is a large body of disaster planning and management literature (and therefore potentially 'evidence') that exists in non-traditional, non-academic journal repositories. There are sizeable grey literature repositories on international relief and development, such as the WHO website[39], Reliefweb, AlertNet[40] and ALNAP[41], where material potentially relevant to emergency planning and management may be found. In addition, there are likely to be numerous reports and documents held by organisations (both intergovernmental organisations such as the WHO as well as international non-governmental organisations) but these may not be publicly available. State agencies and non-governmental organisations from LMICs may be reluctant to share what could be deemed as 'privileged' or 'commercially-sensitive' information. Furthermore, even if they were made available, these documents tend to be difficult to access as there is no universal repository for

[39] WHO website: Accessible at http://www.who.int
[40] AlertNet: Accessible at http://www.trust.org/alertnet
[41] Active Learning Network for Accountability and Performance (ALNAP): Accessible at http://www.alnap.org

such reports. Indeed, there are numerous websites for the various agencies, and electronic documents on these websites are often not indexed, which makes finding the articles challenging in the first instance.

7.4.4 Contextual challenges

The other difficulty that makes generalisation of the findings from this study is the diversity of emergency management systems around the world. Every national emergency management system has evolved to fit its local environment. They are set up differently and they operate differently. As such, the findings of this study from the UK and Nepal case studies are specific to these countries and possibly to other countries that are similar to them. Whether they are truly representative and generalizable to other contexts is contestable.

Also important to note is the fact that humanitarian aid and disaster management interventions are not delivered into a socio-political vacuum. Individual country, or indeed community, contexts are important. For example, if one were to compare LMICs and High-Income Countries, there are different political, legal, social contexts and different constraints. In LMICs such as Nepal, resource limitations and political and regulatory weaknesses may be the key issues that need tackling, whereas in high income countries, the focus may be much more on system processes and operational matters. Complexity is the norm for disasters.(O'Sullivan et al., 2013)

I have tried to tease out some of the more generic findings from the various study components that may be more universal and generalizable elsewhere. Indeed these findings will have lesser or greater salience in different countries depending on their contexts and a significant degree of local interpretation is required.

7.4.5 Missing community views

Finally, the other key weakness of this study is the lack of community perspectives. As noted earlier, most of the interviews both in Nepal and the UK were mainly with professionals, practitioners and policymakers. These participants were selected on the basis of their expertise or prior knowledge and involvement in this field with the expectation that they are more likely to provide key insights into the emergency management system issues. I acknowledge that this is a technocratic approach and consequently what is missing is the "public's voice". For example, in the Nepal study, there were no participants from the community, although some of the interviews did have significant community engagement experience previously.

In part, one assumption made was that it would have been difficult for the public to have been involved as they were likely to not have an intricate understanding of how the emergency

management system is set up and operates. Indeed, in the UK study, three public representatives were interviewed and they did indeed demonstrate this lack of understanding of the system. That said, this is perhaps a useful insight as well and in hindsight, greater involvement of public participants in the interviews may have yielded further insights of relevance. It may also have allowed further exploration into other concepts such as community resilience and vulnerability, coping mechanisms, and evidence-base for behavioural interventions in disasters. Public engagement and participation in emergency management is undeniably key for successful implementation of disaster risk reduction programmes, optimal response and recovery, as well as ensuring sustainability of related programmes.(Pearce, 2003) This area could be an interesting vein for further research.

7.5 Implications

7.5.1 For practitioners

As iterated earlier, there is a need to develop a culture of evidence-based practice in the field of emergency planning and management. To achieve this, it would entail developing in practitioners a greater awareness and a critical appreciation of the knowledge-base. The real challenge here may be to undo deep set ideas and beliefs where personal experience is valued above all else. It may be that due to the organisational backgrounds and cultures of the practitioners involved that real and tangible experience holds greater currency and is perceived as "evidence". To advance this prevailing belief, it is essential that practitioners see the value of having and using the evidence-base, and be able to see it work in practice. Only then would this in turn create a greater appreciation of the more 'scientifically-derived' evidence-based and generate demand for evidence that is essential for stimulating more research in this field. An important caveat to this, as highlighted earlier, is that existing practitioner experience should not be discounted as the lack of 'evidence' to support their experience does not equate to their experience and past judgments being wrong. Whilst there remain large gaps in the existing evidence-base, a more balanced approach that incorporates past experience, reasoning and current evidence is probably the better way forward.

At the basic science level, more research is required to further understand the decision-making process of key individuals whose decisions translate into organisational behaviour. Related to this, we should identify educational techniques that positively affect individual and organisational behaviour during a disaster or major incident, and in particular develop educational techniques to support empowerment of individuals in decision-making. Also required is the identification of

interventions that can facilitate learning from disasters by practitioners, and robust mechanisms for embedding evidence into practice.

Some other emerging issues relevant to practitioners have also been identified in this study such as the lack of standardisation with regards to the terminology used. Practitioners, policymakers and researchers have to speak the same technical language as this would help minimise the potential for miscommunication and misunderstandings particularly between agencies. This requires a standardised emergency planning lexicon that is ideally used internationally. Similarly, there have to be harmonised definitions of risks and vulnerabilities. Again this would require standardised interagency tools for risk assessment to be developed and used. A good understanding of the organisational differences in risk perception and why these occur would be fundamental to developing such tools. It would also be fruitful to explore barriers and enablers to organisational learning in this field.

Finally, practitioners themselves hold a vital role in the system with regards to building the evidence-base. As direct participants and observers of disasters and emergencies, they have a front-row seat of disaster management processes and therefore hold privileged insight. They have at the very least a moral responsibility to report and collate learning from disasters. To make such an endeavour meaningful, this will require the development and refinement of universal disaster reporting templates that capture experience and learning gained from such incidents. This is needed both locally and internationally, and the information should be publicly accessible and indexed for easy retrieval.

