

The Effects of Flooding on Mental Health

Health Protection Agency
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Table of Contents

Executive summary	1
Chapter 1: Introduction	8
Chapter 2: 2007 Flooding in the United Kingdom	19
Chapter 3: The Method of the Literature Review	27
Chapter 4: Results	31
Chapter 5: Discussion	
Chapter 6: Conclusions	
Reference List	97
Annex A: Guidance from the Inter-Agency Standing Committee (IASC).	104
Annex B: MICRODIS	107
Annex C: Psychosocial Care for People Affected by Disasters and Majo Incidents (NATO/EAPC and Department of Health)	or 109
Annex D: Guidance from the Centers for Disease Control and Prevention the USA	on in 120
Annex E: PsySTART	125

THE ORIGINS AND NATURE OF THE REVIEW

The effects of flooding and disasters on people's health, relationships and welfare can be extensive and significant. Flooding can have profound effects on people's welfare, employment, mobility, wellbeing, psychosocial resilience, relationships and mental health. It can pose huge social and welfare problems that may continue over extended periods of time because of not only being flooded (the primary stressor), but also because of the continuing secondary stressors that arise as people try to recover their lives, property and relationships.

This report is borne out of a publication in 2009 from the Department of Health - *New Horizons: a shared vision of mental health*. Its vision states that mental health problems are common as are mental disorders that spring from environmental as well as physical and social risks. One of these environmental risks is posed by disasters, and they include flooding.

As part of the work for New Horizons, the Department of Health asked the Health Protection Agency to research systematically the public mental health impacts of flooding, synthesise best practice on their mitigation, and identify where research can support future evidence-based guidance.

Since then, the present government has published *No Health Without Mental Health: a cross-government mental health outcomes strategy for people of all ages (2011).* That current government policy recognises the importance of psychosocial resilience and is particularly pertinent to this report and aspects of it are summarised in the first chapter.

This report reviews the evidence on mental health and flooding. It complements the interim strategic guidance published by the Department of Health in 2009 – *National Health Service Emergency Planning Guidance: planning for the psychosocial and mental health care of people affected by major incidents and disasters*. That guidance remains contemporary.

This document provides:

- An analytical review of current epidemiological studies related to mental health and flooding;
- A synthesis of a wide range of national and international guidance; and
- An analysis of future research needs.

The material presented here provides further evidence on the impacts of floods on public mental health as well as public health approaches for supporting responses by specialist mental health services within a wider public mental health framework.

The authors have collected evidence through a systematic review of the literature that has been published since 2004. It consists of published research data (including epidemiological, government and non-government data), and guidance published by the government for England and by NATO. Experts in the field have advised on research in press or in process as well as on other known sources of information.

This report draws on, and complements approaches suggested in four recent, substantial documents:

- The Mental Health Strategy: No health without mental health (2011);
- The Public Health White Paper: Healthy lives, healthy people (2010);
- New Horizons: a shared vision for mental health (2009); and
- NHS Emergency Planning Guidance: Psychosocial and mental health care of people affected by major incidents and disasters: Interim national strategic guidance (2009).

THE CONTENTS OF THIS REPORT

Chapter 1: introduces recent governmental policy; provides certain definitions; differentiates distress that affects most people after disasters from the smaller numbers who develop mental disorders; and identifies the psychosocial responses that are appropriate for everyone who is affected by disasters, including flooding. Chapter 2 provides a summary of the impacts of the floods that affected England in 2007. Chapter 3 describes the search strategy for the literature review. The authors identify 48 papers as meeting their criteria for inclusion. Chapter 4 analyses the peer-reviewed epidemiological literature.

Chapter 1 also identifies the stepped strategic model of care that lies behind current policy in England for conceptualising and responding to people's needs before, while and after they are affected by disasters. That model fits with the evidence that is available and is supported further by this review relating to flooding. It recognises that: people's psychosocial resilience can be developed by actions taken before untoward events; the majority of people may suffer temporary distress as a consequence of their being affected by disasters, but that most of them will recover given social and welfare support from people who are close to them and their communities; and some people may develop mental disorders for which they require access to timely and effective mental healthcare.

Nonetheless, the extended timeframe of the impacts of flooding on people, their homes and their communities are such that the effects of secondary stressors in prolonging the welfare, physical and psychosocial impacts are highly important. Recognition of the longer timeframe in which adequate welfare, psychosocial and mental healthcare responses are required is an important lesson that has been learned from floods in the past, and that lesson is supported strongly by the review that is reported here.

THE GUIDANCE REVIEWED FOR THIS REPORT

The strategic paradigms about people's psychosocial needs and mental health after flooding that the authors found in the grey literature and from consultations with stakeholders are reported in the annexes to this report. They offer access to practical guidance for managers, public health services and clinical services, which fits well with the evidence that is reviewed in this report.

The authors think that five pieces of guidance are of great importance. First is the guidance from the Inter-Agency Standing Committee (IASC), an inter-agency forum for coordination, policy development and decision-making involving the key UN and non-UN humanitarian partners; Annex A contains IASC's summary of actions that should and should not be taken to assist populations of people after disasters. The overall goal of the MICRODIS research project, which is summarised in Annex B, is strengthening preparedness, mitigation and prevention strategies in order to reduce the health, social, and economic impacts of extreme events on communities . These two documents identify a number of the requirements that fall on policymakers and local services after disasters of all kinds including flooding.

Those requirements are developed in the guidance from NATO/EAPC, which also provides a strategic framework for planning and delivering both psychosocial and mental healthcare after disasters within an integrated strategic stepped model of care. The fourth piece of guidance is the current policy from the Department of Health, which develops the strategic stepped model of care for use in England. Annex C provides illustrations of the contents of the NATO/EAPC and Department of Health guidance. Readers may also wish to consider the Principles for Disaster and Major Incident Psychosocial Care that were developed by an international group in 2009-10 (1). It is evidence-based and identifies the four levels at which the responsible authorities should plan and develop psychosocial and mental healthcare.

Together, the Annexes A, B and C provide entry points to the contents of the extant guidance and they describe:

- The nature of disasters and psychosocial trauma; core concepts and definitions; and patterns of response;
- A strategic stepped model of care that includes assessment and intervention;
- Important aspects of strategic leadership, management and workforce development needed when planning response to psychosocial and mental health needs.

The key themes that emerge from the guidance include:

- Adopting a multi-sector approach that involves communities as well as agencies is the best way to promote wellbeing and recovery;
- It is important to understand stress, the impacts of stressors, and the nature of people's psychosocial experiences;
- Most people's psychosocial needs are met by people who are close to them;

- People affected by flooding need a tailored response to their psychosocial and mental health needs;
- The psychosocial circumstances that occur in the aftermath can oscillate between continuing or additional stress and recovery;
- The Strategic Stepped Model of Care is a very useful tool.

Annex D provides access to more focused guidance on information, advice and resources provided by the Centers for Disease Control and Prevention in the USA and which can be given to planners, and people who area affected by or involved in disasters. The PsySTART model, in Annex E, offers an approach to psychosocial triage.

Each of the sources of guidance that are summarised in the Annexes offers theoretical standpoints and outlines, directly or by implication, models of care for responding to the psychosocial and mental health impacts of disasters. Furthermore, they appear to the authors of this report to share a common philosophy of approach.

OVERCOMING THE LIMITATIONS OF THE RESEARCH LITERATURE

It became apparent during the epidemiological review that there is a substantial number of methodological complexities and challenges when conducting research and analysing data on the psychosocial, health and mental health impacts of floods. They include:

- The lack of universally agreed statements about the definitions used when researching disasters and the authors found that people may use the same and different terms to describe people's experiences, responses and mental disorders;
- The wide variety of methodologies that are used across the various studies that were scrutinised;
- The broad range of mental disorders that are described and assessed in the literature;
- Diversity in the co-variants that different researchers have assessed;
- The use of a variety of different diagnostic measurement tools; and
- Complexity when classifying the nature of each flood and population that was exposed to it.

This report highlights the authors' central conclusion, which is that people's psychosocial needs, and the mental disorders that they might develop as a consequence of their being flooded, pose core challenges for public health.

However, the recent literature on disasters, especially that on flooding, has tended to focus on the single and narrow concept of post-traumatic stress disorder (PTSD). The result is that, first, less research has been conducted on the psychosocial needs of people who are distressed rather than disordered. Second, the canon of research has tended to neglect the crucial wider and, sometimes, more prevalent morbidity

that is always found in all populations, including that which affects people who are involved in major incidents and disasters.

This is why the main body of this report focuses on the evidence that relates to people who develop mental disorders rather than to the much wider group of people who are distressed by events, temporarily or otherwise (a highly relevant matter after flooding) and who have psychosocial needs and needs that relate to them sustaining their mental health and emotional wellbeing.

As regards people who develop mental disorders, the authors found that risk factors and co-variants did not a have a constant association with poorer mental health across all the studies, partly due to methodological differences and partly because of the unique characteristics of each flood. However, as in general population studies, levels of exposure to the event(s), gender, age, socio-economic status were generally associated with mental ill health.

When considering PTSD specifically, the authors conclude that the symptoms may not decline over time as quickly as was thought previously. The authors found, though, that social cohesion has a significant effect on susceptibility to symptoms of PTSD and it, therefore, must be considered when developing public health strategies.

The studies analysed in this review illustrate the authors' opinion, which is that flooding can have a great impact on people's psychosocial needs and mental health and that evidence-based guidance on the factors that could influence the course of an illness are valuable when developing tools to minimise the psychosocial and mental health impacts of flooding.

The Way Forward for Research

The authors identify significant research gaps, which, if filled, could support design of future: psychosocial; public mental health; and primary and secondary mental healthcare responses to people's needs before and after flooding.

In general terms, more research is required, which studies:

- The responses of, and impacts on populations before and after untoward and extreme events, major incidents and disasters including flooding;
- The impacts of major incidents and disasters, including flooding, on people's psychosocial experiences in the short-, medium- and longer-terms;
- The contextual and subjective, qualitative features of peoples experiences which distinguish distress after disasters from the symptoms of mental disorders; and
- The longitudinal effects of major incidents and disasters, including floods, on people's mental health and ill health.

In particular:

- The authors identified numerous methods and tools for assessing mental health impacts from flooding and other extreme events. Further research would help to:
 - Provide definitions of psychosocial need, mental health and mental ill health that are agreed, understood and used internationally;
 - Achieve better scientific understanding of the psychosocial and mental health impacts of floods;
 - Achieve development of systems for cross comparison of research findings; and
 - Take forward findings to formal meta-analysis to identify better welfare and public health guidance and professional practice.
- The authors have identified the vital requirement for more longitudinal studies to understand the true impacts and trajectories of impact of disasters on people's mental health. Longitudinal studies that collect information on the sample population before the disaster strikes are rare, difficult to conduct and plan in advance (2). Better use could be made of the national psychiatric morbidity survey programme, which could provide some useful baseline data for populations that are flooded subsequently, as well as providing control data in non-flooded areas.
- Prearranged, well-designed prospective longitudinal studies that engage with people's psychosocial needs and all relevant diagnoses of mental disorders should be agreed and implemented appropriately in the UK.
- Better design of research instruments would help researchers to appraise people's common experiences and symptoms rather than a narrow subset, and might provide better information about the duration, severity and effects of people's experiences and/or symptoms. Subsequently, it will be possible to look at the public health impact of people's psychosocial experiences and needs as well as the effects on populations of mental disorders.
- The authors have identified the requirement for more research on vulnerable groups including: children and young people; older people; and people who respond to others needs in the aftermath of major events or disasters. This would help the research community to address:
 - Who or which groups of people are more at risk;
 - Whether or not vulnerability is a useful term;
 - How and why certain groups of people suffer more; and
 - What should be done in addition to current interventions to respond effectively to people's needs.
- Reviews should be considered on the advantages, disadvantages and consequences of diagnosing PTSD after people are flooded, and on how people develop and the consequences of them having PTSD in relation to flooding.

- More research is required on the epidemiology and best practice regarding the somatic effects, the extent of substance misuse, and gender-based violence that may be related to flooding.
- There is requirement for further investigation into the co-morbidity of mental disorders and how this can affect treatment plans.
- More research is required into the psychosocial needs and the impact on the mental health of responders to floods.

Chapter 1: Introduction

- 1.1 BACKGROUND
- 1.2 THE AIMS AND OBJECTIVES OF THIS REVIEW
- 1.2.1 Aims
- 1.2.2 Objectives
- 1.3 CONTENTS OF THIS REPORT
- 1.4 POLICY CONTEXT OF THIS REVIEW
- 1.4.1 The Mental Health Strategy: No Health Without Mental Health (2011)
- 1.4.2 Public Health White Paper: Healthy Lives, Healthy People (2010)
- 1.4.3 New Horizons (2009)

1.4.4 NHS Emergency Planning Guidance: Planning for the psychosocial and mental health care of people affected by major incidents and disasters: Interim national strategic guidance (2009)

1.5 DEFINITIONS

1.1 BACKGROUND

The Health Protection Agency (HPA) contributed to the Public Mental Health Report <u>Confident Communities</u>, Brighter Futures – A framework for developing well-being' (3) which is part of the last UK Government's vision for public mental health that was published as <u>New Horizons' in 2009 (4)</u>. That work involved:

- Assessing and appraising the evidence on flooding and mental health and working through it with other government departments;
- Distilling the findings into a format which could be used by policymakers at a local level.
- Providing a more detailed report for policymakers and services highlighting not just the evidence about the impact of flooding on people's mental health impact, but, where possible, to provide information on practical methods to reduce these impacts, through the work of services and by their collaboration with others.

This document reports on the processes of appraising the evidence and distilling the findings, and it provides the resource that is described in the paragraph above.

1.2 THE AIMS AND OBJECTIVES OF THIS REVIEW

1.2.1 Aims

The principal aim of the review that is reported in this document was to provide a summary of the evidence on the effects of flooding on people's mental health.

In particular, the project was intended to undertake a review of the literature from 2004:

- Of the epidemiological associations between flooding and people's mental health;
- To identify papers which address the impacts of flooding on the mental health of populations that are affected; and
- To assess what guidance on emergency planning exist about responding to the mental health needs of people who are affected.

1.2.2 Objectives

The specific objectives of the review of effects of flooding on the mental health of population of people were:

- To understand the range of different diagnostic tools/assessments that are available and to describe the implications for clinical and public health practice of making them widely known and the world-wide impact that the differences in the performance of the tools might have;
- To review public mental health guidance relating to the impacts of flooding that is underpinned by scientific evidence;
- To improve the links between emergency planning with awareness of the mental health needs of affected people;
- To consult the clinical and public health specialties on best practice for investigating, mitigating, and treating the mental health impacts of flooding; and
- To consider people's mental health responses and the processes of recovery and the indirect associations that flooding can have.

1.3 CONTENTS OF THIS REPORT

This report provides the Health Protection Agency's response to the aims and objectives. It is in three major parts. First, Chapters 1 and 2 set the scene. Second, the main body of the document reports on how the HPA carried out the literature review and its findings and conclusions. Third are the annexes, which provide commentaries on aspects of the guidance that the HPA identified as bearing on the practicalities of developing policy, designing and planning services and delivering mental healthcare.

This chapter signposts how this document responds to the aims of the work that it reports. It surveys recent English governmental policy that bears on the topic of this report. It also summarises and defines some of the terms that are important in the topic area. Thereby, this chapter introduces readers to some of the key conceptual matters and certain limitations that affect their understanding of the research that the Health Protection Agency reports.

Chapter 2 introduces the findings and recommendations made by researchers who have studied the effects of the extensive floods that took place in England in 2007 on the people who were affected by them.

Chapter 3 describes the method used by the authors when they conducted their review of the world literature in order to look in more depth into the evidence as to the effects of flooding on people's mental health. Readers will see a summary of the author's findings in Chapter 4. It focuses on the epidemiology. The authors provide an overview of the limitations that they have found in the literature in the discussion in Chapter 5.

Early on, the authors found that there are substantial limitations in the scope and quality of the literature. The recent literature on disasters, especially that on flooding, has tended to focus on the single and narrow concept of posttraumatic stress disorder (PTSD).

The result is that, first, less research has been conducted on the psychosocial needs of people who are distressed rather than disordered. Second, the canon of research has tended to neglect the crucial wider and, sometimes, more prevalent morbidity that is always found in all populations, including that which affects people who are involved in major incidents and disasters. This is why the main body of this report focuses on the evidence that relates to people who develop mental disorders rather than to the much wider group of people who are distressed by events, temporarily or otherwise (a highly relevant matter after flooding) and who have psychosocial needs and needs that relate to them sustaining their mental health and emotional wellbeing. The authors refer readers to the guidance that they overview in the annexes for access to material on psychosocial resilience and psychosocial care.

The authors bring together the results of the literature review and their exploration of expert advice and government policies in their conclusions in Chapter 6.

Later, this report, the authors develop some of the principles for effective care of people who are affected by flooding by extracting material from governmental policy and other expert advice that has been published with regard to disasters and major incidents of all kinds. This includes grey literature as well as practical guidance found on the global impact of flooding on mental health. These principles and access to the guidance is presented in five annexes at the end of this report.

1.4 POLICY CONTEXT OF THIS REVIEW

The Marmot Review says that people who live in the least favourable environmental conditions in the UK, including with the risk of being flooded, are also people who live in greatest deprivation(5). People who are already disadvantaged are likely to experience more severe consequences following a flood (6). Persons who are vulnerable to mental ill health are particularly at risk from the effects of extreme weather on their emotional wellbeing (7).

The severity of the effects that extreme weather events have on mental health depends on the extent of disruption caused as well as the capacity of people and their social support mechanisms to cope, during and after each event (8). Therefore, it is highly important that the UK's health systems adapt services to accommodate the impacts that flooding can have on people's psychosocial needs and mental health.

In this report, the word flood is used to describe events, which have significant impacts on human life and wellbeing. They may occur either alone or in conjunction with other extreme events or hazards (9).

This report is written in the context of the current UK Government's direction on public mental health. It builds on the last major epidemiological literature review on flooding, which was published in 2005 (10). Also, it highlights methodological difficulties in conducting research after flooding and the challenges that are inherent in drawing inferences from and between studies.