7.5.2 Policy implications

In settings such as the UK where evidence-based practice is not yet the norm, policymakers can play a pivotal role in encouraging and enabling the use of evidence. Policymakers also can play another important role and that is in creating the right environment that enables disaster research to take place. Policymakers should consider anticipatory funding and ethical approval of emergency planning research to be prepared and ready to activate when appropriate at short notice.

The Nepali study clearly demonstrated the need for there to be a supportive legislative framework and policies. Without this, the system lacks the policy leadership required to help drive the disaster management agenda forward. Other consequences include the lack of clarity of roles and responsibilities, as well as processes for managing emergencies. The lack of legislative mandate for emergency management may also translate to insufficient resourcing of the agenda.

However, we need to be mindful of the potential effects of greater politicization of this agenda. For example, one potential issue is that politicization of emergency management will influence the degree of 'agency' of the stakeholders involved. Policies could dictate who should be doing what (be they government, emergency services, civil society or the public). This in turn may (overly-) bureaucratize emergency management activities and potentially disempower some stakeholders. For example, in the UK, some interviewees mused that the general public is fairly disempowered as emergency management roles are formalized. This in turn creates a public expectation and dependency on the state to sort them out in emergencies.

7.5.3 Future research needs

This study uncovered many areas where further research work is required that have already been described earlier. Below are some of the key priority areas that stand out:

7.5.3.1 Building the evidence-base

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 and management literature. Randomized control trials may not be easily carried out in emergency settings or the right method in such situations. Observational studies rather than interventional ones are likely to be the predominant research approach. However, some means of determining the value of such individual studies would be helpful. This would require developing methods to assess the validity and reliability of emergency planning/management data from which such studies are likely to be founded on. 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.

There is also a need to collate and standardise event reports, debriefings and relevant public enquiries in a repository accessible to pubic, practitioners and policy-makers. This in turn indicates a need for further development of methods of evidence meta-synthesis whereby patchy and disparate information on disaster and emergency management, predominantly held in grey literature sources, can be systematically and robustly incorporated to produce evidence-based conclusions and recommendations.

A further related research area is around the metrics used for assessing the effectiveness of disaster management. This requires the development of validated means of measuring the effectiveness of emergency management systems in responding to major incidents.

It would be useful to develop a national or even international database similar to EMDAT for interventions and outcomes of interventions that captures lessons learnt, analyses or research findings from various disasters. One potential challenge to this however is the ability to collate accurate, robust and independent information. Some stakeholders (e.g. political parties, NGOs or IGOs) may have a vested interest for example in presenting findings in a more favourable (or less compromising) light for their agencies. Similarly, data sharing could be a problem, especially if the data is viewed to have commercial sensitivity (e.g. NGOs may be less willing to share information that reveals their organisational processes or flaws). Getting global consensus amongst the many stakeholders is also difficult. That said, such an endeavour is possible if it is driven by donors as has been demonstrated by the Good Humanitarian Donorship initiative.(Good Humanitarian Donorship Initiative, 2003)

7.5.3.2 Understanding behaviours and processes

Likewise, a deeper understanding of the process of emergency planning and how it translates into outcomes, would also benefit from further research. Some areas for further research include for example:

- to ascertain which of the following operational approaches work best for handling emergencies: flexible versus rigid; top-down versus bottom-up; reactive versus proactive; and what mix of top-down control and bottom-up engagement will deliver the best outcomes,
- to establish what is the value emergency plans and planning, and how it relates to disaster outcomes; i.e. determine whether a flexible approach to emergency management guided by an emergency plan, or a more rigid approach dictated by an emergency plan, would produce better outcomes
- to explore further organisational cultural differences and better understand how they affect organisational and individual behaviour. It would also be useful to identify what practices facilitate effective inter-agency working.

7.5.3.3 Community aspects

There are also several avenues for further research into community aspects of disaster management. These include questions such as:

- What constitutes a resilient community? What factors facilitate and hinder this?

- What are public views of the ethical issues in emergency planning and are these concordant with those of planners and policymakers?
- Which techniques best communicate risk to the public?
- How can public involvement in emergency management be enhanced?

7.6 Final summary and conclusions

This study found that the evidence-base for disaster management is patchy and not robust. Much of the evidence is produced by researchers in North America, most of which was published in the last 10 years in the aftermath of the September 11 terrorist attacks in the US.(Figure 1) There is much less from low- and middle-income countries where most of the disasters tend to happen. Secondly, most of the evidence is focused on emergency response activities, less on disaster preparedness, and little on disaster mitigation or recovery from disasters. And perhaps most worryingly, much of the published articles in academic journals about disaster management are not robust – they tend to be unsystematically reported case reports and commentaries (i.e. opinion pieces).

Interviews with experts in the field uncovered issues such as
1) Limitations with the knowledge base for disaster management: it is hard to collect evidence, to share evidence, to implement the knowledge and to retain evidence.
2) There was inadequate understanding of individual and organisational behaviour in crisis situations: these refer not just to the victims but also the responders in such disaster situations.
3) There was uncertainty as to what was the best system for responding to disasters
4) And knowing how best to engage the public in order to help build disaster resilience.

In developing country settings, similar issues were found as well as additional ones. For example, contextual factors were very important. Many of these countries have complex socio-political situations, as well as fragmented and fragile emergency management systems. There tends to be many actors as well which makes coordination much more complicated.

There is a popular saying in management that “every system is perfectly designed to deliver the results it gets”.(Berwick, 1996) So the outcomes that materialise are the result of how the emergency management system is set up and operates. A deep and comprehensive understanding of the system is vital. There is an ongoing need to identify the optimal configuration that delivers the best outcomes. In addition, the current imbalance of focus on the emergency response phase needs to be addressed. There is a need to ensure that research addresses the disaster management cycle

in its entirety, from mitigation, through to hazard analysis, capability assessment, planning, exercising, through to responding and recovering.

To have a disaster resilient system, there is also a need to address many different aspects beyond the emergency management system. For example, it requires appropriate political and legal frameworks to be put in place, i.e. disaster management acts and laws such as building codes. It requires effective emergency management organisations, be they health ministries, civil defence organisations, ambulance service, or health service providers. To be effective, these organisations in turn need to have robust systems and processes in place such as having clear roles, lines of communication, established hierarchy of command and embedded processes of coordination, risk assessment and decision-making.