The HPA carried out this epidemiological review to further understanding of the public mental health impacts of flooding. This complements the recent and significant reports:

- No health without mental health: a cross-government mental health outcomes strategy for people of all ages (2011) (11);
- Healthy lives, healthy people: our strategy for public health in England (2010) (12);
- New Horizons: a shared vision for mental health (2009) (4);
- NHS Emergency Planning Guidance: Psychosocial and mental health care of people affected by major incidents and disasters: Interim national strategic guidance (2009) (13).

1.4.1 The Mental Health Strategy: No Health Without Mental Health (2011) (11)

The cross government mental health strategy, *No health without mental health* identifies the need to adopt public health approaches to tackle the mental health impacts of flooding as well as addressing wider social determinants to promote emotional wellbeing and prevent mental health problems. It links this objective to government commitments to tackle flooding and to the proposed outcomes on health protection in the Public Health White Paper consultation.

The foreword says, "Mental health is everyone's business – individuals, families, employers, educators and communities all need to play their part. Good mental health and resilience are fundamental to our physical health, our relationships, our education, our training, our work and to achieving our potential. The Prime Minister ... made it clear that success for the Coalition Government will be assessed not just on bringing about a healthy economy but

also on the wellbeing of the whole population. Moreover, good mental health and wellbeing also bring wider social and economic benefits. But to realise these benefits, we all need to take action and be supported by the Government to do so." It continues, -Our objectives for employment, for education, for training, for safety and crime reduction, for reducing drug and alcohol dependence and homelessness cannot be achieved without improvements in mental health."

The strategy has six shared objectives, which are that:

- More people will have good mental health
- More people with mental health problems will recover
- More people with mental health problems will have good physical health
- More people will have a positive experience of care and support
- Fewer people will suffer avoidable harm
- Fewer people will experience stigma and discrimination

Through these statements, the strategy secures as central to government policy the combined notions of public mental health and clinical mental healthcare. Furthermore, there are 14 references to resilience in the text. Evidently, resilience and, within that broad topic, psychosocial resilience are now key matters (14).

In the opinion of the authors of this report, an important matter that distils from this policy document is the differentiation between promoting mental health (with emotional wellbeing as one aspect of mental health), and having problems with mental health. This leads the authors to make an aside at this point, which is highly relevant to how the literature relating to mental health and flooding is understood. Within the concept of having problems with mental health lie two domains that are based on differing concepts and philosophies. One, that mental health problems' is a concept that is driven substantially by people's subjective experiences. However, the notion of mental disorder is based on external perceptions of third parties and relates to whether or not the experiences described by users of services meet the criteria that are set by official bodies that set classifications such as the World Health Organisation's International Classification of Diseases (15) or the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (16). This situation raises the possibility that there may be overlaps between people describing themselves as having mental health problems and other people ascribing those problems to a diagnosable disorder. But, there may be differences and disjunctions too.

As readers will see, much of the research that is summarised in this report is based on either self-administered questionnaires or on diagnostic interviews or questionnaires that are administered by researchers. Necessarily, these differing approaches raise challenges for understanding and interpreting the findings and they raise, once again, the subjectivity of some of the data that is collected through research and the differing thresholds that may have been in use.

1.4.2 Public Health White Paper: Healthy Lives, Healthy People (2010) (12)

The documents associated with the public health white paper clearly set out the importance of protecting people from the health impacts of flooding through identifying health protection as a proposed outcome and coordinating with emergency planning arrangements. The consultation also highlights the potential role of Directors of Public Health in delivering local responses together with local stakeholders.

1.4.3 New Horizons (2009) (4)

The New Horizons document and its evidence-based review *Confident Communities Brighter Futures (3)* raised the issue that flooding can have longlasting impacts on mental health and wellbeing. It highlights the need for cross agency working (e.g. with the health services under the Flood and Water Management Bill (2009) (17) and preventative approaches to managing flood risk and flood consequences) to tackle the wider determinants of mental health and wellbeing.

The New Horizons document shows that public health responses to the mental health impacts of flooding take place within a wider approach that addresses social determinants and inequalities. Primary and secondary prevention correspond to wider public health approaches and recovery and tertiary care correspond to better mental healthcare (Diagram 1).

Diagram 1: The scope of public mental health within New Horizons. From: New Horizons: a shared vision for mental health (2009) (4)



An example of the Spectrum of Prevention – Housing

1.4.4 NHS Emergency Planning Guidance: Planning for the psychosocial and mental health care of people affected by major incidents and disasters: Interim national strategic guidance (2009) (13)

The Department of Health's guidance addresses methods for preparing, planning and managing psychosocial and mental health services after a disaster. This guidance was developed from several approved international sources:

- Work led by the Department of Health for the North Atlantic Treaty Organisation (NATO) (18)
- Work conducted for the European Union by the European Network for Traumatic Stress (TENTS) (19)
- The work led by Williams and Bisson to bring together the NATO/EAPC Guidance on developing evidence-based policies, strategies and service design with the TENTS guidelines on clinical care and treatment to provide integrated principles for policy, strategy, operational policies and clinical practice (1).

It also takes into account the Inter-Agency Standing Committee (IASC) Guidelines on Mental Health and Psychosocial Support in Emergency Settings (7).

The result is a practical and evidence-based approach to:

- Policymaking;
- Designing and planning service responses;
- Designing operational policies for delivering services;
- Good clinical practice.

This approach, which is relevant to the circumstances raised by flooding, is driven by the needs of people whose mental health is affected by emergencies and it incorporates the whole of the care pathway that people may encounter, including multiple services and professionals.

In order to be able to plan and meet the needs of people who are affected by disasters most appropriately and effectively, the authors reiterate the importance of distinguishing between distress and mental disorder in conceptual terms and outline the concept of psychosocial resilience (Table 1). Due to the nature of flooding, including, often, both sudden onset and lengthy duration of disruption, an understanding of these matters, and of the nature and impact of secondary stressors, is especially helpful for explaining the possible impact of floods on people's emotional wellbeing and mental health and their capacity for precipitating or provoking mental disorders.

This guidance for NHS England covers the principles of responding to the psychosocial and mental health needs of people that arise from emergencies, major incidents and disasters. It lays out an integrated stepped model of care

for the NHS, and cross-sectional and inter-agency roles. It contains guidance on how to develop, deliver and manage mental health services in emergency settings and on information gathering and research.

The Strategic Stepped Model of Care

The Strategic Stepped Model of Care is shown in Diagram 2. The intention is for it to be used as a conceptual and practical reference for planners. It links the impact of events with the core components of mental health and psychosocial care. The model is founded on the guidance recommended by NATO/EAPC, and is considered by the Department of Health to lie at the core of the public mental health response for people affected by major incidents or disasters.

The core components of the strategic stepped model of care are adapted from NHS Emergency Planning Guidance: Planning for the psychosocial and mental health care of people affected by major incidents and disasters (13). Diagram 2 delineates the main public mental health roles of the key actors in a post flooding. The important but specialised role of psychiatric services is diagrammatically shown at the core. Surrounding this are layers of support by the wider public mental health resources, of workforce in organisations and linking these to the informal social and organisational assets within the wider community. This delineation at the widest level can provide clarity to the strategic level for responding to flooding.

Diagram 2: The core components of the strategic stepped model of care; adapted from NHS Emergency Planning Guidance: Planning for the psychosocial and mental health care of people affected by major incidents and disasters (2009) (13).



1.5 DEFINITIONS

An earlier section has identified challenges for understanding the field that stem from the evaluative nature of mental health, mental health problems and mental disorders.

Box 1 provides the definitions of some of the other terms that arise recurrently in this report. In particular, the adjective psychosocial is used generically to describe the wide array of people's emotional, psychological, social and physical experiences after flooding. Psychosocial care is used to refer to actions taken to meet the needs of people who are distressed whereas mental healthcare is used to describe actions that are required by people who are at higher risk of developing or have already developed mental disorders. Often, that term implies actions that are required by the primary and, sometimes, by the specialist or secondary mental healthcare services.

Box 1: Definitions and descriptions of core terms and concepts. Adapted from NHS Emergency Planning Guidance: Planning for the psychosocial and mental health care of people affected by major incidents and disasters (13)

Psychosocial: The term <u>psychosocial</u> refers to: the psychological, emotional, social and physical experiences of particular people and of collectives of people (in families, communities, and leisure, education and work groups as well as groups of strangers who are thrown together) in the context of particular social and physical environments. It is an adjective that is used to describe the psychological and social processes that occur within and between people and across groups of people.

Distress: Distress is the term that describes the experiences and feelings of people after external events that challenge their tolerance and adaptation. It is initiated and maintained by primary and secondary stressors and subsides if the stressors disappear or as people adapt to the changed circumstances. Distress is an anticipated human experience, not a disorder, when it and any associated psychosocial dysfunction emerges and persists in proportion to external stressful situations.

Thus, people's psychosocial (emotional, cognitive, social, and physical) responses that indicate that they are distressed are:

- Linked to a primary stressor (i.e. the flood) or to secondary stressors (such as problems with housing and insurance) that are caused by the flood;
- Experienced in proportion to the impact of the primary and secondary stressors (e.g. the extent of the flood);
- Likely to improve when the stressors are removed (i.e. when the flood recedes).

Disorder: The term disorder is used when people's experiences, emotions and behaviours are more intense, frequent, sustained or incapacitating than might be expected of the general population or when these features deviate from an anticipated norm and culturally sanctioned responses to external circumstances and situations.

The feelings and dysfunction experienced by people who have a mental disorder are:

- Disproportionate to the anticipated impact of the stressor;
- Persistent after the stressor has been removed;
- Understandable as an indication of anatomical, physiological or psychological abnormality of particular persons.

Differentiation between distress and disorder is evaluative because it is not defined by objective standards and differences are open to cultural considerations and differing personal perceptions and values.

Box 1 (continued): Definitions and descriptions of core terms and concepts. Adapted from NHS Emergency Planning Guidance: Planning for the psychosocial and mental health care of people affected by major incidents and disasters (13)

Psychosocial resilience: Psychosocial resilience refers to the capacity for persons, families, communities, social systems and institutions to respond, withstand and adapt to catastrophic events without lasting detriment.

The concept accepts that people may experience temporary distress. Thus, psychosocial resilience recognises the adaptive capacity of people and the ability they have to accept and use social support. It includes how people actively make meaning out of adversity in order to adapt reasonably well to extreme circumstances. Two components form this concept of resilience:

- Personal psychosocial resilience; and
- Collective psychosocial resilience of groups of people.

People and communities show remarkable psychosocial resilience. Up to approximately 75% of people recover psychosocially without requiring expert intervention given the care, assistance and good relationships with their families and friends and the support of their communities. However, this proportion changes with the nature of the disaster or major incident. Evidence suggests that adequate support reduces the effects of exposure to disasters and emergencies.

Chapter 2 - 2007 Flooding in the United Kingdom

2.1 INTRODUCTION

- 2.2 A SUMMARY OF THE JUNE AND JULY 2007 FLOODS
- 2.2.1 Impacts on healthcare services
- 2.2.2 Disruptions to water supplies
- 2.2.3 Disruptions to electricity supplies
- 2.2.4 Impacts on transportation
- 2.2.5 Impacts on health
- 2.2.6 Impacts on mental health
- 2.3 LITERATURE RELATING TO UK FLOODING AND MENTAL HEALTH
- 2.3.1 The psychosocial impacts of the summer 2007 floods in England
- 2.3.2 After the rain- learning the lessons of flood recovery in Hull
- 2.3.3 Floods in 2007 and older adult services: lessons learnt

2.1 INTRODUCTION

The floods of 2007 were the worst ever recorded in the UK and the impacts on health (both direct and indirect) were wide-ranging. Although these events were exceptional in their severity, they highlighted the UK's vulnerability. Many agencies and organisations were involved in responding to and recovering from the impacts of the flooding, including the Health Protection Agency.

This chapter draws attention to some of the research that was conducted to evaluate the effects on the mental health of people who were affected. Necessarily, this summary is brief and readers are referred to the researchers publications if they wish to pursue the detail.

2.2 A SUMMARY OF THE JUNE AND JULY 2007 FLOODS

The combined rainfall of 24-25 June and 19-20 July 2007 in England and Wales was unprecedented (20), with the areas that were affected most severely registering over three times as much rain compared with the average for this period in the year (see Figures 1a and 1b). This resulted in exceptional flooding across many regions, affecting 55,000 properties and killing 13 people (21).

South Yorkshire and Hull were worst affected in June 2007, followed in July 2007 by Worcestershire, Gloucestershire and the Thames Valley (22;23). A high proportion of the problems were attributed to surface water flooding, as opposed to fluvial flooding (21;24;25) and urban areas with predominately impermeable surfaces were severely affected (20). Major public health threats in the aftermath of flooding were associated with population displacement and damage to infrastructure (26).

Figure 1a: Precipitation Levels for England and Wales, 24–25 June 2007



Figure 1b: Precipitation Levels for England and Wales, 19–20 July 2007



The impacts included:

- Around 7,000 people were rescued from the flood waters by the emergency services;
- 350,000 people near Gloucester were left without mains water supply for over two weeks and 42,000 were left without power for up to 24 hours (21);
- Access to telephone and internet services was lost at some point by many people who were affected by the floods (21;24;27); .
- A significant number of schools were closed in flood affected areas, including 91 of 99 in Kingston upon Hull (28) and 390 in Gloucestershire

and Worcestershire in July (29): as a result of closures, 400,000 pupil school days were lost (28);

- The M1 was closed for 40 hours;
- Around 1,000 people in three villages near Sheffield were evacuated;
- A potential dam breach at the Ulley reservoir was narrowly averted (21;24); and
- The total economic cost of the flooding was estimated to have been £3.2 billion (28).

2.2.1 Impacts on Healthcare Services

According to the Environment Agency (30), 7% of hospitals and 9% of surgeries or health centres are built on a floodplain. In 2007, as a result of particularly severe flooding in Tewkesbury, an early decision was made to evacuate its hospital and transfer 20 patients to other local hospital facilities (31). Those people who had chronic diseases and who were dependent on medications or medical and nursing care (such as people who had diabetes, or renal dialysis patients) can be particularly vulnerable to impacts on the healthcare infrastructure (32). Older people can also be vulnerable; cases have been reported of elderly patients denying their homes were flooded in 2007 in order to avoid the upheaval of moving, or because of their fears of being moved to a care home (33).

2.2.2 Disruptions to Water Supplies

Water-related services require to be based near water supplies, in order to operate and remain affordable (21). As a result, over half of England's pumping stations and treatment works are located in flood-risk areas (30). In 2007, flooding in Gloucestershire of the Mythe water treatment works left 350,000 citizens without water for 17 days (24). The Security and Emergency Measures Direction requires the water utilities to supply 10 litres of water to each affected person who is without mains supply, which increases to approximately 20 litres per person a day after 5 days. However, this proved to be insufficient after a long period as long as 17 days (21).

Lack of mains water supply or contamination by floodwater affected all hospitals in Gloucestershire and this put patients' safety at risk. Despite testing the contingency plans one year earlier, when Gloucestershire was flooded in 2007 there was concern in the short-term when the water tankers and vehicles intended to supply emergency provisions were unable to gain access to hospital sites as a result of roads being impassable (31). Figure 2 – Aerial view of flooding near Mythe water treatment works. Source: British Geological Society



2.2.3 Disruptions to Electricity Supplies

The majority of electricity supplies remained intact during the flooding, through switching power distribution through different parts of the network, where possible (28) . Furthermore, submersion of the Walham sub-station in Gloucestershire, which could have left half a million people without power, was successfully avoided by constructing emergency flood defences (24). However, when the Castle Meads substation was flooded, 42,000 residents in Gloucester lost power for up to 24 hours; in Yorkshire and Lincolnshire, 130,000 households were affected similarly (21;28).

2.2.4 Impacts on transportation

It is estimated that 10,000 motorists were trapped on Friday 20th July 2007 between junctions 10 and 12 of the M5 and nearby (21) . Furthermore, approximately 500 people were stranded at Gloucester railway station on the same evening (21) . While the Highways Agency had developed emergency measures for stranded motorists, the rail industry did not have its own equivalent.

Issues such as displacement make difficult long term follow up in order to assess mortality. In this respect, it is important to consider that displacement does not always occur immediately after a flood; in the case of Hull, damage to some properties by rising groundwater (as opposed to surface flooding) was not immediately apparent (33).

2.2.5 Impacts on Health

The most immediate cause of death from flooding is as a result of drowning, electrocution or other direct injury (32;34). Thirteen people lost their lives as a direct result of the floods in the summer of 2007 (21). However, although mortality provides a clear indicator of the immediate health impact of floods (10;34), comparatively few people die immediately in developed countries as a result of flooding (26). One example of a secondary cause of death occurred at the Tewkesbury Rugby Club where a father and son died from carbon monoxide poisoning after using a generator to empty a cellar of floodwater (35).

A further flood risk is chemical pollution. In urban areas, that may be due to hydrocarbons and other vehicle residues (32;36), or with pesticides or fertilisers (32) in agricultural areas. However chemicals are often sufficiently diluted to pose little serious threat (32;37).

Chemical leaks from flooded industrial plants can present a hazard. In Sheffield, a flooded factory, which was close to the flooded shopping centre in Meadowhall, caught fire, leading to production of a smoke plume (38). Caldin and Murray reported that there was no evidence of increased outbreaks of infectious disease after the floods in 2007 (32). However, many people who were affected by the flooding reported that they had suffered from coughs and colds (21).

2.2.6 Impacts on mental health

Only a small number of studies were designed to assess the mental health impact of the summer 2007 floods in the UK, and to our knowledge, there have been no published initiatives that have surveyed the longer-term impact on psychosocial and mental health outcomes in those communities that were affected. This is despite the conclusion of the Pitt Review (the Government's independent review of the response to the floods), concluding that, -the monitoring of the impact of flooding on the health and wellbeing of people, and actions to mitigate and manage the effects, should form a systematic part of the work of Recovery Coordinating Groups [Recommendation 74]" (21). However three teams conducted projects with direct bearing on the psychosocial and potential mental health impacts of the summer 2007 floods in the months that followed and the following sections summarise this work.

2.3 LITERATURE RELATING TO UK FLOODING AND MENTAL HEALTH

2.3.1 The psychosocial impacts of the summer 2007 floods in England

Researchers from the Health Protection Agency and King's College London conducted a health impact assessment using population surveys in two affected Regions of the UK: South Yorkshire and Worcestershire (23). The prevalence of risk factors for negative psychosocial consequences was measured using a series of validated tools including the General Health Questionnaire (GHQ-12), General Anxiety Disorder Assessment (GAD-7), Patient Health Questionnaire (PHQ-9) and PTSD checklist-shortform. Additionally, exposure variables were

measured (termed, _incident management variables') including the presence of flood water in the home, evacuation and disruption to essential services, perceived impact of the floods on finances, house values and perceived health concerns.

The prevalence of mental health symptoms were elevated two to three times in survey respondents who had been affected by flood water in the home, had health concerns and perceived that the flooding had a significant impact on their finances and house value. Having been evacuated during the floods was associated with an increase in psychological distress, but not with other psychosocial outcome measures. Interestingly, levels of reported mental health symptoms were higher in South Yorkshire when compared to Worcestershire, despite the two regions being similarly affected by the floods. The authors suggest that this outcome may be due to differing levels of social deprivation across the two regions, the timing of data collection (3 months versus 6 months), and the sampling methods used in each region. However the relative increase in self-reported mental health symptoms in flooded versus non-flooded groups lends support to the conclusion that exposure to flooding can result in negative psychosocial outcomes.

As a cross-sectional study of the medium-term impact of the summer 2007 floods, the study goes some way in demonstrating the existence of negative psychosocial outcomes that are of concern to public health agencies tasked with responding to flooding emergencies. In addition, the authors conclude that the insights gained can inform emergency preparedness plans, such as ensuring that evacuation requests are only made when essential, that health concerns are addressed and support is giving for interactions with financial and other services in the months following a flooding event

2.3.2 After the rain- learning the lessons of flood recovery in Hull

A team from Lancaster University, with support from the Economic and Social Research Council, Engineering and Physical Research Council and Environment Agency, conducted a longitudinal study using diary, interview and focus group methods with 44 flood-affected residents of Kingston-Upon-Hull (33). Participants were followed for 18 months following the floods of June 2007, whilst a process of wider stakeholder engagement was conducted through presentations, workshops and consultation.

Whilst the study did not seek to assess the mental health trajectories of the flood-affected participants, the study aimed to identify the key dimensions of flood impact and recovery, including manifestations of resilience and vulnerability in the health, economic and social aspects of the flood recovery process. In this way, the study provides a rich data source which charts the successes and set backs on the flood recovery pathway, with implications for local level resilience planning.

The key outcomes of this qualitative study included the identification of the socalled __Recovery Gap,' the period after which the emergency response arrangements have ended and individuals must rely on the private sector, including insurance companies and builders, for continued recovery efforts. The lack of formal support and the requirement for individuals to manage the ongoing restoration processes themselves placed unusual pressures on individuals and communities. Experience with this process of recovery, and interactions with the different companies and organisations involved in the flood recovery process, had a significant impact on whether participants were able to cope. Whilst positive experiences were also reported under such circumstances, many individuals' experience of the trauma of flooding was confounded by poor treatment from those who are supposed to be helping with flood recovery.

The challenges presented by flood recovery are well documented in this study, and the _psychologically challenging' nature of the recovery process is evident. The authors identify key areas for action to address the Recovery Gap following a major flooding event that include: developing more flexible definitions of recovery in formal frameworks so that the longer-term aspects of flood recovery are considered by the emergency planning community; developing an _ehic of care' that extends to all companies and organisations involved in flood recovery, including the private sector; promoting community resilience through flexible working practices and facilitating new ways that communities can engage with stakeholders involved in policy making; and understanding and addressing vulnerability due to pre-existing social characteristics.

2.3.3 Floods in 2007 and older adult services: lessons learnt

The floods of July 2007 extended to the West Oxfordshire region, where a community mental health team documented their experience following local flooding. Over 200 elderly people were evacuated from nursing homes to places of safety, often at very short notice. The authors identify four factors associated with flooding in the wider literature that they considered relevant to their experiences: immediate threat to life; displacement; damage to property and increased social isolation (39).

Immediate and delayed problems caused by flooding for older people who had pre-existing mental health problems, including dementia, included unmasking cognitive impairment; and provoking exacerbations of depressive and anxiety disorders. New clinical problems associated with the flooding were identified in 11 out of 348 individuals known to the community mental health team, with some problems occurring immediately, and others up to 9 months afterwards. These included: worsening of dementia, behavioural difficulties, and the development of depression on top of pre-existing clinical problems. Overcrowding of care homes that were used temporarily to accommodate additional residents were thought to worsen existing psychological symptoms and cause behavioural changes. Considerable additional pressure was put on staff to manage those displaced by the floods, at a time where infrastructure problems also made it difficult for staff to visit certain areas.

The authors conclude that community mental health teams should be aware of the potential psychosocial impact of flooding on elderly people, particularly those with pre-existing mental health problems such as undiagnosed dementia. Symptoms of depressive and anxiety disorders may also be exacerbated in the months following the floods. Furthermore, temporary overcrowding of care homes as a result of evacuations can contribute to behavioural and psychological difficulties. To help mitigate these effects, the authors recommend that personal evacuation plans should be used for people who have cognitive impairment, which can also help to avoid difficulties in identification.

Chapter 3 - The Method for the Literature Review

- 3.1 OBJECTIVES
- 3.2 SEARCH STRATEGY
- 3.3 INCLUSION CRITERIA
- 3.4 EXCLUSION CRITERIA
- 3.5 THE PAPERS REVIEWED

3.1 OBJECTIVES

The specific objectives of the literature review were:

- To review the epidemiological evidence about flood-related mental health impacts by critically appraising published studies of flooding world-wide; and
- b. To identify gaps in current knowledge about reducing the psychosocial and impacts of flooding, its effects on public mental health, and people's needs for mental healthcare.

3.2 SEARCH STRATEGY

The health outcomes of flooding may be complex and may encompass more than one health system. It is for this reason that the HPA adopted a flexible search strategy with the intention of not missing inadvertently papers that do not have mental health in the title, but which are relevant nonetheless.

The methodology used is that advised in the epidemiological review published in 2005 on the health impacts of flooding (10). We developed an algorithm and used the Scopus¹ search engine to search for all papers with the specified search terms in their titles, abstracts or as keywords.

Search terms used were: flood*; dams; embankment*; hurricane*; inundation; overflow*; "seawater intrusion"; "storm surge*"; "storm water*"; "tropical storm*"; typhoon*; "water logging"; waterlogging; accident*; alcoholi*; allergy; allergen; allergies; anxiet*; burul*; campylo*; "cardiac arrest"; cardiovascular; (chemical pollut*); cholera; conjunctivitis; contamination; death*; dengue; dermatitis; diarrhoea*; diarrhea*; disease*; "drug suppl*"; drown*; dysentery; electrocution*; epidemic*; Escherichia; gastrointestinal; giardia*; health; hepatitis; hospital*; hypothermia; illness; infectio*; injur*; leptospirosis; malaria; malnutrition; "medical facility*"; medicine*; mental; morbidity; mortality; mosquito*; naegl*; outbreak*; pesticide*; poison*; pollut*; psychological; psychosocial; respiratory; "risk factor*"; shigella; shock; "side effect*"; "snake bite*"; Some words

¹ Scopus is a search tool that scans and has access to many large academic databases including Medline (pubmed), Embase, Psychinfo, and covers 15,000 peer-reviewed journals as well as conference proceedings and book series.

have been truncated with a * as is common practice, so that all syntactic compounds are included.

3.3 INCLUSION CRITERIA

Only papers published in peer-reviewed journals were included and our selection was limited to the subject areas of: medicine, nursing, psychology, pharmacology and toxicology.

3.4 EXCLUSION CRITERIA

Papers were excluded if they were:

- Irrelevant to the search such as the use of <u>flood</u> and <u>flooding</u> to mean inundation; biochemistry, genetics and molecular biology;
- Conference papers, dissertations, older papers, editorials, commentaries, meta-analyses and unpublished manuscripts; or
- Not published in either English or French, and not published between 2004 and 2010.

References from full text papers were reviewed manually for further articles. In addition, the databases listed here were searched for existing epidemiological reviews:

- DARE (Database of Abstracts of Reviews of Effects);
- CDSR (Cochrane Database of Systematic Reviews);
- EPPI (Evidence for Policy and Practice Information Centre); and
- DoPHER (Database of providing health effectiveness reviews).

A team of seven public health specialists and registrars screened the references generated by this search. The 3,585 references generated from the search were reduced to 827 papers by using the exclusion criteria. Further, all of the papers were assessed for suitability for inclusion in the review against the strict epidemiological criteria that are cited in Ahern et al (10).

3.5 THE PAPERS REVIEWED

A total of 48 papers on mental health were found that fit the strict criteria. The authors included all of them in the review, but gave greatest weight to studies that were based on epidemiological designs with controlled comparisons.

Twenty-eight (28) of the papers assessed people's mental health after American hurricanes and 20 after floods. Table 1 shows the research papers that we included in this review.

The authors made the decision to include hurricanes on account of the difficulties in classifying disasters. Those difficulties are described in greater

detail below. The authors concluded that it is important to include the extensive data on mental health following hurricanes in this epidemiological review of the mental health impacts of flooding, and especially so because the floods immediately consequent to Hurricane Katrina led to 200,000 people having to evacuate, out of more than 500,000 people who were evacuated overall. One thousand six hundred (1,600) people died either directly from the hurricane or from the floods that followed. Flooding of nursing homes and hospitals was severe and 215 patients and residents died in these sorts of facilities (40).

Flood	Number of papers
American Hurricanes 2004/5	28
(2;40-66)	
	2
(6/;68)	
Mexico 1999	2
(69;70) China I I was and 1000	
China, Hunan province 1998	3
(/1-/3)	
Vietnam, Xangsane Typnoon 2006	1
(/4) Ori Lenke, Teuremi 2004	4
Sri Lanka, Tsunami 2004	1
(75)	1
Germany 2002	1
(70) Karaa 2006	1
Korea 2006	I
(77) Carliala LIK 2005	1
Callisie, UK 2005	I
	2
10wa, 03 1993 (70.90)	2
(79,00) Mississippi Divor (Illinois and Missouri)1003	2
	2
(01,02) Italy 1006	1
(83)	
	2
(23.39)	<u>۲</u>
LIK 1998-2002	1
(84)	•
Total	48

Table 1: Distribution of research papers by flood event

The majority of papers that we reviewed considered population samples of adults affected by a particular flood. A few papers sampled specific populations: six (8%) addressed people aged under 18; two were conducted in evacuation shelters after Hurricane Katrina; one specifically sampled ethnic minorities; one assessed patients evacuated from a heart centre; and one looked at a school mental health clinic.

The researchers had used a wide range of approaches. One paper looked at all hurricanes in America in 2004; another, a UK-based study, assessed a single population affected by any flood between 1998 and 2005. All other papers focused on flooding. The majority of the studies were cross-sectional.

The timing of the studies, relative to the flood, varied from data collected preevent, to data collected zero-two weeks to 8 years after flooding. However, the vast majority fell between six months and 24 months post-event. Sample size was also very diverse, ranging from 50 to 33,000 people.

Chapter 4 - Results

4.1 THE CONTENTS OF THIS CHAPTER		
4.2 TERMINOLOGY, DEFINITIONS AND TOOLS FOR ASSERTAINING CASES		
4.2.1 A List of Conditions		
4.2.2 Diagnostic tools used in case ascertainment		
.3 CONSIDERATIONS AND CHALLENGES IN CONDUCTING AND NTERPRETING RESEARCH ON THE PSYCHOSOCIAL AND MENTAL HEALTH MPACTS OF FLOODING		
4.3.1 Conceptual challenges		
4.3.2 Logistical challenges		
4.3.3 Technical challenges		
4.4 THE FINDINGS ABOUT MENTAL HEALTH—GENERAL		
4.4.1 Findings about emotional wellbeing and distress		
4.4.2 Findings about specific mental disorders and use of services		
4.4.3 Findings relating to confounding variables and effect modification		
4.5 FINDINGS ABOUT POST-TRAUMATIC STRESS DISORDER		
4.5.1 The definition of PTSD		
4.5.2 Findings about the prevalence of PTSD		
4.5.3 PTSD and exposure variables		
4.5.4 Demographics and PTSD		
4.5.5 Variables relating to the nature of the flood		
4.5.6 Chronic disease and/or previous mental disorders and PTSD		
4.5.7 Personality traits and PTSD		
4.5.8 PTSD and social support		
4.5.9 The consequences of PTSD		
4.5.10 Children and young people and PTSD		

4.1 THE CONTENTS OF THIS CHAPTER

In this chapter, the authors summarise their findings from the literature review. Necessarily, it is an extensive chapter.

The authors have broken the contents into a number of sections. It begins with a summary of the terminology and a list of the many tools used by researchers. Then, the authors summarise the challenges faced by the researchers in conducting their studies and in interpreting their findings that emerged while conducting the literature review.
After a summary of the findings offered in the literature about mental health and distress in relationship to flooding, two major sections follow. The first summarises the results relating to specific mental disorders reported as being associated with people being affected by flooding. The authors found that a disproportionate volume of the literature focuses on post-traumatic stress disorder (PTSD); therefore, this report contains a separate section on PTSD.

4.2 TERMINOLOGY, DEFINITIONS AND TOOLS FOR ASSERTAINING CASES

The Inter-Agency Standing Committee's Guidelines on Mental Health and Psychosocial Support in Emergency Settings (7) uses mental health and psychosocial support as a composite term that is intended to recognise that psychological wellbeing is dependent upon a variety of wider social factors such as food security, safety, availability of shelter to name a few.

While, in the past, mental health was the term that was used more frequently among health sector actors, it is important to recognise the overlap between mental health, psychological wellbeing and social factors. In recent years, there has been much greater emphasis internationally on using the term psychosocial to describe the wider emotional, psychological, social, and physical effects of disasters and major incidents that are mediated by stress and strain. Where this is the case, mental health is used in this report in a more focused way to refer to the needs of people who may require mental health services and who may have diagnosable mental disorders.

Outcomes that are included in this review reflect this interpretation. However, it is beyond the scope of this document to review social impacts. Instead, social factors are considered only in terms of their effects on mental or psychological health.

4.2.1 A List of Conditions

This review covers mental health and a number of specific mental disorders as listed below:

- a. General self-reported mental health (using the Self-Reporting Questionnaire-20 (SRQ20) and 36-Item Short-Form Health Survey (SF-36-K)
- b. Mood-anxiety disorder
- c. Mental health disability
- d. Self-rated health status
- e. Psychological distress
- f. Major Depressive Episode (MDE)
- g. Major Depressive Disorder (MDD)
- h. Acute Stress Disorder (ASD)
- i. Post Traumatic Stress Disorder (PTSD)
- j. Post Traumatic Stress (PTS)
- k. Major Depressive Disorder (MDD)

- I. Panic Disorder (PD)
- m. Generalised Anxiety Disorder (GAD)
- n. Severe Mental Illness (SMI)
- o. Mild-moderate mental illness (MMI)

4.2.2 Diagnostic Tools Used in Case Ascertainment

Many diagnostic criteria are used in the literature and they vary in levels of correlation with, and mapping onto criteria for specific disorders as are contained in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) (16). The literature shows that the diagnostic tools used in case ascertainment also vary in terms of how they had been validated, and how appropriately they were applied within the context of different populations of affected people.

Mental health (28)	Post Traumatic Stress Disorder (14)
 Composite International Diagnostic Interview K6 scale of nonspecific psychological distress Medical Outcome Study Short Form 12 Structured Clinical Interview for DSM- IV (SCID-IV) Family Crisis Oriented Personal Evaluation Scale F-COPES. Rosenberg Self-Esteem Scale RSES. Hospital Anxiety and Depression Scale (HADS) National Comorbidity Survey- Replication Beck Depression Inventory BDI 1961 General Health Questionnaire GHQ-28 Goldberg and Hillier 1979 GAD 7 Centre for Epidemiological Studies Depressive Symptoms scale (CES-D) DSM-III R Diagnostic Interview Schedule/Disaster Supplement (DIS-II R) Depression - Edinburgh Depression Scale Symptom Checklist-90-revised (SCL-()- R) Patient Health Questionnaire-9 (MDD) State-Trait Anxiety Inventory for Children (STAIC-T) Children's Anxiety Sensitivity Index (CASI) Silverman 1991 Children's Somatization Index (CSI) Garber 1991 	 Centre for Epidemiological studies depressed mood scale. PTSD checklist-civilian version National Centre for PTSD PTSD- National Women's Study (PTSD Module) modified from Diagnostic Interview Schedule Kilpatrick 1989 Also validated in DSM-IV Revised Civilian Mississippi PTSD Scale Post Traumatic Checklist a Likert- type questionnaire PTSD Checklist-Civilian version (PCL) PTSD-Factorial Version (PTSD-F) Inventory Posttraumatic Symptom Scale Post-traumatic Stress Disorder Checklist (PCL-17) Impact of Events (revised) (IES- R)PTSD-RI (PTSD Reaction Index for Children) Post Traumatic Stress Scale Davidson Trauma Scale (DTS) Post traumatic stress psychopathology Post traumatic Distress Scale (PDS) Child PTSD Checklist Traumatic Events Questionnaire

Table 2: Diagnostic tools used in mental health research

_		
•	Revised Children's Manifest Anxiety Scale (RCMAS) Reynolds & Richmond 1978	
•	Acute Stress Disorder Scale	
•	Preschool age psychiatric assessment (PAPA)	
•	Hopkins Symptom Checklist-25	
•	Revised Child Anxiety and Depression Scale (RCADS)	
•	Positive and Negative Affect Schedule- Child	
•	Self-Reporting Questionnaire-20 (WHO)	
•	Minnesota Multiphasic Personality Inventory (MMPIPTSD)	

4.3 CONSIDERATIONS AND CHALLENGES IN CONDUCTING AND INTERPRETING RESEARCH ON THE PSYCHOSOCIAL AND MENTAL HEALTH IMPACTS OF FLOODING

Conducting any research in a disaster zone is challenging, and mental health research is particularly complicated due to: lack of gold standard indicators; the evaluative nature of diagnoses; social stigma; a raised baseline of stress and distress; and the subjective nature of the data due to the common practice of placing great reliance on self-reporting tools. In this report, challenges to mental health research in disasters are described under the headings: conceptual, logistical and technical.