But we must also not overlook the crucial role played by the community and individuals. Wider civil society too is affected by disasters but also responds to them. If the communities' coping capacities and resilience is strengthened, they are less likely to be victims of disasters. Instead, they can be part of the solution as community disaster responders and supporters.

There is also a need for the emergency management community to document better what they do in disasters and to learn from them. The agencies involved need to share what they have learned, and as highlighted by the Pollock Review, there is a need for these lessons to be acted on and retained.

Finally, evidence-based practice has a lot to offer emergency planning and management. It may help the field identify what it does not know, generate impetus to seek answers, enable practitioners to more consistently make the best decisions based on available evidence, and in doing so realize the best possible outcomes in disasters. That is ultimately the key aim of developing evidence-based practice in disaster management. This will require a change in current professional cultures in emergency planning and management in the UK and Nepal towards a more evidence-friendly culture. Unless we learn from disasters we will end up forever repeating the mistakes of the past.

APPENDICES

Appendix 1: Ethics approval for UK study

Sheffield Research Ethics Committee
Yorkshire and Humber REC Office
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Mill Pond Lane
Meanwood
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LS6 4RA

Telephone: 0113 3050160

20 October 2010

Professor Steve Goodacre
Professor of Emergency Medicine/Consultant in A&E Dept
Northern General Hospital Sheffield.
University of Sheffield
Medical Care Research Unit
University of Sheffield
30 Regent Street
Sheffield
S1 4DA

Dear Professor Goodacre

Study Title:	**Emergency Planning in Health Care: Scoping study of the international literature, local information resources and key stakeholders.**
REC reference number:	**10/H1308/67**
Protocol number:	**09/1005/03**

The Research Ethics Committee reviewed the above application at the meeting held on 04 October 2010. Thank you for attending to discuss the study.

Ethical opinion

The Committee asked for clarification about how participants would be recruited to the study. You advised that you will use a snowballing method with the Department of Health and Resilience Teams. Professor Mackway-Jones can suggest academic colleagues to be invited from the field. It would be made clear that there was no obligation to become involved in the research.

The Committee asked for the audio taping of interviews to be included as a point on the Consent Form.

The members of the Committee present gave a favourable ethical opinion of the above research on the basis described in the application form, protocol and supporting documentation, subject to the conditions specified below.

Ethical review of research sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

For NHS research sites only, management permission for research ("R&D approval") should be obtained from the relevant care organisation(s) in accordance with NHS research governance arrangements. Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at http://www.rdforum.nhs.uk. Where the only involvement of the NHS organisation is as a Participant Identification Centre, management permission for research is not required but the R&D office should be notified of the study. Guidance should be sought from the R&D office where necessary.

Sponsors are not required to notify the Committee of approvals from host organisations.

The Committee requested that:

- The Participant Information Sheet should make it clear that the interviews would be audio taped and what will happen to the tapes in terms of storage and destruction.
- The Consent Form should include provision to consent to the interview being audio taped.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

You should notify the REC in writing once all conditions have been met (except for site approvals from host organisations) and provide copies of any revised documentation with updated version numbers.

Approved documents

The documents reviewed and approved at the meeting were:

Document	*Version*	*Date*	
Investigator CV		16 September 2010	
Protocol	2	10 September 2010	
CV Student		16 September 2010	
REC application		03 September 2010	
Covering Letter		10 September 2010	
Letter from Sponsor		16 April 2010	
Interview Schedules/Topic Guides	1	16 September 2010	
Participant Information Sheet	1	16 September 2010	
Participant Consent Form	1	16 September 2010	
Evidence of insurance or indemnity		30 July 2010	
Letter from Statistician		09 September 2010	
Referees or other scientific critique report		16 April 2010	

Membership of the Committee

The members of the Ethics Committee who were present at the meeting are listed on the attached sheet.

Mrs Jennifer Martin advised the Committee that she was working with one of the key collaborators and would not therefore participate in this ethical discussion. The Committee accepted Mrs Martin's decision.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Now that you have completed the application process please visit the National Research Ethics Service website > After Review

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

The attached document "After ethical review – guidance for researchers" gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

We would also like to inform you that we consult regularly with stakeholders to improve our service. If you would like to join our Reference Group please email referencegroup@nres.npsa.nhs.uk.

10/H1308/67	**Please quote this number on all correspondence**

With the Committee's best wishes for the success of this project

Yours sincerely

Neil Sykes
Vice Chair

Email: john.robinson@leedspft.nhs.uk

Enclosures: *List of names and professions of members who were present at the meeting and those who submitted written comments*
"After ethical review – guidance for researchers" SL-AR2

Copy to: *Lauren Smaller, Research & Innovation Services, The University of Sheffield, New Spring House, 231 Glossop Road, SHEFFIELD, S10 2GW*
Angela Ross, NHS Rotherham, R&D, D Level, Room DLE91, Rotherham Hospital, Moorgate Road, ROTHERHAM, S60 2UD.

Sheffield Research Ethics Committee

Attendance at Committee meeting on 04 October 2010

Committee Members:

Name	*Profession*	*Present*	*Notes*	
Dr Ruth Stirton	Lecturer in Law	Yes		
Miss Lauren Baxter	Research Co-ordinator	No		
Dr Jennifer Burr	Lecturer in Foundations of Medicine and Ethics	Yes		
Dr Mary Cooke	Lecturer in Midwifery and Nursing	No		
Dr Nigel Hoggard	Consultant Vascular Radiologist	Yes		
Miss Pamela Kingman	Retired Care Home Manager	Yes		
Mr John Kirkland	Deputy Ward Manager	Yes		
Professor R M Loynes	Retired Professor of Statistics	Yes		
Mrs Jennifer Martin	Pharmacist	Yes		
Mr Ian Potter	Senior Operating Department Practitioner	Yes		
Dr Basil Sharrack	Consultant Neurologist	Yes		
Dr Soon Song	Consultant Diabetologist	Yes		
Mr Neil Sykes	Engineering Company Director/Owner	Yes		
Dr Angela Tod	Senior Research Fellow	No		
Mr Mark Wilkinson	Consultant Orthopaedic Surgeon	No		

Appendix 2: Ethics approval for Nepal study

The University Of Sheffield.