4.3.1 Conceptual Challenges

Assessment of studies on the mental health impacts of flooding requires an understanding of the scale of the events that are reported by each of the studies. In this context, it is important to realise that people may find it difficult to separate the immediate effects of a disaster from subsequent events and their effects. This was the case after Hurricane Katrina when widespread flooding followed devastatingly destructive winds.

Identifying under which category of natural hazard a disaster falls is also difficult. When disasters involve more than one element, such as a primary hazard of wind, which causes a secondary hazard of flooding, understanding exposure stressors becomes complex. Often, this is the case when another quickly follows the first disaster, as was the case in New Orleans when Hurricane Katrina was closely followed by Hurricane Rita. The impact of a series of events, and what might be termed a compound disaster, in Japan in 2011 are another very good example. In that event, there was an earthquake that was followed by a second around a week later. The second earthquake provoked massive flooding in the form of a tsunami. In turn, that event caused structural damage to a nuclear power plant and, consequently, a world-scale

nuclear and radiological incident. The effects of these events are compound, overlapping, additive and short-, medium-, and long-term (85).

4.3.2 Logistical Challenges

A flood can cause great destruction to the health and social infrastructure that research programmes rely upon; they range from the specific, such as health data systems, to the generic, such as mechanisms for communication. There are four main logistical challenges to post-disaster research (86):

- Organising the research strategy;
- Organising the research team;
- Engaging the local community; and
- Finding funding and approval.

Also, disaster research has limited repeatability due to the unique nature of the events being studied. This means that each event is likely to present researchers with a unique set of circumstances and variables of interest, such as exposure level to event, severity of event, time of study post event, population sample, and so on.

4.3.3 Technical Challenges

Technical challenges may be further categorised as diagnostic, epidemiological and related to assessment of exposure.

The Epidemiological Measures and Diagnostic Challenges

Many different tools are used to assess mental illness, most notably for posttraumatic stress disorder (PTSD). They are not always comparable nor adequately validated for the purpose for which they are used.

Self-reported questionnaires, rather than clinical interviews, are often the epidemiological method used in research, for reasons of time and resource limitations. They should always be validated against a gold standard research clinical interview. If this is not done, then the researchers have no information about the likely misclassification rates. Additionally, study designs are often cross-sectional, with no data about particular persons pre-event, so effects seen may be the result pre-existing disorders, exacerbated disorders, and new disorders. Unless the date of onset of symptoms is recorded, it is not possible to tease out these different groups of people who may have similar disorders. Also, people are likely to have had differing degrees of exposure to the event, other stressful life events, resilience, coping strategies, and social supports. Most studies conduct multivariate analyses, which account for some confounding factors that add confidence to results.

Mental health measurement scales can be open to interpretation as different studies use different cut-off thresholds within the scales to categorise mental illness. This makes it difficult to compare reported prevalence rates across studies and, thus, generalisation is also difficult.

The HPA has found that, often, mental health measurement scales are customised and used without the amendments being piloted or validated. The Impact of Events Scale (revised) (IES-R) (87) was, for example, revised from 15 questions to 22 after Hurricane Katrina. Further, it was designed to be used in the immediate aftermath of a disaster. Nonetheless, it has been used one year later (45). This increases the complexity of drawing conclusions and finding corresponding prevalence patterns between research studies.

The diagnostic classification criteria may differ depending on whether DSM-IV or ICD-10 criteria are used.

Assessing Exposure

Exposure is difficult to define and measure in many disasters. Impact measurement is easier than assessments of exposure because of the complex nature of the issues, and, therefore, the former may be used as a proxy.

Several studies have taken into account the level and type of exposure experienced by the sample population and investigated the association between this data and mental health impacts (42;43).

There are various measurement tools that have been developed to assess exposure level including, for example, the Traumatic Events Questionnaire (66) and the Hurricane-Related Traumatic Experiences (HURTE) questionnaire. The former assesses experiences with 9 stressors defined by DSM-IV as criterion A1 for PTSD as being of sufficient intensity to elicit symptoms of PTSD. However, stressors that intervene between the index event of the hurricane and the research date may account for or co-contribute to symptoms over and above those evoked by the event itself. This establishes the requirement for more longitudinal studies (42). Furthermore, the results could be considered correlational, and not necessarily causal with respect to event exposure, unless there is pre-event baseline data (43).

People's exposure to flooding and other disasters and their experience of stress have to be measured retrospectively and are personal and subjective. This raises the possibility of recall of past experiences being influenced retrospectively by people's more recent and current experiences and psychosocial functioning (44).

Sampling

There is a range of difficulties inherent in defining and sampling the study population. When a disaster has scattered people and disrupted their lives, it is much harder to define the _population at risk' or construct a scientifically rigorous sampling frame or to conduct cohort studies, for example.

The sampling frame and population studied have an impact on the generalisability of the results. The participants that are included are those that have been available and accessible: this may mean that the most marginalised people who may be, potentially, the most vulnerable to mental illness are under represented in study samples. This could make conservative estimates of prevalence (44).

Figures for Comparison

As a result of these challenges, the epidemiological studies reported in the literature that the HPA examined provide, predominantly, point prevalence estimates, as measured by cross-sectional studies. Although, ideally, new cases caused by a disaster should be measured to give an incidence, post-disaster measurements of incidence are often not possible due to lack of pre-disaster baseline epidemiological data in the study population against which to draw comparisons. However, for public health purposes, point prevalence data is also valuable as they provide evidence on the burden of need in the population concerned, and they are useful in informing planning decisions concerning delivery of health services.

Studies are often of a cross-sectional nature with no pre-event data from or about particular people. As a result, mental health outcomes might represent pre-existing differences. It is very problematic to attribute causality without being able to establish which came first, the disorder or the exposure.

This review reported here has also showed that the period in which PTSD is assessed in relation to the event is often unclear, and, therefore, the authors' opinion is that prevalence estimates should be considered conservatively. Furthermore, as the authors observe elsewhere, the diagnostic tools used do not make clinical diagnoses (which requires a clinical interview), and they are unlikely to be able to explicitly link PTSD to a disaster and establish causal effects rather than associations.

Few cohort studies have been undertaken on this topic. As a result, the longterm mental health impacts of flooding are less well characterised. Similarly, resource considerations in post-disaster scenarios, with little time or resource to sample and match a control population, have meant that there are relatively few comparative case-control studies.

There are notable exceptions however, such as the work of the Hurricane Katrina Community Advisory Group (CAG), which constructed a representative sample of residents from the FEMA-defined areas in Louisiana, Mississippi and Alabama affected by Katrina, who had lived there before the hurricane, and who agreed to participate in research over several years to assess demand on mental health services. (44) (53)

However, there are some examples where obtaining baseline data on the mental health of affected populations has been attempted. Data to assist in understanding pre-disaster mental health were gathered from a nationally representative mental health survey in the US. This is the National Comorbidity

Survey-Replication (NCS-R) from which data from the 826 participants resident in the hurricane-hit area was accessed for the panel survey involving the Hurricane Katrina Community Advisory Group (CAG) (54). The estimate of the prevalence of serious mental illness (SMI) was 6.1%, mild-moderate mental illness was estimated to occur in 9.7% and the prevalence of any mental illness was 15.7%. Prevalence of PTSD in the whole NCS-R sample was 6.8% and GAD 5.7%. Norris et al. (69) reported the baseline prevalence estimate of PTSD in Mexico as 2%.

Confounding Variables and Effect Modification

There are, in addition, other risk factors that may potentially confound or modify the associations observed between mental health outcomes and exposure, in this case, to different disastrous events. These factors fell largely into three groups:

- Demographics (e.g. age, sex, education and socio-economic status);
- Event impact (e.g. injury, death, evacuation, loss of home, prior trauma and type of flood); and
- Social support (e.g. formal, informal, personal and regulatory).

Most studies, however, did use multivariate analyses which accounts for the effects that some of these factors may have on associations between event and mental health outcome adding, thereby, confidence to results (2).

Statistical Models

The range of correlates and statistical models used to document associations is very wide. Therefore, it is difficult to provide a summary of findings from across the full range of relevant literature.

4.4 THE FINDINGS ABOUT MENTAL HEALTH--GENERAL

4.4.1 Findings about emotional wellbeing and distress

The opening chapters in this report expose variations in the ways in which similar terms are used and understood. Commonly for example, there are two ways in which the term mental health is used. This first is to refer to people who have a diagnosable disorder and the second refers to what degree people have achieved or are sustaining good mental health overall, or, more specifically, emotional wellbeing and psychological health. In the view of the authors, these terms are not interchangeable though a glance at the literature shows that, often, they are used as if they are.

Readers are, often, dependent on the context of written accounts when identifying which of the meanings is intended. Similarly, the authors have identified in Chapter 1 the variable ways in which the terms mental health problem and mental disorder are used. These matters of definition and context can make difficult communication and interpretation. Therefore, this report picks its way carefully our way through this circumstance. To this end, the authors

separate out in this section certain research findings that relate to people's experience of distress and their quality of mental health.

The Department for Food, Environment and Rural Affairs (Defra) and the Environment Agency (EA) undertook research to understand the effect that flooding may have on people who were affected by flooding in the UK in 1998. Respondents to the survey that was conducted after the flooding were asked to rate a number of effects of the flood on their household's life using a scale from 1 (no effect) to 10 (serious effect). Stress of the flood rated as the second most serious effect (7.1) and worry about flooding was high at 6.6. The paper states that much of the literature concentrates on the occurrence of PTSD. However, the chance of suffering PTSD is relatively low, and people may suffer from symptoms incurred through trauma without fulfilling criteria for a diagnosis of PTSD (88).

In 2002, Tunstall et al. (84) conducted a survey, based on interviews concerning the health effects of flooding in England and Wales . Their paper demonstrates the impact of flooding on mental health. Of two groups that were sampled from across 30 locations, the first group included people who had been flooded in 1998, while the second group was composed of people who lived in the same at risk areas, but who had not been flooded.

The participants completed the General Health Questionnaire 12 (GHQ-12) twice; once, answering on the basis of how they felt at the time of the survey, and, then, based on how they had been feeling at the time of flooding, and when their worst time was in reference to the time of flood. Most participants reported that the worst time was within 3 months of the flood. Sixty-four per cent (64%) of the group that had experienced flooding were found to have a worst time' score (a score of 4 or more on the GHQ-12 scale which is indicative of psychological distress), which was significantly higher compared to the 25% who had the same score at time of interview (p<0.001). Fifty-six per cent (56%) of the flooded group reported improved health as measured by GHQ-12 over time since the flood took place, but 19% reported no change between the worst time and the time of survey, and 24% reported a deterioration in their health.

Readers should be note that Tunstall et al.(84) found social factors, such as problems with insurers, evacuation, and length of time to return to normal were strongly associated with a high GHQ-12 score (all at p<0.05).

The importance of social factors to good psychological health are also reported by Carroll et al. (78), who carried out a qualitative study in Carlisle in the UK, to look at the health and social impacts, and psychological processes by using phenomenological and transactional practice to understand concepts of attachment, identity, alienation and dialectics (78). Social impacts, such as disruption to life and displacement, had a strong impact on psychological health. The floods caused stress and anxiety, but so did the aftermath and clear up. Many people reported suffering from anxiety and stress a year after being flooded. The destruction of their homes as private safe entities had an adverse psychological impact. Often qualitative research, such as this study, can reveal much useful and powerful information as to the experiences that people have and the significance of events to them. Importantly, the results of the research by Carroll et al.(78) are reinforced by findings from quantitative studies that have used diagnostic measures and statistical analysis.

The self-rated health status of 1,452 adults in affected counties in the USA was assessed following the hurricanes in 2004 by examining social and psychological correlated aspects (41). Fourteen point six per cent (14.6%) of the sample persons rated their own health as poor. This was associated with extreme fear during the hurricanes (OR 1.87, 95%CI 1.08-3.24), \geq 60 years old (OR 3.06, 95%CI 1.90-4.93), low social support (OR 2.68, 95%CI 1.05-2.68) and depression since the hurricane (OR 5.02, 95%CI 1.75-14.40). Neither PTSD nor GAD contributed to self-rated health. However, PTSD did have significant correlations at the bi-variate level. The authors suggest that significance was lost due to the high amount of shared variance with MDD. Wang et al. (55) assessed use of mental health services 7 months after Hurricane Katrina in 1,043 adult survivors. They estimated that 31% of the sample had evidence of a mood or anxiety disorder (using the K6 scale).

Other experience from Katrina includes a cohort study by Abramson et al. who measured mental health disability using the Medical Outcome Study Short Form 12, version 2 mental component summary score (56). The participants were interviewed 6 to 12 months post Katrina and had further telephone follow up 20 to 23 months after the disaster. More then half the cohort showed significant mental health distress at both time points (p<0.05). Self-reported poor health and worry about security were consistently associated with poor mental health. The most significant predictors of distress were life situational variables such as overcrowded housing, and attitudinal characteristics such as fatalism and poor self-efficacy. Informal social networks acted as a protective factor against mental ill health.

Another prospective cohort study from Korea (77) assessed 83 residents using the Korean version of the 36-Item Short-Form Health Survey (SF-36-K) just prior to the flood of 2006. Fifty-eight (58) members of this sample were available for further assessment 18 months after the flood; their assessment used not only the SF-36-K, but also other diagnostic measurements for depression and PTSD.

After the flood, a significant decrease in total SF-36-K scores was observed (p<0.014) indicating a decline in health-related quality of life. These same cohorts of people were assessed using the BDI. The greatest health score reductions were physical and social functioning (both p<0.001). Protective factors included: being male (p<0.003); being currently married (p<0.017); age below 45 years (p<0.005); education beyond middle school (p<0.001); and an income above \$10,000 (p<0.007).

4.4.2 Findings about specific mental disorders and use of services

The papers that the HPA reviewed report a range of mental health impacts. They included psychological distress, acute stress disorder (ASD), generalised anxiety disorder (GAD), panic disorder (PD), mood-anxiety disorders, major depressive episode (MDE), major depressive disorder (MDD), and post-traumatic stress disorder (PTSD).

The context suggests that a number of authors have considered PTSD to be the dominant form of psychopathology that is associated with natural disasters (10). However, this is likely to be due to research bias; 29 of the 52 studies that the HPA reviewed included measures for only for PTSD. However, Galea et al.(53) report that the great majority of respondents estimated to have serious mental illness (98.1% in the New Orleans metropolis c.f. 85.5% in the control sample) also screened positive for PTSD symptoms.

PTSD is covered in a separate section in this chapter to reflect the volume of relevant research literature. However, this does not necessarily reflect the relative prevalence of PTSD compared with other mental disorders. This may be due to a bias in selecting topics for research and/or in designing studies. It is important that readers are mindful of the potential for there to be bias that emerges from the past research agenda for the reasons that we have identified.

The authors of this report recommend that prevalence studies should use instruments, which are able to assess the presence of all the main categories of disorder, and not solely PTSD. If screening instruments for PTSD are the only ones used, as, unfortunately, has all-too-often been the case, cases of depression, anxiety and other mental disorders may become erroneously subsumed into the PTSD category or are not detected. This inflates PTSD prevalence rates and leads to neglect of the other disorders, some of which may be more prevalent e.g. depression and anxiety.

Also, there is the risk of conflating people's common and natural experiences after disasters, including features of anxiety and distress, with PTSD because those experiences may be similar to symptoms of PTSD if researchers rely solely on participants' responses to questionnaires at a single point of measurement. Again, this risks inflating the apparent prevalence of PTSD. This observation argues for researchers adopting narrative designs, in which the trajectories over time of people's experiences can be recorded, and for including clinical interviews that allow greater accuracy of distinguishing PTSD from other forms of anxiety and distress.

The HPA included in its sample from the literature a series of studies of specific mental disorders as outcome measures. Of these, four cohort studies were included from the literature with mental health as an outcome measure (54;56;74;77) and two were included with the outcome measure of depression (77;80). Of the four mental health outcome studies, three were conducted with pre- and post-event data, and the fourth with two post-event time points. Each measured a different disorder as the outcome, or used a different mental health scale to determine prevalence change. All report a decline in mental health following the flood to which it referred, though the risk factors measured and found to be associated with the event differ across the studies.

Amstadter et al. conducted opportunistically one of the few cohort studies that was able to measure pre-disaster and post-disaster mental health in the same population (74). Data collected pre- and post-disaster was available on 797 adult participants. The Self-Reporting Questionnaire-20 (SRQ20) had been administered in the three months before Typhoon Xangsane hit Vietnam in October 2006 and round 2 of the study was conducted in January of 2007, 3 months after the typhoon. The study focused on PTSD, major depressive disorder (MDD), panic disorder (PD), and generalised anxiety disorder (GAD).

Comparison of the results from the two rounds of the study showed that posttyphoon scores were significantly higher than the pre-typhoon ones, (p<0.01), indicating that participants felt their own mental health had significantly worsened after their experience of the typhoon.

One hundred (100) participants (12.5%) met the criteria for a mental disorder. The prevalence of MDD observed after the typhoon was 5.9%, PTSD 2.6%, PD 9.3% and GAD 2.2%. Seventy per cent (70%) met criteria for only one disorder, 15% for two and 14% for three, and 1% met criteria for all four disorders. As stated by the authors, these prevalence rates are low in comparison to population studies of disasters in the West (42) and are lower than the estimated prevalence level in a population in the US that had not experienced a disaster and which was found from the National Comorbidity Study (89).

Amstadter et al. (74) suggest a number of possible reasons for this, all of which add to the methodological debate about comparison across epidemiological studies, disaster situations and socio-cultural contexts. They observe, for example, that the measurements used were different to those used in other studies, and, due to time constraints, no pilot psychometric tests were carried out involving Vietnamese people. Also, they suggested that the diagnostic criteria might not fit Vietnamese culture; and, third, that there may protective factors, such as family cohesion, in Vietnamese society that were not measured.

Kessler et al. studied the prevalence of mental disorders and suicides post-Katrina. The disorders were measured five to seven months after the hurricane using the same diagnostic measurements (K6), as used in the National Comorbidity Survey-Replication that was conducted between 2001 and 2003 (54). The post-Katrina sample had a significantly higher estimated prevalence of serious mental illness compared to the same disorders found in the earlier survey (11.3% vs. 6.1%, p< 0.001) and mild-moderate mental illness (19.9% vs. 9.7%, p < 0.001). However, the prevalence of suicide ideation and plans was significantly lower in the post-Katrina study (0.4% vs. 3.6%, p=0.014). The authors reported that they considered that this lower conditional prevalence of suicidality was strongly related to two dimensions of personal growth after the trauma (faith in one's own ability to rebuild one's life, and realisation of inner strength), without which between-survey differences in suicidality were insignificant.

Kessler et al. (44) assessed adult survivors of Katrina for various disorders 5 to 8 months afterwards and, again, one year later. Their findings suggest that

symptoms of mental disorders did not remit in the Katrina context, as typically expected (90), and may even be rising. Serious mental illness increased from 10.9% to 14%, suicidal ideation from 2.8% to 6.4%, and suicide plans from 1.0% to 5.0%. Unresolved stressors related to the hurricane accounted for increases in serious mental illness (SMI) and suicidal ideation (89.2% and 61.6% respectively) (44).

Galea et al. (53) performed a telephone survey 6-8 months post Katrina in which they assessed participants for stressors that were related to the hurricane and they screened the participants for DSM-IV anxiety-mood disorders (AMD) 30 days after the interview date. The estimated prevalence of any 30-day DSM-IV AMD was 31.2% in the total sample, and significantly higher among pre-hurricane residents of the New Orleans (49.1%) than the remainder of the sample (26.4%), (p<0.001). Stressors that were related to the hurricane (physical illness/injury) (OR 2.8 95% CI 1.2-6.6) and physical adversity (OR 7.9 95% CI 3.2-19.7) were associated with increased odds of symptoms of PTSD in the case group. The estimated prevalence of DSM-IV anxiety-mood disorders in the New Orleans was substantially higher than typically found in population based surveys of mental illness after natural disasters in the US, while the estimated prevalence in the remainder of the sample was comparable with that in previous studies (90).

Two cohort studies are included in this review, which specifically look at depression. The first, by Stimpson (80), is a prospective cohort study carried out during two rounds of the Iowa health poll following flooding in 1993. One thousand seven hundred and fifty-three (1753) adults were surveyed pre-1993, and the second survey was conducted approximately 60 days after the peak impact of the flood. Statistically significant reciprocal relationships were found between flood, depressive symptoms and sense of control, and each feature had an impact on the others (80).

A valuable, but small study comparing the general health status, prevalence of depression and PTSD symptoms before and after a major flood in 2006 in an agricultural area in Korea was published in 2008. Eighty-three (83) of 160 residents were assessed using the Korean version of the SF-36-K and the Beck Depression Index (BDI). After the flood in 2006, Heo et al.(77) estimated, on the basis of participants' responses to the BDI, that 31 subjects (53%) had mild depression (BDI >10), 11 (19%) had moderate depression (16 < BDI < 23) and 10 (17%) had severe depression (BDI >24). This shows how multi-tool use can make research difficult to interpret and cross-comparisons between studies challenging.

Stimpson et al. report that the number of experiences of flooding that people have is positively correlated to the likelihood of someone seeking help form disaster services after a flood in Iowa, US (79). Overall however, most people did not seek help. Those who were most likely to see help were white, experiencing economic hardship, living in urban areas and reliant on social support. Flood exposure and the other identified variables associated with seeking help reflect the known groups who are most likely to suffer mental health consequences from a flood. Twenty-two point nine per cent (22.9%) of people post-Katrina with pre-existing mental disorders reported a reduction in, or termination of, treatment 6 months after the hurricane according to a telephone survey of 1,043 adults conducted by Wang et al. (57). Of those people who developed new-onset disorders after the hurricane, 18.5% received some form of treatment for emotional problems. Reasons for not receiving any were a low perceived need or structural barriers (57).

Reijneveld (91) compared the health effects of adolescents 5 months after a disaster with the effects 12 months after. Effects had decreased over the time period, however they had not entirely gone as alcohol misuse remained high. Schroeder & Polusny (92) also found that alcohol misuse increased in this age group.

4.4.3 Findings relating to confounding variables and effect modification

Several specific variables are described in the literature that may modify or confound the associations seen between various mental health outcomes and the exposures to, in this case, the disastrous events. Often, these variables are categorised as: personal variables and event-related variables. Here, we describe the results for selected variables. There are many more that are not discussed here because they were not concentrated upon in the research that we found.

Youth

In 2008, Madrid et al. (58) reported that school-based health centres in Louisiana were called upon to respond to a sharp increase in demand for their services after Hurricane Katrina (data collected 6 months after Katrina). Fifty-three per cent (53%) reported an increase in volumes of patients referred. Anxiety and adjustment problems increased the most, the prevalence rates of which increased more in schools that received the highest numbers of displaced students. Nearly half of the parents who were involved reported observing new emotional or behavioural problems in their children (58).

Two (2) months after Katrina, Vigil et al. (59) assessed adolescents (12-17 years old). A control group, matched on demographic variables, was also assessed. Adolescents exposed to and displaced by Katrina reported lower self-esteem and higher internalising symptoms including depression, worry, fear, self-injury, and social withdrawal and symptoms of distress than the control group. Case participants reported that families engaged in more mobilising coping strategies (seeking non-familial, community based support), but that this brought unexpected higher psychological stress (59).

Galea et al.(53) also found young people to be at comparatively high risk of anxiety-mood disorders after Katrina.

Age

Acierno et al.(60) specifically undertook a study after the hurricanes in 2004 to investigate psychopathology among older (age 60 years +) as compared with that in younger adults . Older adults reported fewer symptoms of PTSD, GAD and MDD (p<0.05). They found that significant predictors of all three disorders in younger adults were social support, health problems, and prior traumatic event exposure. Female gender was related to GAD and depression only.

The results were the same for older adults, except that female gender was not associated though lower income was associated with PTSD. Variables that were related to storms were significant predictors for the older group, but not for the younger people.

However, contrary to findings in Western populations, older age was not a protective factor for any of the disorders studied by Amstadter et al.(74) in the Vietnamese population affected by a typhoon , but, conversely, was associated with increased likelihood of most symptoms at the univariate level, before the effects of other variables were controlled.

Other Personal Factors

Interviews were conducted 6 months post-event with 292 women who had been pregnant during or shortly after Katrina (48). 18% met the criteria for depression, and 13% for PTSD.

Ethnicity was a strong predictor of mental ill health (p<0.01) with higher reported rates among black women. Women with high school diploma level education and women without a partner also reported higher levels of mental illness. Area or residence and being evacuated were not associated with mental health overall. There was no significant difference between women who were pregnant during or after the hurricane. Two or more severe experiences of storm were associated with increased risk for both depression (RR 1.77, 95% CI 1.08-2.89) and PTSD (RR3.68, 95% CI 1.80-7.52) (48). The prevalence estimates may be relatively low because the population of women had not suffered the most traumatic events (rescue off roof, time in Superdome).

While pregnant women are usually considered a vulnerable group and to require specific public health attention, this review suggests that they have no greater vulnerability to distress when compared to the needs of the general population. However this might depend on people's experiences related to particular events.

Gender-based Violence (GBV)

Larrance et al. (61) conducted a survey, using a structured questionnaire, of 366 internally displaced persons (IDP) about 9 months after Katrina. Violence rates between intimate partners after their displacement were 3 times higher than US baselines and a 55-fold increase in prevalence of sexual violence was found. Criteria for major depressive disorder (MDD) criteria were met by 50% of

the sample, and 69% reported symptoms of depression, and 20% reported suicidal ideation. Fourteen per cent (14%) reported increasing substance misuse since displacement, which was associated with a 3.3-fold increase risk of MDD after controlling for confounding factors.

Anastario et al.(62) used the same data as Larrance et al. (61) and reported that 17.5% (34 women) experienced post-disaster gender-based violence (PDGBV). The odds of exposure was 2.3 times higher among women with low self-esteem (p<0.05, 95% CI 1.2-4.6) and 2.7 higher with suicidal ideation (p<0.05, 95% CI 1.1-6.7). Severity of depression was associated with PDGBV exposure, and the odds of PDGBV increased by a factor of 1.2 with each depressive symptom (p<0.05, 95% CI 1.02-1.5) (62).

Anastario et al. (63) also reported that the crude rate of gender-based violence increased from 4.6/100,000 per day to 16.3/100,000, and remained elevated at 10.1 in 2007 (2 years post Katrina). The increase was driven by an increase in intimate partner violence. GBV is significantly associated with poor mental health outcomes (63).

These papers suggest that people's problems with mental health could be a driver for increased GBV, but it is not clear how the two interact or how much the association is driven by the circumstances that the disastrous event has created rather than by a sequential series of effects.

<u>Comorbidity</u>

Most studies looked at specific diagnoses. Some researchers evaluated general mental health status and a few examined comorbidities. Norris et al.(69) examined comorbidity between PTSD and MDD over time after the flood that occurred in 1999 in Mexico . Unlike PTSD prevalence in the same sample (see above), MDD did not demonstrate a declining trend over time. There was a substantial degree of comorbidity, and the proportions of people who had both PTSD and MDD did not vary over time. The average prevalence of MDD in people who had PTSD cases was 23.4% compared to 4.4% of people who did not have PTSD. Twenty-eight per cent 28% of the total sample had evidence of one of the disorders, or both. These kinds of data have led some authorities to question whether or not PTSD is a discreet disorder (93).

Acierno et al. (42) investigated the prevalence and major risk factors for PTSD, GAD, major depressive episodes 6-9 months after the hurricanes that affected Florida in 2004 . The following point prevalence rates were found in 1,452 adults who were in the direct path of 1 or more hurricanes: PTSD-General was found in 3.6% (equating to 267,000 of 7.4m adults who live in Florida); PTSD-hurricane in 1.4 (104,000 adults); GAD in 5.5% (408,000); MDE in 6.1% (453,000). Ten point nine per cent (10.9%) met the criteria for 1 of 3 disorders (PTSD Gen), which, on bivariate analysis were the risk factors common across disorder type: previous exposure to traumatic stressors; and low social support 6 months previous to hurricane [3 aspects - emotional (someone to care for you), instrumental (someone to help) and appraisal (someone to give advice)]. Risk factors for anxiety disorder (PTSD, GAD) also included variables that

relate to exposure to storms such as displacement for more than 1 week, and great financial cost. Displacement from home was associated with PTSD (OR 4.6 PTSD-gen and 5.8 for PTSD hurricane). In bivariate analysis, GAD was observed at a 50% greater prevalence compared to PTSD.

On the twelfth and nineteenth days after Katrina, 133 adult evacuees at an emergency shelter completed a self-report questionnaire (66). Sixty-two per cent (62%) of the sample met the threshold criteria for acute stress disorder (ASD). Previously, research on disasters has not shown diagnosis of ASD to be a good predictor for who later develops PTSD. However, in the study that the HPA reports here, the data on the predictive power of ASD as leading to PTSD suggest that between 38% and 49% of total sample of evacuees would meet criteria for chronic PTSD two years after Katrina. Black race/ethnicity, perception of peri-disaster life threat (OR 1.37, 95%CI 1.08-1.75), female gender (OR 4.08, 95%CI 1.45-11.48), and the experience of injuries that were related to Katrina (OR 2.75, 95%CI 1.05-7.11) were all positively and significantly related to the severity of people's symptoms. Perhaps surprisingly, people's experiences of trauma previously did not have significant association with their experiences as regards Hurricane Katrina.

Previous Mental Health

People's mental health before an index disastrous event (in this instance, flooding) appeared repeatedly as a predicting factor. This is an important finding for public health preparedness.

Amstadter et al. (74) found that people's experiences previously of another traumatic event (with a prevalence of 46.5% in their sample population in Vietnam) was a statistically significant factor for all disorders at the bivariate level of analysis. However, it lost significance for GAD in the multivariate regression. Nonetheless, it retained a highly significant association with MDD and PTSD (p<0.01), PD (p<0.001), and for any disorder (p<0.001).

The literature shows that people's exposure to a typhoon was also associated with all the disorders at the bivariate level, but it only remained significant for MDD (p<0.001), GAD (p<0.05) and any disorder (p<0.001) at the multivariate level. Research shows consistently a dose-response relationship between level of exposure to a disaster and the level of impact on mental health: the greater the traumatic experience, the more severe the symptoms (64).

KEY MESSAGES FROM REVIEWED LITERATURE ABOUT EMOTIONAL WELLBEING, MENTAL DISTRESS AND DISORDERS

- 1. There is difficulty in comparing studies due to heterogeneity in the definitions used to measure outcomes, context of the events and the use of different screening tools.
- 2. The full extent of depression, anxiety and other mental disorders may not be fully reflected in the literature, as many methods of research only use screening tools for PSTD.
- 3. There is a decrease in self reported health and quality of life, and an increase in distress and mental disorders, both at the time of the event (primary stressor) and in the longer term due to secondary stressors.
- 4. Variables which increase the risk of developing mental distress or mental disorders after a flooding event include young age, mental health problems prior to the event, and previous experience of a traumatic event.
- 5. Gender based violence is reported to increase after flooding events.

4.5 FINDINGS ABOUT POST-TRAUMATIC STRESS DISORDER

4.5.1 The Definition of PTSD

There are two definitions for PTSD that are in regular use. One can be found in DSM-IV and the other in ICD-10. The former describes posttraumatic stress disorder, the latter post-traumatic stress disorder (18)

The American Psychiatric Association publishes the Diagnostic and Statistical Manual of Mental Disorders (DSM) which provides standard criteria and common language for the classification of mental disorders (16). It is used worldwide, though predominantly in the US, in research and in clinical practice. The fourth edition was published in 1994, although a text revision was produced in 2000. The fifth edition (DSM-5) is due for publication in May 2013.

The International Classification of Diseases Tenth Revision (ICD-10) is produced by the World Health Organization (WHO). (15) Chapter V covers mental and behavioural disorders. It is a guide that is used widely, though more so in Europe and other parts of the world.

The DSM-IV coding system was developed to correspond with that of the ICD. However, the revision of each system is not synchronised so there is the potential for discrepancies to occur.

The definition of PTSD describes an anxiety disorder that arises after exposure to an untoward extreme event in which serious physical harm occurred or was threatened. PTSD can affect anyone, though there are some people who experience risk factors that make them more vulnerable to it. Frequently, other anxiety disorders and depression occur simultaneously with PTSD (18) and comorbidity is extremely common.

The diagnosis of PTSD requires three elements to be present:

- The patient has suffered from a major traumatic event or series of events;
- One of more symptoms from three categories are present: re-experience, avoidance and hyperarousal (see Box 2); and
- The symptoms arise within six months of the event(s) and have duration of at least one month (though delayed-onset can be diagnosed if symptoms arise after six months and there is strong evidence of association with a specific event(s)).

Box 2: The symptom categories for diagnosing PTSD

Re-experience	Reliving the event in intrusive memories, dreams, <u>flashbacks</u> or when something reminds the person of the event
Avoidance	Persistent avoidance of stimuli associated with the trauma and a sense of -numbness" and emotional blunting
Autonomic hyperarousal	A state of hypervigilance, insomnia, enhanced startled reactions and outbursts of anger

ICD-10 states that the avoidance and hyperarousal categories contribute to the diagnosis but are not of prime importance, giving more weight to exposure to events and the category of re-experiencing symptoms. DSM-IV does not rank the categories in this explicit way.

ICD-10 also refers to the increased alcohol and substance misuse that can occur as a complicating factor.

Occasionally, these categories are assessed separately in research studies. Norris et al. (49), for example, report that intrusion, arousal and interference were common symptoms for Vietnamese Americans, but that avoidance and/or numbing did not occur together after Hurricane Katrina sufficiently often to form a cluster of symptoms.

4.5.2 Findings about the prevalence of PTSD

Table 3 presents data on the studies that reported the prevalence of the symptoms that are found in PTSD after flooding or after a disaster that involved flooding. The event that was covered most frequently by the 24 papers was Hurricane Katrina (n=11 - although two authors used the same data set). Most sample populations consisted of adults, four were of children and three were of a wide age range including both children and adults. The data show a wide range of estimates of the prevalence of PTSD. The highest, 50.5%, was found among populations of people affected by Hurricane Katrina (51).

We have organised the studies in Table 3 by chronological date for each flood. Presented in this way, the table illustrates the increasing interest in assessment for PTSD. Table 3 also shows the time interval in each study between the index event and when the researchers made their estimates of the prevalence of PTSD. Here, we provide a key to the column headings to assist readers to understand the table:

- 1. Disaster Event;
- 2. Date of event;
- 3. Study authors and date of publication;
- 4. Sample population;
- 5. Sample size;
- 6. Epidemiological method;
- 7. Time 1 is the time by weeks or months after the event when the researchers made their first/only assessment for PTSD;
- 8. Prevalence Time 1- is the identified prevalence of PTSD

- 9. Time 2 is the time by weeks or months after the event when the researchers made their second assessment for PTSD; and
- 10. Prevalence Time 2- is the identified prevalence of PTSD

In 2008, Heo et al. (77) reported that 31.03% of the sample of people involved as subjects in the research met the threshold for clinical PTSD using the IES-R measurement tool and 43.10% were diagnosed using the MMPI-PTSD scale in the same population sample after the floods in Korea in 2006. Twenty-two point four one per cent (22.41%) met the criteria for PTSD on both the tests. This illustrates how the different measurement tools produce different prevalence estimates, which explains some of the variation seen in Table 3.

Furthermore, we reiterate that PTSD is a clinical diagnosis and that the rating scales do not necessarily make reliable diagnoses. We direct readers' attention to Chapter 1 and earlier in this chapter for the authors' summary of the methodological difficulties and confounding matters that arise in this regard.

Several studies have concentrated on specific groups or populations and they are summarised in the series of sections.