Kirsty Woodhead
Ethics Committee Administrator

Regent Court
30 Regent Street
Sheffield S1 4DA
Telephone: +44 (0) 114 2225453
Fax: +44 (0) 114 272 4095 (non confidential)
Email: k.woodhead@sheffield.ac.uk

Our ref: 0690/KW

15 October 2013

Andrew Lee
ScHARR

Dear Andrew

Disaster management evidence in Nepal.

Thank you for submitting the above research project for approval by the ScHARR Research Ethics Committee. On behalf of the University Chair of Ethics who reviewed your project, I am pleased to inform you that on 15 October 2013 the project was approved on ethics grounds, on the basis that you will adhere to the documents that you submitted for ethics review.

The research must be conducted within the requirements of the hosting/employing organisation or the organisation where the research is being undertaken. You are also required to ensure that you meet any research ethics and governance requirements in the country in which you are researching. It is your responsibility to find out what these are.

If during the course of the project you need to deviate significantly from the documents you submitted for review, please inform me since written approval will be required. Please also inform me should you decide to terminate the project prematurely.

Yours sincerely

Kirsty Woodhead
Ethics Committee Administrator

Appendix 3: 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.
2. *Aberfan Disaster*. 1966, Cabinet Office UK Resilience.
3. *Carlisle storms and associated flooding: multiagency debrief*. 2005, Other organization.
4. *CHaPD 2005*. 2005, HPA - Chemical Hazards and Poisons Division.
5. *Sellafield off-site exercise*. 2005, Other organization.
6. *Buncefield multiagency recovery plan*. 2006, Other organization.
7. *CHaPD*. 2006, HPA - Chemical Hazards and Poisons Division.
8. *Multiagency debrief*. 2006, Other organization.
9. *Radioactive polonium contamination*. 2006, Cabinet Office UK Resilience.
10. *Buncefield: multiagency debrief report and recommendations*. 2007, Other organization.
11. *CHaPD report 2007 Jan-June*. 2007, HPA - Chemical Hazards and Poisons Division.
12. *Exercise Winter Willow: lessons learned*. 2007, Department of Health.
13. *Flooding in England 2007*. 2007, Health Protection Agency.
14. *Recommendations on the emergency preparedness*. 2007, Other organization.
15. *CHaPD report 2008*. 2008, HPA - Chemical Hazards and Poisons Division.
16. *GMRF Exercise Naval*. 2008, Other organization.
17. *Government response*. 2008, Other organization.
18. Alcock, R., *Emergency Departments: Acute Chemical Incidents: Not such a rarity?* 2006, Other organization.
19. Andrews, N., *Rapid estimation of excess mortality in England and Wales during the heatwave of June 30th to July 2nd 2009*. 2010, Health Protection Agency.
20. Asgari, N., *"Fire in a tyre depot in Barking, NE London"*. 2006, Health Protection Agency.
21. Auseet, C., *Buncefield Fire Summary*. 2006, Health Protection Agency.
22. Barker, H., *Air quality in major incidents*. 2010, Health Protection Agency.
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.
25. Bennett, S., *Operation MSC Napoli*. 2009, Health Protection Agency.
26. Bone, A., *Health co-benefits of climate change action*. 2010, Other organization.
27. Briggs, R., *Anatomy of a terrorist attack*. 2011, Other organization.
28. Brockway, C., *The case of a smouldering bone meal fire: consistent complications and the power of public concern*. 2006, Health Protection Agency.

29. Brooke, N., *Maritime and Coastguards Agency Hazardous and Noxious Substances Response Team Exercise - Heysham Port*. 2010, Health Protection Agency.

30. Brunt, H., *"Sulphur mustard incident, Swansea"*. 2010, Health Protection Agency.

31. Carnall, R., *Review of London hospital fires*. 2009, Other organization.

32. Checkley, E., *A summary of the NHS Security Management Service Lockdown Guidance*. 2010, Department of Health.

33. Chow, Y., *"Fire at a chemical factory, September 2006"*. 2007, Health Protection Agency.

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.

35. Cotton, G., *Fire at an adhesives factory: lessons identified from both occupational and public health practitioner perspectives*. 2008, Health Protection Agency.

36. Cowen, L., *Carlisle storm and flood recovery phase debrief*. 2005, Other organization.

37. Culff, N., *Post exercise report*. 2009, Other organization.

38. Culff, N., *Exercise Planning Document*. 2010, Other organization.

39. Cullen, W., *Ladbroke Grove*. 1999, Other organization.

40. Dunne, A., *"Asbestos: The hidden hazard in domestic, educational and health care settings"*. 2010, Health Protection Agency.

41. Elliot, A., *Syndromic Surveillance in the HPA*. 2010, Health Protection Agency.

42. Fisher, P., *Regional impacts of climate change*. 2010, Health Protection Agency.

43. Fisher, P., *The Bullring incident*. 2010, Health Protection Agency.

44. Flooding Taskforce, *Report on Fermanagh floods 2009*. 2010, Other organization.

45. Foster, K., *The challenges and importance of early public health advice in non-major incidents*. 2008, Health Protection Agency.

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.

48. Galea, A., *A UK recovery handbook for chemical incidents*. 2010, Health Protection Agency.

49. Goodfellow, F., *Close Encounters with Aluminium Phosphide in West Yorkshire*. 2009, 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.

51. Haroon, S., *The HAZMED training course*. 2010, Health Protection Agency.

52. Harper, L., *A multiagency approach: the Chancery Lane fire*. 2009, Health Protection Agency.

53. Head, S., *Overview of sources of information on health and social effects of flooding*. 2010, Health Protection Agency.