Table 3: Summary of studies of flood related events that report the assessment for and prevalence of PTSD by year of event

Disaster	Date	Study	Sample Population	Sample Size	Epidemiological Method	Time 1 since event, months or weeks	Prevalence at Time 1 %	Time 2 since event, months or weeks	Prevalence at Time 2 %
St Louis	1993	North et	Adult	162	Cohort	4	22	16	16
US flood		al., 2004							
Italy floods	1996	Di Fiorino et al., 2005	Adult	61	Cross-sectional	94	45.9		
Poland floods	1997	Stepien et al., 2005	Flood- affected population	97	Cross-sectional	60-63	30.9		
England & Wales floods	1998- 2005	Tunstall et al., 2006	983 flooded adults/527 at risk	1,510	Case control	58-60	15 (flood group)		
Hunan China floods	1998	Feng et al., 2007	Flood- affected population	25,478	Cross-sectional	18-24	9.7		
Hunan China floods	1998	Huang et al., 2010	16 years old upwards	25,478	Cross-sectional	18-24	9.2		
Hunan China floods	1998 & 1999	Liu et al., 2006	7 years old upwards	33,340	Cross-sectional	18-24	8.6		

Table 3: Summary of studies of flood related events that report the assessment for and prevalence of PTSD by year of event (continued)

Mexico floods	1999	Norris et al., 2004	Adults affected by floods in 2 villages	561	Cohort	6	Village A: 14 Village B: 46	24	Village A: 8 Village B: 19
Germany floods	2002	Nitschke et al., 2006	Heart centre patients	164	Cohort	1	18 (sample size: 99)	7	23.6 (sample size: 67)
Sri Lanka tsunami	2004	Dewaraja and Kawamura, 2006	90 adults affected by tsunami (case), 18 not affected (control)	108	Case control	Not specified	42 (case)		
Florida Hurricanes	2004	Ruggiero et al., 2009	Adults	1,452	Cross-sectional	7-11	3.6		
Florida Hurricanes & Hurricane Katrina	2004 & 2005	Acierno et al., 2007	Adults	1,452	Cross-sectional	6-9	3.6		
Hurricane Katrina	2005	Hensley and Varela, 2008	Youth 10- 15 years old	302	Cross-sectional	5-8	37 (moderate- severe)		

Table 3: Summary of studies of flood related events that report the assessment for and prevalence of PTSD by year of event (continued)

Hurricane Katrina	2005	Kessler et al., 2008	Adults	815	Cohort	5-8	14.9	18	20.9
Hurricane Katrina	2005	Kishore et al., 2008	Adults (university)	364	Cross-sectional	12	22		
Hurricane Katrina	2005	Pina et al., 2008	Youth average age 11 years old	46	Cross-sectional	6-7	23.9		
Hurricane Katrina	2005	Scheeringa and Zeanah, 2008	Children 3- 6 years old	70	Cross-sectional	6	15.7		
Hurricane Katrina	2005	Harville et al., 2009	Pregnant women	292	Cohort	6-20 months	13	Data not presented due to substantial attrition	
Hurricane Katrina	2005	Norris et al., 2009	Adult Vietnamese Americans	82	Cross-sectional	12	5		
Hurricane Katrina	2005	Weems et al., 2009	Ethnic minority 8- 15 year olds	191	Cohort	24	41 (moderate- severe)	30	39 (moderate- severe)

Table 3: Summary of studies of flood related events that report the assessment for and prevalence of PTSD by year of event (continued)

Hurricane Katrina	2005	Sprang and LaJoie, 2009	Katrina adults evacuated	101	Cross-sectional	12	50.5
Hurricane Katrina evacuation shelter	2005	Coker et al., 2006	Katrina evacuees	124	Cross-sectional	0-2 weeks	38.6 (moderate) 23.9 (severe)
Korea floods	2006	Heo et al., 2008	Adults	58	Cohort (pre/post disaster)	18	22 (post- disaster)
Vietnam Typhoon	2006	Amstadter et al., 2009	Adult	797	Cohort (pre/post disaster)	3	2.6 (post- disaster)

Children

Four studies observed children 5-24 months after Hurricane Katrina in August 2005 (43;46;47;50) and reported high PTSD prevalence estimates of 37%, 23.9%, 15.7% and 41% respectively (see Table 4). All used different measures to assess PTSD and so cross-study comparisons are difficult. However, these estimates are high and three support an opinion that children are particularly vulnerable. Further, the small number of studies collected here shows the paucity of work on children. The data in Table 4 is arranged by the time from the floods to the time of assessment in all four studies with the fourth study having a second assessment period.

Study	Since ev months	ent	Sample	Sample	Prevalence	Disaster	
	Time1	Time 2	Population	Size	Time 1%	Time 2%	
Hensley and Varela, 2008	5-8		Youth 10-15 years old	302	37 (moderate- severe)		Hurricane Katrina 2005
Pina et al., 2008	6-7		Youth average age 11 years old	46	23.9		Hurricane Katrina 2005
Scheeringa and Zeanah, 2008	6		Children 3-6 years old	70	15.7		Hurricane Katrina 2005
Weems et al., 2009	24	30	Ethnic minority 8- 15year olds	191	41 (moderate -severe)	39 (moderate - severe)	Hurricane Katrina 2005

Table 4: Summary of studies that report PTSD prevalence in a sample population of children

Hurricane Katrina

Prevalence estimates of symptoms of PTSD from studies conducted with populations affected by Hurricane Katrina range between 3.6% (41;42) and 50.5% (51) (see Table 5). Given that Katrina was one of the most destructive and deadliest hurricanes in US history, some readers might expect the prevalence levels to be high, and for the length of recovery to be more protracted. So, is the lower estimate unusual? Certainly, it is similar to the National Comorbidity Survey-Replication (NCS-R) baseline rates, and very different to other prevalence estimates.

The authors suggest that there may be a number of possible explanations. The first, and most probable, lies in realising that there are a number of confounding methodological issues (above). In this regard, the HPA identifies two particular items: first is variable age ranges of the sample populations (lower prevalence figures are recorded in Table 4 for children aged 3 to 6); and, second, is the variability of methods used in different research studies and the consequential difficulties of comparing studies. Second is the possibility that this variability of

prevalence reflects the composition of the populations in the counties that were hit by the hurricane. These counties had a high proportion of elderly people, who, typically, do not report lower symptom levels, and the research focused on all four of the hurricanes that hit in 2004-2005.

Again the data in Table 5 is arranged by the time from the floods to the time of assessment in all eleven studies. Two of the studies included a second assessment period.

Study	Since ev months	vent	Sample Population	Sample Size	Prevalence		
	Time 1	Time 2			Time 1%	Time 2%	
Coker et al., 2006	0 to 2 weeks		Katrina evacuees	124	38.6 (moderate) 23.9 (severe)		
Acierno et al., 2007	6-9		Adults	1,452	3.6		
Hensley and Varela, 2008	5-8		Youth 10- 15 years old	302	37 (moderate- severe)		
Kessler et al., 2008	5-8	18	Adults	815	14.9	20.9	
Kishore et al., 2008	12		Adults (University)	364	22		
Pina et al., 2008	6-7		Youth average age 11 years old	46	23.9		
Scheeringa and Zeanah, 2008	6		Children 3- 6 years old	70	15.7		
Harville et al., 2009	6-20		Pregnant women	292	13		
Norris et al., 2009	12		Adult Vietnamese Americans	82	5		
Weems et al., 2009	34	30	Ethnic minority 8- 15 year olds	191	41 (moderate- severe)	39 (moderate- severe)	
Sprang and LaJoie, 2009	12		Katrina adults evacuated	101	50.5		

Table 5: Summary of studies that report PTSD prevalence in a sample populationaffected by Hurricane Katrina in 2005

Vulnerable population subgroups

Six studies focused on prevalence estimates for certain particular populations (see Table 6), such as children of ethnic minorities (41% and 39%) (50), the population in an evacuation shelter after Katrina (38.6%) (52), the patients evacuated from a flooded heart centre in Germany (18% and 23.6%), (76) and pregnant women (13%) (48).

Study	Since ev months	vent	Sample	Sample	Prevalence		Disaster	
-	Time 1	Time 2	Population	Size	Time 1%	Time 2%		
Coker et	et 0 to 2		Katrina	124	38.6 (moderate)		Katrina evacuation	
al., 2000	weeks		evacuees		23.9 (severe)		2005	
Nitschke et al., 2006	1	7	Heart centre patients	164	18 (sample size 99)	23.6 (sample size 67)	Germany 2002	
Harville et al., 2009	6-20		Pregnant women	292	13	Data not presented due to substantial attrition	Hurricane Katrina 2005	
Norris et al., 2009	12		Adult Vietnamese Americans	82	5		Hurricane Katrina 2005	
Sprang and LaJoie, 2009	12		Katrina adults evacuated	101	50.5		Hurricane Katrina 2005	
Weems et al., 2009	24	30	Ethnic minority 8-15 year olds	191	41 (moderate -severe)	39 (moderate- severe)	Hurricane Katrina 2005	

Table 6:	Summary	of	studies	that	report	PTSD	prevalence	in	а	sample	population	of
specific g	roups											

Norris et al. (49) assessed PTSD in Vietnamese Americans after Katrina. 21% met criteria for partial PTSD, 5% all criteria. Weems (2;64) conducted a longitudinal study after Katrina on a group composed of predominantly African Americans who were still in New Orleans. She found a stable high prevalence estimate of __severe' PTSD at two points, 24 months (41%) and 30 months (39%) after the hurricane, with no significant difference between the two. This appears to support the finding that the impact of disasters on high risk groups may endure, even if the general trend is for symptoms of mental disorder to decline (94).

All of these groups of people are considered to be more vulnerable to developing PTSD: children, evacuees, people who are already ill, pregnant women and people in minority groups. The evidence suggests that they are likely to fare worse. However, the number of studies is few, with methodological

differences, both in terms of epidemiology and how PTSD was measured and this makes comparison with population estimates difficult.

Again, the data is arranged in Table 6 by the time of the floods to the time of assessment in all five studies and two of the studies included a second assessment.

The Prevalence of PTSD over Time

Five longitudinal studies report estimates of the prevalence of PTSD over two time points (see Table 7). Again the data is arranged by the time from the floods to the two times of assessment in all five studies. The results are varied.

Study	Since e months	event S	Sample	Sample	Prevalence	Disaster		
olddy	Time 1	Time 2	Population	Size	Time 1%	Time 2%	Dicuctor	
	Adult		Adulte		Village A:	Village A:		
Norris et	6	24	affected by	561	14	8	Mexico	
al., 2004		2 7	floods in two	001	Village B:	Village B:	flood 1999	
			Villages		46	19		
North et al., 2004	4	16	Adult	162	22	16	St Louis US 1993	
Nitschke et al., 2006	1	7	Heart centre patients	164	18 (sample size 99)	23.6 (sample size 67)	Germany 2002	
Kessler et al., 2008	5 to 8	18	Adults	815	14.9	20.9	Hurricane Katrina 2005	
Weems et al.,	24	30	Ethnic minority 8-15	191	41 (moderate	39 (moderate-	Hurricane Katrina	
2009			year olds		-severe)	severe)	2005	

Table 7: Summary of studies that report PTSD prevalence over time

Commonly, authors of papers opine that the prevalence of PTSD is likely to decline with time since the event (94;95). However, as more cohort studies are reported, the results do not always support this hypothesis. Two of the studies that we include in this review did find a reduction in PTSD between the two or more time points (69;82): one study reported estimates of stable, high prevalences over the time period (50), and two papers report an increase in prevalence of PTSD (44;76).

Norris et al. (69) report both a quadratic and linear effect of time on the prevalence of symptoms of PTSD. One paper reported that symptoms of PTSD declined at first and then stabilised over four 6 monthly time points during 2 years. However, even two years after the event in Mexico, the prevalence of PTSD remained significantly higher than the base-rate of PTSD that was established in 2004 (2%). The data show that recovery was substantial after

one year, indicating that suffering may linger for considerable time after the event. The authors suggest that, if recovery has not occurred within 18 months, it is unlikely that improvement will be seen. This confirms earlier studies that propose that, in one third of cases, PTSD takes a chronic course.

A survey, in which the researchers interviewed the same sample from the population repeatedly over time, was commissioned to widen the review of the mental health impact on specific subgroups following Katrina (see, for example, Abramson et al., 2008 (56)). Other longitudinal research provides point prevalence figures for the whole population that was affected (44;53-55;57). The Hurricane Katrina Community Advisory Group (CAG) was formed of people who consented to their long-term involvement in the study. At the second time point, 18 months after Katrina hit, the PTSD level in the CAG group was 20.9%, an increase from 14.9% after the first time point at 5 to 8 months (44). This illustrates a course that was unexpected at that stage of the research.

It is difficult to compare these studies because of the differences of sampling and methodologies used in the various research studies. They include differences in: sample type and size; times of assessments after the index events; and diagnostic measurements. These differences may explain why different patterns were found for the same event when longitudinal prevalence was researched by separate studies.

Some cross-sectional studies that are presented in the literature were conducted years after the flood was researched and report high estimates of the prevalence of PTSD. This provides further evidence of the longevity of the effects of flooding on the mental health of affected people as is reflected by the prevalence rates of PTSD. Di Fiorino et al. (83) found a prevalence of 45.9% eight years after floods in Italy. Other research in Poland found an estimate of 30.9% after 5 years (67). Tunstall et al. (84) reported an estimate of 15% of people who were affected as suffering mild to moderate levels of post-traumatic stress 4 years after floods in England and Wales and larger numbers of people were in a _high' or _extreme' category of post-traumatic stress.

4.5.3 PTSD and Exposure Variables

Three psychological elements are often measured to determine evidence of symptoms PTSD. Some studies report on their measurement, and the cumulative points, rather than prevalence estimates of the proportion of people with symptoms of PTSD. Tunstall et al. (84), for example, report that using the PTSS scale 10 people fell into the category of high' levels as they scored between 148-209 on the PTSD Intensity scoring and 4 persons showed _extreme' levels with score between 210-272.

4.5.4 Demographics and PTSD

The literature review reported here shows that a range of demographic variables has been recorded in studies. They include: age; gender; education; and socio-economic status, for example. Not all studies found that the same variables remain associated with PTSD in multivariate analysis. However being

younger, female, less highly educated, and having a low income were the most consistent demographic factors that predicted more symptoms of PTSD. Some research, however, as reported in Kishore et al. (45), has found that no demographic variables were associated with PTSD (however, in this study, the age range was narrow).

Age

Amstadter et al. (74) did not find that age was a significant risk factor for PTSD after Typhoon Xangsane in Vietnam. This differs to findings for Western populations. However, younger age predicted stable elevated levels of PTSD throughout a 2 year study after Katrina (OR 3.94, 95% CI, 1.46-10.63) (50).

Di Fiorino (83) reported that older subjects showed significantly higher scores than younger subjects in some of the sub-symptoms (for example, hyperarousal frequency) of post traumatic stress psychopathology in people who had a diagnosis of their meeting fully the criteria for the PTSD syndrome. People who fell just under the threshold for diagnosing PTSD had higher scores for avoidance/numbness. A significant risk factor was older age (age 18 to 59 years, OR 2.28, 95%CI, 2.02-2.57) and age \geq 60 years (OR 2.42, 95%CI, 2.05-2.85) in the 8.6% of people who met the criteria for PTSD after flooding in Hunan in 1998 (73). Now, there is a considerable weight of opinion that both young and old age can be risk factors for PTSD.

Gender

Women have been found to have a higher risk for developing PTSD after a flood (see, for example, Huang et al.(72).) One study showed that female gender predicted stable, elevated PTSD levels throughout a 2 year period following Katrina (OR 4.45, 95% CI, 1.76-11.20) (50). Liu et al. (73) reported that, of 33,340 subjects in villages affected by the 1998 floods in Hunan, China, 8.6% had symptoms that met the diagnostic criteria for PTSD two years after the flood; one of the significant risk factors was female sex (OR1.12, 95%CI, 1.04-1.21). Feng et al. (71) found that women were more likely to have PTSD than males (10.2% females, 8.2% males (p<0.001) after the same flood.

On the other hand, Coker et al. (52) did not find that PTSD varied with gender. This might be because the research was conducted 2 weeks after Katrina hit land, in an evacuation centre, where stress levels would have been running high for everyone and a gender difference might not have arisen. In any case, two weeks is an interval that is insufficient for the diagnosis of PTSD to be made, and the authors of this report speculate about whether it is possible that the subjects of that research were distressed (the experiences of distress may be similar to those of PTSD) rather than having PTSD.

Amstadter et al. (74) did not find that gender was a significant risk factor for PTSD after Typhoon Xangsane in Vietnam. Men were diagnosed more frequently in a sample from Poland. However, this was probably explained by the fact that it was a sample with unusually low socioeconomic status, which could have acted as a confounding variable (67).

Socio-economic Status

Stepień et al. (67) assessed the incidence and course of PTSD 5 years after severe flooding of 4 villages in Poland in 1997. The sample consisted of 97 eyewitnesses of the flood who had never needed psychological care before the flood, and who had not experienced other major stressful events. Close to a two-fold higher level of PTSD was found in people who were unemployed compared to those who were not (39.2% vs. 21.7%). The majority of people who were found to have PTSD had only primary education (42.9% of 35 people who had had primary education, and 27.3% of 55 people who had had secondary education had PTSD). While these findings could be seen as anticipated, no statistical tests were reported in the paper and so we found it difficult to assess the status of these findings.

Huang et al. (72) also found that illiteracy gave a higher probable positive rate of 24.9% as compared with 3.1% for high school or higher and 8.0% for elementary school education.

4.5.5 Variables Relating to the Nature of the Flood

According to the literature, the characteristics of the floods have an impact on their differing effects on people's mental health. A number of separate studies have tested the association of a variety of risk factors relating to the nature of the flood with measures of mental health or ill health. The findings are outlined in this section.

Exposure to Flooding

High intensity scores for PTSD were concentrated among those people in the sample who reported that flooding in England and Wales was a physical and mentally traumatic event for them (84). Trauma, and the level of trauma, after flooding was significantly associated with the presence of the symptoms of PTSD, and could be used as a predictor of the intensity of PTSD symptoms that subjects experienced during the flood, independent of the time when PTSD assessment took place, whether at 3 months, 15 months or 3 years after the event (68). Strelau and Zawadzki (68) found that long-term consequences of trauma were a predictor of symptoms of PTSD, which suggests that stressors that occur after the flood could increase the intensity of people's experiences or PTSD symptoms.