54. Hine, D., *An independent review*. 2010, Other organization.

55. Hulf, J., *Swine flu critical care*. 2010, Department of Health.

56. Izon-Cooper, L., *"Tyre fire, Mexborough, Doncaster"*. 2010, Health Protection Agency.

57. Jessop, L., *"The canary in the coal-mine: Congenital anomalies, environmental chemical exposure and surveillance"*. 2010, Health Protection Agency.

58. Kettle, N., *The concept of a Joint Safety and Health Advisory Cell*. 2010, Other organization.

59. Kibble, A., *Health Protection Agency experience on the public health aspects of fires involving waste materials*. 2010, Health Protection Agency.

60. Kirkpatrick, A., *Industrial Fires: What are we missing?* 2006, Health Protection Agency.

61. Kumbang, J., *Maritime chemical incidents at sea: Current assessment and reporting procedures*. 2009, Health Protection Agency.

62. Kumbang, J., *"Review of maritime chemical incidents at sea: Description of reported maritime Incidents, 2004-2008"*. 2009, Health Protection Agency.

63. Lamb, P., *Marine spill modelling*. 2010, Health Protection Agency.

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

65. Lowe, G., *Outbreak of E coli*. 2006, Health Protection Agency.

66. McBride, M., *The 2009 pandemic - learning from experience*. 2010, Other organization.

67. McCrea, S., *"Wood pallet yard fire, near Swansea"*. 2006, Health Protection Agency.

68. McLean, E., *Epidemiological report of pandemic H1N1*. 2010, Health Protection Agency.

69. Middlemiss, V., *Exercise Salvus: Hospital evacuation emergency response*. 2010, Health Protection Agency.

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

71. Murray, V., *Global launch of the international day for disaster reduction: hospitals safe from disasters*. 2010, Health Protection Agency.

72. O'Connell, E., *Casualties from acute poisonings and the potential for secondary contamination: A case study and risk assessment tool*. 2010, Health Protection Agency.

73. Orford, R., *The Alerting System for Chemical Health Threats*. 2010, Health Protection Agency.

74. Padfield, S., *Carbon monoxide poisoning at indoor go-karting track*. 2006, Health Protection Agency.

75. Palmer, M., *Tears at playtime: An unusual chemical incident with multiple exposures related to an imported slide in a playground*. 2009, Health Protection Agency.

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

77. Pitt, M., *Learning lessons from the 2007 floods*. 2008, Other organization.

78. Porritt, S., *Adapting UK dwellings for heat waves*. 2010, Other organization.

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

80. Rubin, J., *Psychological Reactions to the 7 July London Bombings*. 2006, Other organization.

81. Rutty, G., *The first human fatality investigated using the CR1 Personal Protective Equipment*. 2007, Other organization.

82. Smith, A., *Lewes flood of October 2000: a review of the recovery*. 2000, Other organization.

83. Soler, M., *Disaster epidemiology in Europe*. 2010, Health Protection Agency.

84. Stewart Evans, J., *The Happy Lady: All at sea*. 2009, Health Protection Agency.

85. Stewart, L., *A preliminary assessment of info in the HPA chemical incident database*. 2010, Health Protection Agency.

86. Stewart-Evans, J., *A review of Health Protection Agency involvement in incidents occurring at sites regulated under the Control of Major Accident Hazards (COMAH) Regulations*. 2010, Health Protection Agency.

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

88. Stone, C., *Lessons from the 7th July assistance centre*. 2009, Other organization.

89. Taye, A., *Lessons learnt from a COMAH site exercise: A public health trainee's view*. 2010, Health Protection Agency.

90. Taye, A., *Report on the investigation of chemical leaks from refrigerators in healthcare settings in London*. 2011, Health Protection Agency.

91. Trimble, E., *Kegworth*. 2000, Other organization.

92. Urquhart, G., *World Future Society workshops and conference*. 2010, Health Protection Agency.

93. Vivancos, R., *Hyperbaric or normobaric oxygen therapy for carbon monoxide poisoning?* 2006, Health Protection Agency.

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

95. Wilson, J., *Environmental sampling and analysis on the London Underground in response to the 7th of July 2005 bombings: lessons identified for major incident management*. 2006, Health Protection Agency.

96. Wilson, J., *"The July 2005 London Bombings: environmental monitoring for non-infectious materials release, allied health risk assessment and lessons identified for major incident response in the UK"*. 2008, Health Protection Agency.

97. Yadav, S., *"Environmental health problems from floods: A comparison of flooding in Mumbai, Western India in 2005 and England in 2007"*. 2010, Other organization.

Appendix 4: Grey literature coding sheet

Category	Data fields	Entries	Type	Example
Reviewer	Reviewer code	AL, WP, PG, KC		
Article identifier	Biblio #	(Number)	Number	1,2,3,…
	1st author name	…	Free text	Walsh JA
	Publication title	…	Free text	Drink causes accidents…
	Publishing organization	DH	Tick box	Department of Health, HPA
		HPA		
		CHAPD		
		Other		
	Other publishing organization:	…	Free text	Center for Disasters
	Year of Publication	…	Number	1998
Article descriptors	Type of disaster	Natural disaster	Tick box	
		Industrial disaster		
		CBRN		
		Conflict-related/War		
		Terrorism		
		Civil disturbance/riot/strife		
		Outbreaks, epidemics, pandemics		
		Transport accidents		
		Generic		
		Multiple		
		Other		

Grey literature coding sheet – continued

Category	Data fields	Entries	Type	Example
Article descriptors	Publication type	Event report/review	Tick box	
		Commentary/editorial/letter		
		Literature review		
		Education		
		Expert guidance		
		Systematic review		
		RCT		
		Other research study		
		Other		
	Other publication type	…	Free text	Government circular
	Phase of emergency cycle article pertains to	Mitigation	Tick box	
		Planning and preparedness		
		Response		
		Recovery		
		Other cross cutting theme		
	Specific issues or deficiencies identified/ raised	Mitigation activities	Tick box	
		Hazard analysis		
		Emergency planning		
		Business continuity planning		
		Capability assessment/gap analysis		
		Capability maintenance including training and education		
		Response activities including incident management		
		Triage		
		Recovery activities		
		Internal communications		

Grey literature coding sheet – continued

Category	Data fields	Entries	Type	Example
Article descriptors	Specific issues or deficiencies identified/ raised	External communications	Tick box	
		Mass media		
		Informatics & intelligence		
		Roles and responsibilities/ Organizational hierarchy		
		Plan activation		
		Alert and warning		
		Decision-making		
		Data protection/ Confidentiality/ Information sharing		
		Legal issues		
	Key issues/gaps	….	Free text	

Appendix 5: Interview invitation letter to participants (UK)

The University Of Sheffield.

School Of Health And Related Research.

Dean
Professor Jon Nicholl

Regent Court
30 Regent Street
Sheffield S1 4DA

Telephone: +44 (0) 114 2220872
Fax: +44 (0) 114 272 4095
Email: andrew.lee@sheffield.ac.uk

Dear

Re: Emergency Planning in Health Care: Scoping Study

We write to you on behalf of Professor Steve Goodacre and our research collaborators from the University of Sheffield, Manchester Metropolitan University and the Health Protection Agency.

We would like to invite you to take part in our research study.

This is a 12-month NIHR funded study that seeks to identify the knowledge and research gaps for emergency planning in the UK. We intend to do this by means of a review of the existing literature and mapping existing academic literature on this topic, as well as obtaining insight and views from key stakeholders in this field. It is hoped that the outputs from this project will help guide future emergency planning research as well as inform the organisation of emergency planning in health care.

You have been identified as an individual either working in the field of emergency planning, or as having considerable expertise and/or experience in it. We are therefore very keen to interview you.

We have attached for your information an information sheet outlining our study.

We hope you will agree to take part in this study. If so, kindly send us back (either electronically or by post) the attached consent form.

Should you have any further queries, please do not hesitate to contact us.

Yours sincerely

Dr Andrew C K Lee
Clinical Lecturer in Public Health, ScHARR

Dr Wendy Phillips
Director/Consultant in Communicable Disease Control,
South Yorkshire Health Protection Unit

Appendix 6: Participant informant sheet (UK)

The University Of Sheffield.

School Of Health And Related Research.

EMERGENCY PLANNING IN HEALTH CARE: SCOPING STUDY

Participant Information Sheet for Key-Informant Interviews

Invitation
We would like to invite you to take part in a research study on emergency planning that is being carried out by the University of Sheffield, Manchester Metropolitan University and the Health Protection Agency. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

What is the study's purpose?
There are different methods and systems in place around the world for preparing and responding to emergencies, major incidents and disasters. However, it is not known which method or system works best. This study aims to look at what is known and to identify the gaps in knowledge for emergency planning in health care. It is part of a wider research project funded by the National Institute for Health Research that will be conducted over 1 year. Some of this work will also be used by one of the researchers, Dr Andrew Lee from the University of Sheffield, as part fulfilment of a research doctorate degree.

Why have I been chosen?
We want to speak to various academics, managers and health professionals who can give us insight into emergency planning in the UK and help us to identify the research gaps. We have chosen to speak to you as you have particular expertise, knowledge and/or experience in this field.

Do I have to take part?
It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. You are free to withdraw at any time without having to give a reason.

What will happen to me if I take part?
If you agree to take part, we will arrange to have a one-to-one interview with you. This may either be in person or by telephone at a time and place that is convenient for you. The interview will be with one of the researchers, and will likely take no longer than one hour.

What do I have to do?
You will be asked mostly open-ended questions on topics relevant to emergency planning in health care. You only have to respond to questions that you feel comfortable answering in your

professional capacity. You do not need to answer questions that you do not know the answer to, or feel uncomfortable or unable to answer for any reason.

What are the possible disadvantages and risks of taking part?
We do not expect you to experience any discomforts, disadvantages or risks with taking part.

What are the possible benefits of taking part?
Whilst there are no immediate benefits for those people participating in the project, it is hoped that this work will help academics and professionals identify where the knowledge gaps are in this field.

What happens if the research study stops earlier than expected?
If this is the case the reason(s) will be explained to you.

What if something goes wrong?
If something goes wrong, please contact our project lead, Professor Steve Goodacre, at the University of Sheffield on the contact number given below. If your complaint is not handled to your satisfaction then please contact Dr. David Fletcher the 'Registrar and Secretary' of the University of Sheffield by post (Registrar and Secretary's Office, Firth Court, Western Bank, Sheffield, S10 2TN), telephone (0114 222 1100) or e-mail (D.E.Fletcher@sheffield.ac.uk).

Will my taking part in this project be kept confidential?
All the information that we collect about you during the course of the research will be kept strictly confidential. You will not be able to be identified in any reports or publications. No information collected will be shown to anyone apart from our research team. Transcripts and recordings will be kept in a locked cabinet. Transcripts will be anonymised and parts in which participants might be identified will be avoided in publications. For regulatory purposes, data from the study will be stored securely for 1 year following the study and destroyed as confidential waste thereafter.

What type of information will be sought from me and why is the collection of this information relevant for achieving the research project's objectives?
We are interested in your reflections, opinions and thoughts on various issues in emergency planning from your professional or academic perspective.

What will happen to the results of the research project?
This research will take place over a year, after which the results will be reported back to the National Institute for Health Research. The information may also be presented at academic conferences and be published in research journals. You can also obtain a copy of the published report once this is completed by contacting Dr Andrew Lee. The data collected during the course of the project might be used for additional or subsequent research. Should this be the case, any information about you will continue to be kept confidential.

Who is organising and funding the research?
This research is funded by the National Institute for Health Research. The research will be organized and undertaken by the University of Sheffield, Manchester Metropolitan University and the Health Protection Agency.

Who has ethically reviewed the project?
This project has been reviewed and ethically approved by the Sheffield NHS Research Ethics Committee in October 2010.