Coker et al. (52) found that persons, in a sample of people in an evacuation shelter two weeks after Katrina, who were afraid that they would die in the flood or saw others injured or killed were more than twice as likely to report moderate to severe PTSD symptoms (OR 2.4, 95% CI, 1.0 - 6.2, p<0.05). If family or friends had died or had yet to return, PTSD symptoms were significantly higher (45). Dewaraja and Kawamura (75) also reported that witnessing the death of a child, elderly relative, neighbour or friend predicted significantly a diagnosis of PTSD. Galea et al. (53) reported that the hurricane related stressors of physical illness or injury (OR 2.8, 95%CI, 1.2-6.6) and physical adversity (OR 7.9, 95% CI, 3.2-19.7) are associated with increased odds of developing PTSD

symptoms. Being trapped, seriously injured, knowing someone who had been seriously injured, witnessing drowning, and whether the flood was the first one experienced all yielded higher rates of PTSD than for people who had not experienced these events (71).

Previous Exposure to Psychosocial Trauma

Acierno et al. (42) assessed 1,452 adults who were in the direct path of one or more hurricanes that occurred in 2004. Prevalence rates were: PTSD-General 3.6% (equating to 267,000 of 7.4m adults who lived in Florida). In this regard, the assessors used questions to establish the presence of disorder that was not necessarily specific to the hurricanes. The category PTSD-hurricane was specific to experiencing the hurricanes and the researchers found a prevalence of 1.4% (equivalent to 104,000 adults from the whole population). Bivariate analysis showed risk factors that are common across disorder type. One of them was previous exposure to traumatic stressors (p<0.05). Multivariate analysis showed previous exposure to PTSD stressors (direct experience accompanied by extreme fear, rather than exposure per se) was associated with PTSD and GAD. Displacement from home was associated with PTSD outcomes (OR 4.6 PTSD-general and 5.8 for PTSD hurricane). Amstadter et al. (74) found experience of a prior trauma was a significant risk factor for PTSD after Typhoon Xangsane in Vietnam (Bivariate analysis: OR 7.07, 95%CI, 2.06-4.33).

Continued Disrepair of People's Homes

Continued disrepair to people's homes predicted stable, elevated levels of PTSD throughout a 2 year period after Katrina (OR 2.71, 95% CI, 1.04-7.04) (50). Dewaraja and Kawamura (75) have also reported that experiencing the destruction of property beyond repair was significantly associated with a diagnosis of PTSD in 90 subjects who were affected by the Tsunami in 2004. Many of the tools or opportunistic questionnaires used to measure hurricane exposure include questions about the condition of property and so this variable may be included in assessing more general exposure to hurricanes.

Type of Flood

The type of flood has been considered in terms of its effect on health of people who live in China. We think that the results are interesting because they confirm that flash floods, which have more characteristics of an extreme event, have the greatest impact on estimates of the prevalence of PTSD as compared with estimates that were made after the collapse of an embankment and the slow-onset flood disaster, known as a _soak'. Huang et al.(72) and Feng et al. (71) conducted a cross-sectional survey in 2000, two years after flooding in Hunan, China in 1998. Flash floods induced the highest rate of PTSD (24.9%), followed by embankment collapse (12.9%) and then _soaked' 2.9% (p<0.001). Liu et al. (73) also conducted a study after the floods of 1998 and found a similar pattern in prevalence of PTSD, though at lower rates for flash flood (16.8%), collapsed embankment (10.4%) and at slightly higher for soaked (4.1%). The type of flood was also a significant risk factor for PTSD: collapsed embankment (OR 1.84,

95%CI, 1.64-2.05) and flash flood (OR 3.12, 95%CI, 2.76-3.52), in addition to the severity of the flood (intermediate OR 4.05, 95%CI, 3.55-4.62 and severe OR 2.98, 95%CI, 2.60-3.41).

4.5.6 Chronic Disease and/or Previous Mental Disorders and PTSD

Coker at al. (52) did not find the presence of chronic disease had a significant effect on level of PTSD symptoms suffered immediately after Hurricane Katrina, but PTSD symptom scores were found for those people who had used mental health medication prior to Hurricane Katrina (p<0.04). Amstadter et al. (74) found previous mental ill health, as measured by the Self-Reporting Questionnaire-20 (SRQ20) was a significant risk factor for PTSD after Typhoon Xangsane in Vietnam (Bivariate analysis: OR 4.21, 95%CI, 1.72-10.29).

Coker et al.'s study (52) was conducted within a month of the event. Therefore, it is difficult to assess the significance of the findings. This is because everyone affected by the event is likely to be affected by distress, and it is not until later that differences in personal adaptation and recovery lead to diagnoses of PTSD for some people, and to differences in estimates of the prevalence of PTSD. PTSD is not usually diagnosed appropriately in the vast majority of instances in the first month after a major incident. Generally, measurements of **___symptoms**' in the first month after an event are difficult to assess because the research may be measuring distress (for which the experiences are similar to PTSD symptoms). This is one of the important reasons why people's trajectories of response and recovery have more predictive power than do single measures of prevalence.

4.5.7 Personality Traits and PTSD

The research suggests that certain tempermental traits, such as perseverance and emotional reactivity (as measured by the Formal Characteristic of Behaviour-Temperament Inventory), augment the effect on people's mental health of them experiencing trauma. Endurance and briskness were positively correlated with the level of PTSD. Emotional reactivity was the best predictor of PTSD symptoms (68). Sprang and LaJoie (51) found that avoidant coping strategies are a partial mediator between exposure and development of PTSD. Pina et al. (46) also reported that youths' avoidant coping behaviours predicted PTSD and anxiety symptoms.

Kishore et al. (45) conducted a cross-sectional, web-based survey of members of New Orleans University one year after Katrina in which 364 adults participated. The university was flooded for over two weeks and 57% of participants suffered damage. Twenty-two per cent (22%) were classified as having symptomatic PTSD. Respondents who had injuries, or physical or psychological problems were more likely to experience PTSD symptoms. Community coping self-efficacy was not associated with PTSD, but greater coping self-efficacy was associated with fewer PTSD symptoms. Hazardous or harmful drinking and increased drug use resulted in a significantly increased likelihood of subjects experiencing PTSD symptoms. No baseline data were available for this study so the researchers were not able to determine changes from before the hurricane.

4.5.8 PTSD and Social Support

There is evidence that social support is strongly correlated with PTSD and mental health following a disaster. Good support can act as a protective factor against PTSD. Weems et al. (2;64) found that social support was negatively related to the brief symptom inventory score, suggesting that better social support acts as a protective factor against the mental health impacts of flooding and other disasters. Pina et al. (46) observed from the results for 46 youths that those young people who had extra-familial social support showed fewer symptoms of PTSD, depression and anxiety. A positive predictive relationship was found between availability of professional support and not developing PTSD.

There are many different forms and ways of measuring social support. PTSD was associated with total support (OR 0.8, 95% CI, 0.78-0.82), subjective support (OR 0.48, 95% CI, 0.44-0.52), and support utilisation (OR 0.53, 95% CI, 0.49-0.57) after the floods in Hunan, China in 1998 (71), although not with objective support.

Low availability of social support on the other hand can be a risk factor for PTSD. Acierno et al. (42) found from bivariate and multivariate analysis that low social support 6 months prior to a hurricane [3 aspects - emotional (someone to care for you), instrumental (someone to help) and appraisal (someone to give advice)] was a risk factor for PTSD (OR 7.92, 95%CI, and 1.54-40.63 for hurricane-PTSD).

Norris et al.(96) have reported that three elements of social support act to protect people who are affected by disasters from vulnerability to mental disorders (received support, perceived support and social embeddedness). In a later review, Norris et al. (70) assessed the destruction of social support after the devastating Mexican floods and landslides that occurred in 1999. This assessment of social support in two sample populations in two cities showed that where there was less support, a noticeable decrease in perceived support and social embeddedness was observed. The researchers showed, for people who were in the city in which the most reduction in social support was identified, vulnerability was also associated with gender: women were more at risk as were people who had low levels of education levels.

4.5.9 The Consequences of PTSD

Two hundred and five (205) women from areas that were flooded by the Mississippi River in 1993 were assessed over a 4-month period, starting approximately 6 months after the end of the flood. The researchers looked at the interrelationship between PTSD symptoms, relationship adjustment, and aggression as well as the effects on family life of having PTSD (81). The subjects were interviewed for symptoms of PTSD, which the researchers found were associated with higher physical and psychological aggression

victimisation, poorer relationship adjustment, and higher perpetration of physical and psychological aggression. Not many studies focus on the wider consequences of having PTSD for people who are suffering, and for people with whom they interact closely, and especially so after flooding.

4.5.10 Children and Young People and PTSD

Research has not always found that variables relating to exposure have significance for which children are more likely to develop PTSD, despite their being such strong and consistent predictors in adults.

Terranova et al. (65) assessed 152 children aged 13-15 years for PTSD using a self-report questionnaire at 1.5 months and then, a second time, at 8 months after Katrina. The intention was to examine psychosocial and behavioural factors that are involved in the course of PTSD symptoms. Hurricane exposure, fear, and negative coping style (defined by externalizing, internalizing, and avoidant coping efforts) were all significantly associated (p<0.001) with more severe PTSD symptoms at Time 1. At Time 2, young people who had experienced higher prevalence of PTSD at Time 1 also experienced more severe PTSD symptoms. Peer victimisation added to the prediction of severity of PTSD symptoms at Time 2 (p<0.001).

Terranova et al. (65) found that fear did not predict PTSD and this differs from the findings of Weems et al. (64) and Hensley and Varela (43) who found that anxiety and other forms of negative affectivity did predict PTSD symptoms. This suggests that fear could be associated with severe immediate symptoms of PTSD (which the authors of this report prefer to call distress rather than implying a diagnosis until at least 28 days have elapsed after the index event, unless, that is, there are overwhelming clinical reasons for diagnosing PTSD), but that it may not continue to have a great impact on the course of PTSD symptoms.

Hensley and Varela (43) assessed 302 children aged 10 to 15 years for somatic complaints (negative social, emotional and academic consequences) in addition to PTSD symptoms at 5 to 8 months after Katrina. Twenty-four point five per cent (24.5%) of children had moderate PTSD symptoms, 10.3% had severe, and 2.3% had very severe PTSD symptoms. The somatic symptoms that were reported most commonly were headaches, nausea and stomach upset. Trait anxiety was significantly associated with PTSD above and beyond exposure to the hurricane, as was found by Weems et al. (64). Anxiety sensitivity explained 6% more variance in PTSD symptoms than did exposure and trait anxiety.

Weems et al. (64) found that child trait anxiety² (97) before a disaster and negative affect predicted disaster-related post-traumatic stress symptoms and generalised anxiety disorder symptoms, even when hurricane exposure was controlled (p<0.05). Fifty-two (52) children and young people with an average

² The State–Trait Anxiety Inventory for Children-Trait version (STAIC–T) is a 20-item self report instrument that was designed to measure relatively stable individual differences in the tendency to experience anxiety states

age of 11 years and who were registered in New Orleans were interviewed 17 months before Hurricane Katrina and 6 to 7 months after the hurricane. This research found that PTSD symptoms were predicted by the number of hurricanes to which the subjects had been exposed and by being female (p<0.01).

Formally provided social support acts as a protective factor against PTSD for children and young people as it does for adults. Terranova et al. (65) added to the body of evidence about the prolonged time that PTSD symptoms can remain at a high level despite the original predicting factors losing significant association. This is important as it highlights that other factors (which we call secondary stressors) may keep PTSD symptoms at a high level after the effects of the initial event (which we call the primary stressor) have subsided. One source of secondary stress may include the characteristics of individual persons.
KEY MESSAGES FROM REVIEWED LITERATURE ABOUT PTSD

- 1. There are discrepancies and differences in the definition criteria used to diagnose PTSD between the two main classification systems (ICD-10 and DSM-IV) used in the literature which makes studies difficult to compare.
- 2. Methodological issues in studies, such as different screening and measurement tools or the time of assessment of PTSD symptoms after the index event, result in a wide estimated range of the prevalence of PTSD, from 2.6% to as high as 50.5%.
- 3. Some studies show a long term chronic high prevalence of PTSD even years after the event, but differences in study methodology result in conflicting results and prevalence estimates.
- 4. PTSD is often diagnosed through self-completed questionnaires rather than by clinical interview, and therefore the prevalence of PTSD may be overestimated because normal anxiety and distress after an extreme event is being wrongly diagnosed as PTSD.
- 5. Those particularly vulnerable to a high prevalence and ongoing symptoms of PTSD after a flooding event include children, evacuees, those already ill, pregnant females and minority groups; however, it should be noted that there are relatively few studies of PTSD and high risk groups and methodological issues make it difficult to compare these to studies of the general population.
- 6. A variety of variables predict the risk of developing PTSD after a flooding event. These include demographic factors (female, young and old age, low income and low education) and stressors both at the time of the event (severe physical injury to self or others, fear of dying or witnessing others die, being trapped, previous experience of a flood or traumatic event) and secondary stressors in the long term (continued disrepair of housing, displacement, low levels of social support).
- 7. There is little known about the consequences of having PTSD.

Chapter 5 - Discussion

5.1 INTRODUCTION

5.2 PSYCHOSOCIAL EXPERIENCES, DISTRESS AND MENTAL HEALTH

5.3 COMPLEXITIES, LIMITATIONS AND PRAGMATIC APPROACHES TO RESEARCH AND PRACTICE

5.4 MENTAL DISORDERS

5.4.1 General findings from the research reviewed in this report

5.4.2 Post-traumatic stress disorder

5.5 THE IMPACTS OF DISASTERS, INCLUDING FLOODING ON CHILDREN AND YOUNG PEOPLE, AND OLDER PEOPLE

5.5.1 Children and young people

5.5.2 Older people

5.6 GUIDANCE ON DESIGNING AND DELIVERING RESPONSES TO THE PSYCHOSOCIAL AND MENTAL HEALTH NEEDS OF PEOPLE WHO ARE AFFECTED BY FLOODING

5.1 INTRODUCTION

As part of the work to underpin development of the New Horizons policy, the Department of Health for England asked the Health Protection Agency in England to research systematically what is known about the psychosocial and mental health impacts of flooding, synthesise best practice on their mitigation and identify where research can support future evidence-based guidance. The result is this report.

The authors' first finding is that the effects of flooding and disasters on people's health can be extensive, prolonged, and significant. People's psychosocial needs, and the mental disorders that they might develop as a consequence of their being flooded, pose core challenges for public health.

However, the social, welfare, public health, psychosocial, public mental health, and mental health impacts of flooding can be complicated. This is because, usually, they are interwoven. Disasters cause stress and evoke powerful feelings. They impact on people's feelings of safety and capacity for coping with the events and with their consequences. This creates a web of health, social, relationship and welfare effects that is not only complicated but, also complex because disasters involve people's experiences, feelings and relationships. This situation frames the HPA's second core finding.

This interweaving of stressors resulting from flooding with people's experiences, personal responses and social responsibilities, and the financial consequences for them also presents great challenges to researchers who wish to find answers to what might appear, at first sight, to be straightforward questions.

The authors of his report have experienced those challenges in conducting the meta review that they report here and when they analysed the many findings from research studies that can be difficult to compare for important methodological reasons. This experience suggests that achieving results risks separating effects that are inter-related. Their conclusion, or third core finding, is that there remains considerable work to do to understand the how the webs of interconnection operate.

At their centre of each web are people who may have suffered grievously in many ways. Yet, it is also clear that people have remarkable psychosocial resilience. Without their resilience, the toll on people, families, communities and nations would be so much greater and it does give cause for hope. This is the fourth key finding from this review.

While a study of psychosocial resilience is not the subject of this review, readers who wish to pursue better understanding of that topic are referred to the relevant sections in the guidance from NATO/EAPC and the Department of Health (13;18). Both of those organisations take resilient responses to be the anticipated ones, but both of their guidance documents advise that psychosocial resilience cannot and should not be assumed and services are required to assist people to develop and sustain their resilience. In other words, the advice international responsible agencies give is that universal public mental health advice and services that target people who are most at risk are required in addition to services that are able to respond to the needs of people who develop ill health as a result of their exposure to being flooded.

Much of the volume of the research considered in this report concerns the relationships between flooding and the risks of people developing the symptoms of a variety of mental disorders. Furthermore, the focus of this document on studies in the literature of people who develop the symptoms of PTSD reflects the preponderance of the literature.

But, as the research reported herein and this discussion show, understanding the context in which people find themselves before and after flooding is particularly important both in respect of differentiating distress from mental disorders and in respect of understanding the impacts of flooding on people who are affected. The lecture given by Professor Maj in June 2011 (see below) (98) and the report from the University of Lancaster (33) both substantiate this position.

This discussion begins by providing a commentary on what the HPA has learned about the psychosocial effects of flooding on affected people. That is followed by consideration of the mental disorders that are covered in the literature in sections that relate to the complexities and limitations revealed by the HPA's literature review. The discussion addresses the meaning of people developing the symptoms of post-traumatic stress disorder and it offers a commentary on the research relating to children, young people and older.

The aims and objectives for this report go further than conducting a review of the peer-reviewed literature. They also require the HPA to identify guidance that

should assist policymakers, planners, designers of services and practitioners to work to mitigate the potential and actual effects of flooding on people who are affected. Therefore, towards the end of this chapter, the authors comment on the guidance material that they summarised in the annexes to this report.

5.2 PSYCHOSOCIAL EXPERIENCES, DISTRESS AND MENTAL HEALTH

It is clear that bereavement, and welfare and psychosocial problems are rife in the immediate aftermath of any disaster, including, especially, flooding. Its effects on people's lives may be short-, medium- and long-term and are, all-tooeasily, aggravated by people's fears of recurrence and, particularly, by the ways in which other people and agencies respond. Depending on the actions that people take to provide psychosocial support and to promote recovery of people's homes, relationships, jobs, optimism for the future, and agency, the stress may be short or prolonged and, in the worst instances, sometimes so for many years.

In this regard, the research undertaken by Whittle et al. provides a striking account of how a sample of people in Hull experienced the extensive flooding there in 2007; refer to chapter 2 for a more substantial summary. Their report showed "... that it is often not so much the floods themselves, but what comes afterwards, that people find so difficult to deal with." Their research undertook "... a real-time longitudinal study to document and understand the everyday experiences of individuals following the floods of June 2007 in interaction with networks of actors and organisations, strategies of institutional support and investment in the built environment and infrastructure."