Contacts for further information

Dr Andrew Lee, Section of Public Health, ScHARR, the University of Sheffield, Regent Court, 30 Regent Street, Sheffield S1 4DA. Tel: 0114 2220872, Email: Andrew.lee@sheffield.ac.uk.

Professor Steve Goodacre, Medical Care Research Unit, ScHARR, the University of Sheffield, Regent Court, 30 Regent Street, Sheffield S1 4DA. Tel: 0114 2220842, Email: s.goodacre@sheffield.ac.uk.

This information sheet is for you to keep. Thank you for your time and help.

Appendix 7: Participant consent form for key-informant interviews (UK)

The University Of Sheffield.

School Of Health And Related Research.

EMERGENCY PLANNING IN HEALTH CARE: SCOPING STUDY

Participant Consent Form for Key-Informant Interviews

Title of Research Project:
Emergency Planning in Health Care: Scoping study of the international literature, local information resources and key stakeholders.

Name of Researchers:
Dr Andrew CK Lee, School of Health & Related Research
Dr Wendy Phillips, South Yorkshire Health Protection Unit

Participant Identification Number:

1. I confirm that I have read and understand the information sheet dated 27 May 2011 explaining the above research project and I have had the opportunity to ask questions about the project. YES/NO*

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without there being any negative consequences. In addition, should I not wish to answer any particular question or questions, I am free to decline. YES/NO*

3. I understand that my responses will be kept strictly confidential. I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the report or reports that result from the research. YES/NO*

4. I agree for the data collected from me to be used in future research YES/NO*

5. I agree to take part in the above research project. YES/NO*

_____	_____	_____
Name of Participant	Date	Signature
Andrew Lee	_____	
Researcher	Date	

***Please delete as appropriate**

Appendix 8: Key-Informant Interview Schedule (UK)

EMERGENCY PLANNING IN HEALTH CARE: SCOPING STUDY

Key-Informant Interview Schedule

Pre-interview

Introduce researcher and project to participant.
Special issues to cover: voluntary nature of study, right to withdraw without penalty, confidentiality, recording of interviews and information governance.
Seek and obtain written consent before proceeding.
Re-iterate "Health" and "UK" context for questions.

1. What involvement have you had in emergency planning?

2. What in your opinion is the state of emergency planning in the UK?

3. How are emergency plans and policies devised?

4. How are they implemented?

5. Do practitioners adhere to them during incidents?
    a. If not, why not?

6. What sources of information, evidence, guidance or advice do you use on which to base your emergency planning decisions/work on?

7. How reliable are these sources?

8. Can you think of any knowledge or research gaps for the following issues:
    a. Hazard and Risk assessment
    b. Mitigation activities
    c. Capability assessment/Gap analysis/Preparedness evaluation
    d. Emergency planning including Business continuity planning/management
    e. Emergency preparedness training, drills and exercises
    f. Communication strategies and issues
    g. Command and control/Incident command
    h. Inter-agency working/relations/Roles and responsibilities of various key stakeholders
    i. Surveillance, Alert and Warning systems
    j. Recovery activities including debriefing
    k. Organisational learning e.g. from incidents
    l. Legal jurisdictions and considerations
    m. System integration (i.e. of all the response activities as part of an emergency management system)
    n. (Any other topics/issues as identified iteratively from interviews or from documentary analysis/literature reviews)

9. Reflecting on your own experience of or work in the field of emergency planning, are there any particular deficiencies, difficulties or issues that comes to mind?

10. In particular, are there any aspects of emergency planning and management in health that you would prioritise for further research?

Appendix 9: Interview invitation letter to participants (Nepal)

The University Of Sheffield.

School Of Health And Related Research.

Dean
Professor Jon Nicholl

Regent Court
30 Regent Street
Sheffield S1 4DA

Telephone: +44 (0) 114 2220872
Fax: +44 (0) 114 272 4095
Email: andrew.lee@sheffield.ac.uk

Dear Sir/Madam

Re: Disaster Management in Nepal

I write to you to invite you to take part in a research study on disaster management in Nepal.

I am a Senior Clinical University Tutor in Public Health at the University of Sheffield and I am currently undertaking research in the field of disaster management as part fulfilment for my doctoral studies.

I am especially interested in trying to identify the knowledge and research gaps for disaster management both in high income countries such as the UK, as well as Low- and Middle-Income countries such as Nepal. I intend to do this by means of a review of the existing literature and mapping existing academic literature on this topic, as well as obtaining insight and views from key stakeholders in this field. It is hoped that the outputs from this project will help guide future disaster management research and policy.

You have been identified as an individual working in the field of disaster management who has considerable expertise and/or experience in this field. I am therefore very keen to interview you.

I have attached for your information an information sheet outlining my study.

I will be in Kathmandu from 4-11 September 2014 and I will be carrying out interviews during this time.

I hope you will agree to take part in this study. If you would like to take part, please contact me by email at andrew.lee@shef.ac.uk or by telephone on +44 114 2220872 and we can arrange a time and place that is convenient for you.

Should you have any further queries, please do not hesitate to contact me.

Yours sincerely

Dr Andrew C K Lee
Senior Clinical University Tutor in Public Health, ScHARR
& Consultant in Communicable Disease Control, Public Health England

Appendix 10: Participant information sheet for interviews (Nepal)

The University Of Sheffield.

School Of Health And Related Research

DISASTER MANAGEMENT IN NEPAL

Participant Information Sheet for Key-Informant Interviews

Invitation

I invite you to take part in a research study on disaster management that I am carrying out as part of my doctoral studies. Before you decide it is important that you understand why the research is being done and what it will involve. Please take time to read the following information and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you.

What is the study's purpose?

There are different methods and systems used around the world for preparing and responding to disasters. However, it is not known which method or system works best. This study aims to look at what is already known and to identify the gaps in knowledge for disaster management.

Why have you been chosen?

I want to speak to various academics, managers, professionals and policymakers involved in disaster management who can give me insight into disaster management in Nepal to help me to identify the knowledge gaps. I have chosen to speak to you as you have particular expertise, knowledge and/or experience in this field.

Do you have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. You are free to withdraw at any time without having to give a reason.

What will happen to you if you take part?

If you agree to take part, I will arrange to interview with you. This may be in person or by telephone at a time and place that is convenient for you. The interview will take no longer than one hour. The interview will be recorded to help me recall the interview later. If you are not happy for the interview to be recorded, you can still take part in the interview as I will not record the interview and will only take handwritten notes.

What do you have to do?

You will be asked mostly open-ended questions on topics relevant to disaster management. You only have to respond to questions that you feel comfortable answering in your professional capacity. You do not need to answer questions that you do not know the answer to, or feel uncomfortable or unable to answer for any reason.

What are the possible disadvantages and risks of taking part?
I do not expect you to experience any discomforts, disadvantages or risks with taking part.

What are the possible benefits of taking part?
Whilst there are no immediate benefits for those people participating in the project, it is hoped that this work will help academics and professionals identify where the knowledge gaps are in this field.

What happens if the research study stops earlier than expected?
If this is the case the reason(s) will be explained to you.

What if something goes wrong?
If something goes wrong, please contact me or my project supervisor, Professor Steve Goodacre, at the University of Sheffield on the contact number given below. If your complaint is not handled to your satisfaction then please contact Dr. David Fletcher the 'Registrar and Secretary' of the University of Sheffield by post (Registrar and Secretary's Office, Firth Court, Western Bank, Sheffield, S10 2TN), telephone (0114 222 1100) or e-mail (D.E.Fletcher@sheffield.ac.uk).

Will your taking part in this project be kept confidential?
All your personal details that I collect during the course of the research will be kept strictly confidential. What you say in the interview will also be anonymised, and I will make sure that you will not be identified in any reports or publications. Transcripts and recordings will be kept in a locked cabinet. Electronic data will be kept secure using password-protected devices. Transcripts will be anonymised and parts in which participants might be identified will be avoided in publications. Data from the study will be stored securely for 2 years following the study and destroyed as confidential waste thereafter.

What will happen to the results of the research project?
This research will take place over a year, after which the results will be used as part of my doctoral studies. The information may also be presented at academic conferences and be published in research journals. You can also obtain a copy of the published report once this is completed by contacting me. The results of the project might be used to inform additional or subsequent research. Should this be the case, any information about you will continue to be kept confidential.

Who is organising and funding the research?
This research is organised by me and is self-funded fully. I receive no monies for this from the University of Sheffield or other funding body.

Who has ethically reviewed the project?
This project has been reviewed and ethically approved by the University of Sheffield Research Ethics Committee.

Contacts for further information
Dr Andrew Lee, Section of Public Health, ScHARR, the University of Sheffield, Regent Court, 30 Regent Street, Sheffield S1 4DA. Tel: 0114 2220872, Email: andrew.lee@sheffield.ac.uk.

Professor Steve Goodacre, Medical Care Research Unit, ScHARR, the University of Sheffield, Regent Court, 30 Regent Street, Sheffield S1 4DA. Tel: 0114 2220842, Email: s.goodacre@sheffield.ac.uk.

This information sheet is for you to keep. Thank you for your time and help.

Appendix 11: Participant consent form for key-informant interviews (Nepal)

Participant Consent Form

Title of Research Project: DISASTER MANAGEMENT IN NEPAL
Name of Researcher: DR ANDREW LEE

Participant Identification Number for this project: **Please initial box**

4. I confirm that I have read and understand the information sheet explaining the above research project and I have had the opportunity to ask questions about the project. ☐

5. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without there being any negative consequences. In addition, should I not wish to answer any particular question or questions, I am free to decline. ☐

6. I agree/do not agree* to my interview being recorded. (* delete as necessary) ☐

7. I understand that my responses will be anonymised. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the report(s) that result from the research. ☐

4. I agree for the data collected from me to be used in future research ☐

5. I agree to take part in the above research project. ☐

_____	_____	_____
Name of Participant	Date	Signature
_____	_____	_____
Dr Andrew CK Lee	Date	Signature

To be signed and dated in presence of the participant
Copies:

Once this has been signed by all parties the participant should receive a copy of the signed and dated participant consent form, the letter/pre-written script/information sheet and any other written information provided to the participants. A copy of the signed and dated consent form should be placed in the project's main record (e.g. a site file), which must be kept in a secure location.

Appendix 12: Key-informants interview schedule (Nepal)

Disaster Management in Nepal
Key-Informant Interview Questions

1. What involvement have you had in disaster management?

2. In your experience, how are disaster plans and policies devised?

3. How are they implemented?

4. Do practitioners adhere to them during incidents?
    a. If not, why not?

5. What sources of information, evidence, guidance or advice do you use on which to base your disaster management decisions/work on?

6. How reliable are these sources?

7. How much do you rely on these sources?

8. Can you think of any knowledge or research gaps for the following issues:
    a. Hazard and Risk assessment
    b. Mitigation activities
    c. Capability assessment/Gap analysis/Preparedness evaluation
    d. Emergency planning including Business continuity planning/management
    e. Emergency preparedness training, drills and exercises
    f. Communication strategies and issues
    g. Command and control/Incident command
    h. Inter-agency working/relations/Roles and responsibilities of various key stakeholders
    i. Surveillance, Alert and Warning systems
    j. Recovery activities including debriefing
    k. Organisational learning e.g. from incidents
    l. Legal jurisdictions and considerations
    m. System integration (i.e. of all the response activities as part of an emergency management system)
    n. (Any other topics/issues as identified iteratively from interviews or from documentary analysis/literature reviews)

9. What in your opinion is the state of disaster planning and preparedness in Nepal?

10. Reflecting on your own experience of or work in the field of disaster management, are there any particular deficiencies, difficulties or issues that comes to mind?

11. Is the public involved in disaster management in Nepal? If so, how?

12. Finally, are there any aspects of disaster management that you would prioritise for further research?

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