Whittle et al. provide a picture of people's experiences and document the recovery processes and in so going identify a *-recovery gap*." They say that, *-This gap emerges during the longer process of recovery at the point where the legally-defined contingency arrangements provided to the community by its local authority diminish and where the less well-defined services provided by the private sector (e.g. insurance, builders, etc.) start. The nature of the gap means that residents receive little effective support during this time. As a result, they must step in to coordinate the actions of the different private and public sector organizations involved. Such project management is challenging, time-consuming and stressful"(33).*

It is clear that flooding is very stressful and that the stress continues for a long time after the water has receded. Flooding affects people of all ages and it can herald: bereavement; huge economic problems for families; behaviour problems among children; increased substance use and/or misuse; increased domestic violence; as well as exacerbating, precipitating or provoking people's problems with their mental health.

In general, psychosocial distress occurs when a person's natural coping threshold is challenged. It is widespread and enormously frequent after disasters of all kinds. Reviews conducted by the authors show that, often, people's experiences, which reflect the personal and social meanings of the

event for them, and the understandings and meaning they derive from it, have more influence on the psychosocial impact of the event than the event itself.

These are all important points. Given the enormity of the stress that flooding causes and the frequency and length or persistence of secondary stressors that arise while people endeavour to recover, it is hardly surprising that people who are affected by flooding experience strong feelings over substantial periods of time. This is a position that is substantiated by Whittle et al.; they say that people's recovery after being flooded flood is about them rebuilding a sense of home and community as they adapt to new and altered circumstances.

Thus, recovery from distress after disasters including flooding is characterised by adaptation to circumstances that have changed and rebuilding rather than hoping that the situation will return exactly to that which existed before the flooding occurred. Masten, for example, points out that resilience is a process that reflects natural human adaptation (99). People may, then, experience distress as a consequence of the enormity of the events that have affected them and as they adapt to and deal with the impact of those events. The authors of this report observe that people being distressed for a period of time (in the case of flooding that time may be drawn out) is not pathological in itself, and that they may experience intense feelings while also behaving in resilient ways.

Furthermore, the wider literature shows that the experiences of people who are distressed in the aftermath of all disasters including floods, are not always easy to distinguish from the symptoms of common mental disorders (NB: the authors avoid using the term _symptom' for such common experiences). The authors of this review are aware of the potential for confusion between: the effects of stress that amount to distress; problems with mental health; and developing a mental disorder. The thresholds between what might be considered a common or anticipated response to an extreme event and what is indicative of a person developing a disorder are difficult to define. Much turns on the severity, duration and impacts of these experiences on people's lives when it comes to differentiating distress and disorders.

In summary, the authors are aware that many people experience distress that may be relatively transient after all natures of disaster and that being distressed is not antithetical to people also being resilient. This is one of the reasons why NICE (100) recommended allowing a period of one month before deciding whether or not a person's experiences may reflect a mental disorder. Evidently, there is a balance to strike between providing services to assist people to remain resilient and to help them in their recovery, adaptation, and rebuilding after what has happened to them, and delivering mental healthcare. Put another way, it is not necessarily helpful to consider that every person who has experiences that might be symptomatic of a mental disorder does have a disorder that requires specialised mental healthcare.

On the other hand, the research that the HPA has surveyed for this report also indicates the substantially raised incidences and prevalences of mental disorders after flooding and how long disorders may persist. This stresses the importance of planning for and providing effective and timely clinical responses.

Often, recognising the narratives of people's experiences is key to making this differentiation and, therefore, to understanding and responding appropriately to their needs. As Whittle et al. show, this is particularly pertinent in the case of flooding because not only their research but the wider literature shows how long the recovery phase may be and the extensive nature of the secondary stressors that emerge while people endeavour to rebuild their lives, homes and workplaces and adapt to circumstances that may not return to how they were prior to the flood.

This situation also creates very broad challenges for researchers, reviewers, planners and practitioners. This is complicated further by the evaluative nature of many diagnoses in the mental health arena and the lack of firm or _____old standard' criteria for caseness. The authors direct readers' attention to Chapter 1 and Chapter 4 for their summary of the methodological difficulties and confounding matters that arise in this regard.

Together, these observations and findings also explain, at least in part, why some people people appear to be more vulnerable than do others. If people's lives are stretching (perhaps, for example, because they have chronic disease, are carers, or they depend on other people, as do children and some older people), their abilities to cope with an extra event may be too much for them. Again, this reinforces the importance of people's narratives and contexts to determining what should be the pragmatic and effective responses from public services.

5.3 Complexities, Limitations and Pragmatic Approaches to Research and

Practice

In the course of its searches for, and scrutiny of the papers in the literature and the published guidance, it became apparent to the HPA that there are a number of complexities and limitations that exist in the research that has been conducted. They pose challenges to analysis of the impacts of flooding on people's mental health. The complexities include:

- The lack of universally agreed statements about the definitions used when researching disasters and about how people use different terms to describe people's experiences, responses and mental disorders and the same terms to mean different things;
- The wide variety of methodologies that are used across the various studies that the HPA has scrutinised;
- The broad range of mental disorders that are described and assessed in the literature;
- Diversity in the co-variants that different researchers have assessed;
- The use of a wide variety of different diagnostic measurement tools; and

• Complexity when classifying the nature of each flood and population that was exposed to it.

In the text, the authors have identified other matters that limit current understanding of the extent of the impacts of disasters, including flooding, on the mental health of populations of people who are affected. They include, first, the difficulty of distinguishing distress from disorder given the common nature of people's experiences after major incidents and disasters and the symptoms of mental disorders, including depression and PTSD. A second limitation arises from the challenges to the methodologies used in research if it is to establish associations between people being involved in disasters, such as flooding, and them subsequently developing a mental disorder. This discussion deals with the first matter in a little more depth here and the second in the section on PTSD.

In his address to the International Congress of the Royal College of Psychiatrists in June 2011, Maj (who is President of the World Psychiatric Association) drew attention to the nature of diagnosis (98). He quoted Kutchins and Kirk (101) who have opined that deciding when common experiences, such as sadness, are symptoms of a disorder requires boundaries to be set that are substantially arbitrary or evaluative. He also pointed to the work of Horwitz and Wakefield (102) and Regier et al. (103). The former have observed that the DSM definitions of certain disorders fail to exclude the feelings that humans experience naturally when they respond to major events such as bereavement and other losses (102). Additionally, Regier et al. have opined that it is reasonable to suppose that some syndromes in community populations of people may represent transient responses to internal or external stimuli that do not represent pathological disorders (103). These are points that are similar to those made by the authors in the previous section in this chapter. They summarise the problem of separating distress from disorder when considering people's responses to flooding.

As readers have seen, the challenges are made more substantial in the case of flooding by the high frequency of secondary stressors (such as people's experiences with restoring their houses and in relation to insurance companies), which serve to sustain strain and distress. In this report, the authors urge researchers, planners and clinicians to consider the trajectories of people's responses over time and their relationships with events in people's lives. Maj calls this the <u>contextual approach (98).</u>

Maj also draws attention to the qualitative approach, which implies that there may be qualitative and subjective differences between people's common experiences and apparently similar experiences when their feelings are the symptoms of disorders.

Maj's pragmatic approach to diagnosis combines lessons from the contextual and qualitative approaches. But, that is hard to achieve if questionnaires are used alone and unless clinicians are employed to explore people's narratives and the nature of their experiences. Thus, the authors of this report believe that establishing caseness' on the basis of using self-report questionnaires alone is

limited in the absence of opportunities for researchers and/or clinicians to explore matters more widely.

In addition, the methodological challenges faced by researchers is transmitted to the HPA in presenting a coherent picture of the relationship of people experiencing flooding with them developing mental disorders later. Necessarily, what the authors report here is a product of the literature. There is, relatively, less research on the broad scope of the psychosocial effects of flooding. As a result, the authors have focused on people who may require mental health services because they develop the symptoms of diagnosable mental disorders.

5.4 Mental Disorders

5.4.1 The general findings from the research reviewed in this report

Despite the methodological limitations, the authors of this report are able to draw certain conclusions. Their core conclusion is that people's psychosocial needs, and the mental disorders that they might develop as a consequence of their being flooded, pose core challenges for public health.

The studies analysed in this review illustrate the great impacts that flooding can have on mental health and the importance of evidence-based guidance on the factors that could influence the course of an illness as valuable resources for developing tools to minimise the mental health impacts of flooding.

Only one study has reported data on suicides and suicide ideation (86), but the authors are unable to comment on whether or not the results reflect a bias in research preference, or whether or not flooding does have a low impact on the occurrence of suicide.

Depression is a diagnosis that is under-represented in the published data. This could reflect the nature of the diagnostic measurement tools that are available, and/or the difficulty of distinguishing depression from other mental disorders, and/or research bias.

The HPA found that the focus in the literature is on PTSD. While that is valuable, it is also accompanied by relative neglect of the crucial wider morbidity that is always found in all populations, including after disasters. As a result, PTSD occupies a prominent position in this review because of the volume of papers on it in comparison with papers that consider the wider range of psychiatric diagnoses and because there are general lessons that can be drawn from research on PTSD. However, this review found that other mental disorders are of consequence as well, and public health considerations must include them.

The HPA's scrutiny suggests that risk factors and co-variants do not a have a constant association with poorer mental health across all the studies. The authors think that this is due, partly, to methodological differences and partly to the unique characteristics of each flood. However, as in studies of general

populations, gender, age, socio-economic status, and exposure level to the event were generally associated with mental ill health.

The situation is complicated. Research studies, which have assessed a sample population of flood victims for more than one disorder, found that not all the risk factors were the same for the differing disorders. This is important, practical knowledge if planners and practitioners are to develop better understanding about what they can expect to be the range of prevalence for each disorder after flooding.

Furthermore, there are many risk factors that have been established for each mental disorder, but their predicting factors also vary across populations, between Vietnam, Mexico, the UK and so on. This suggests that there are important personal, community, population, and societal differences, which underlie people's responses to and mental health after disasters. While, for example, the risk factors that have been established within European countries remain predominantly the same (gender, age, exposure to flooding, etc.), it can be the social context within which the flood occurred and which also impacts on the aftermath of the flood that produces varied risk factors between populations that have an impact on the severity and longevity of people's psychosocial distress, or whether or not they develop mental disorders. Therefore, the authors conclude that the evidence that links each disorder with the range of potential risk factors is not yet sufficiently coordinated to allow the HPA to express a coherent picture.

As the authors observe, the preponderance of the research that the HPA reviewed has focused on PTSD and so the discussion considers next what this review has shown about people who attract that diagnosis.

5.4.2 POST-TRAUMATIC STRESS DISORDER

Definitions

PTSD has two overlapping, but not identical, definitions, sets of criteria and spellings (as in DSM-IVR and ICD-10) (15;16). PTSD is often considered separately from other mental health conditions and needs in research studies and as a dominant mental disorder after disasters.

The Challenges for Research and Practice when Diagnosing PTSD

The authors recognise the challenges that are faced by researchers and practitioners in screening large numbers of people for possible mental disorders after major incidents and disasters that include flooding. Many research studies are based on using questionnaires to identify people who have <u>PTSD</u> symptoms.' Having PTSD symptoms does not necessarily indicate that people have confirmed diagnoses of PTSD because PTSD is, essentially, a clinical diagnosis. Using self-report scales alone, which rate symptoms, does not necessarily allow researchers to make reliable diagnoses. This makes comparisons difficult of the findings from different studies. It may also make it

difficult to decide who requires general support and who should be referred for more substantial specialist mental healthcare.

As regards clinical practice, the trajectory of people's responses over time, the severity of their suffering, and its association or otherwise with dysfunction are important discriminators. However, so far, rather few research studies have considered in detail the nature and effects of people's dysfunction or acquired disability, or reviewed their trajectories of response and/or recovery.

Freedy et al. (104) point out that screening tests must meet criteria for clinical utility and that key points in deciding on clinical utility include: 1) the test must identify a harmful condition; 2) the condition must be prevalent; 3) early detection through screening should lead to improved outcomes; and 4) effective, efficient and practical screening tools exist. Freedy et al. provide an assessment, based on the literature to which they refer, of the extent to which the position for PTSD meets these criteria. Their assessment is essentially positive. The view of the authors of this report is that further research is required to more substantially support the third and fourth points above.

Freedy et al. report research on a sample of adult persons who attended primary healthcare services. They used experienced telephone interviewers to assess their subjects using the CAPS diagnostic interview and the findings from these interviews provided their gold standard for PTSD. The researchers compared the results with findings from four PTSD screening tests. Four hundred and eleven (411) adults (17.5% men and 82.5% women) completed the study. The researchers found a high prevalence of PTSD in the past month (32.1% for women and 20.0% for men). They observe that this is a relatively high figure as compared with other studies of civilian populations though their figures lie within the range found in other studies conducted with primary care samples. Also, they found a substantial overlap with depression (in 76.5%).

A key point is that, while this research is not of people who were randomly selected from a general population, it does show high rates of PTSD for the month prior to the interview in a sample of people who were not selected because of their exposure to a major incident or disaster.

These figures remind us that it is important to compare the prevalence figures after major incidents and disasters with prevalence estimates gained by comparable methods prior to events. In other words, if research of general populations shows that PTSD is common in samples of people who were not selected for their involvement in major incidents or disasters, such as flooding, then the background figures must be taken into account when assessing the impacts of untoward events. The authors of this report observe that many studies do not provide data about prevalence estimates of comparable populations prior to flooding.

In summary, measurement of estimates of the prevalence of PTSD is dependent upon the characteristics of the sample population and its connection to the event in terms of time and place and pre-event life situations. The estimate is also subject to the measurement tool used, the methodology of the research, and the thresholds taken to indicate that subjects might have PTSD. The authors think that this explains why they found such a range of PTSD prevalence estimates, and, also, why it is difficult to compare studies' findings on the severity and impact of events on mental health.

These are also the reasons why the authors have advocated taking Maj's pragmatic approach (98) to clinical practice after major incidents and disasters, and, particularly, when diagnosing mental disorders.

Single and Compound Events

The floods that followed Hurricane Katrina were caused by the wind collapsing the levees. In other words, flooding was combined with the force of the wind. This combination was the second most frequent risk factor for PTSD in China. It might explain the high estimates of prevalence of PTSD in the research that the HPA reviewed.

Indeed, a substantial volume of research is not on single events, but on the effects of compound disasters. To this we should add our opinion that the past distinction between <u>ratural</u> and <u>human made</u> disasters is less substantial than it was because, frequently, natural events lead on to failures in human engineering from which at least some of the impact derives. Furthermore, most of the floods that have been the subject of the studies that the HPA considered for this report have been fast onset, flash floods, so the findings might have been skewed by the type of flood.

Findings from the research on PTSD that is reviewed in this report

Despite these reservations, there are some findings about PTSD that emerge clearly from this review of the literature. First, the papers that the HPA considered build on the evidence that indicates that the prevalence of PTSD does not necessarily decline over time or as quickly as previously thought, and, moreover, that the severity does not reduce as rapidly either.

These findings are important for planners and practitioners as they suggest that, regardless of the event, the prevalence of PTSD may increase with time since the index event, and, given the evidence reported herein, the greater the disaster, the greater the potential impacts on mental health. Therefore, the authors believe that the initial psychosocial emergency response for a substantial proportion of people who are affected by events (which many reports agree should be based on the principles of psychological first aid) should run seamlessly into more specialised mental healthcare for a smaller minority of affected people and then evolve into long-term care for a smaller proportion of people as people adapt and the recovery effort occurs. In other words, there is evidence to suggest that a recovery gap should not be allowed to occur when planning responses to people's psychosocial needs and their requirements for mental health services after flooding.

The longitudinal studies illustrate that it is very difficult to ensure that, when PTSD symptoms are measured, they are attributable to the event in question.

This applies to studies that have examined the association between an event that occurred several years before and consequential ill health. However, what causes PTSD symptoms, or PTSD, if diagnosed, and whether or not the event itself, or subsequent stressors that are secondary to the actual event are the cause is debatable and remain matters for further research.

However, the public mental health perspective is that assessing people's needs and offering them interventions to assist them by meeting their needs are the core focus regardless of the theories of association and causality. Thus, the authors advocate a needs-led rather than a diagnosis-specific approach. Furthermore, whatever the power of the present scientific evidence, qualitative research, such as that conducted by Whittle et al.(33), should remind planners, public health experts and practitioners of the substantial potential impacts of secondary stressors. It is clear from the context that, without relief from them, affected people may continue to be subject to distress and exposed to stress and strain that may precipitate or provoke mental disorders later or maintain their mental ill health.

Another key finding is that the demographic variables that are considered in the literature as risk factors for PTSD confirm previous opinions that children and young people, older people, women, people who have lower education attainments, and people of lower socio-economic levels are more vulnerable. However, some studies have reported no significant differences and others suggest that some men were more at risk. The lessons for planners and practitioners suggest that the toll from PTSD affects everyone and policy should be wide-reaching and that it should not focus solely on specific groups of people.

The body of empirical research on the prevalence of PTSD in minority and vulnerable groups is thin, but existing evidence suggests that immigrant and underrepresented populations suffer more than average (see Norris & Alegría, 2005 for a review) (105).

A consistent finding across many studies is that people's level of exposure to the event and their earlier exposures to other traumatic experiences are strongly associated with PTSD. However, in the context in which there are similar inconsistencies between event-exposure measures as there are for mental health measures, it is difficult to understand the associations because there are no generic levels of exposure: __severe' in one paper may be considered _moderate' in another. Therefore, it is difficult to draw reliable and meaningful comparisons between the studies. Furthermore, not all measures used in the many studies, appear to have been validated. The finding of the HPA is that some items have been measured by using questions that were drafted by particular researchers for particular purposes.

A considerable amount of research has been conducted into the variables that relate to social support and human character traits in order to assess their relationships with risk of, and protection from PTSD. Again, there were few similarities across studies between research approaches, variables assessed, and the measures used. Nonetheless, there is a clear message; lower

likelihoods of developing PTSD are associated with availability of adequate social support (whether informal, familial and state or NGO provided support). People's perceptions of whether or not social support was available to them appear to be of particular importance.

The attributes that characterise effective social support are more difficult to unfurl, but, it appears that people's ways of coping and managing their feelings have an association with their risk of developing PTSD.

The notion of collective psychosocial resilience is new and it has yet to feature directly in a great deal of research on the mental health aspects of disasters. We think that this notion deserves greater emphasis in future research because so few people are affected alone in major events such as flooding, because of the evidence on the important of social support to outcome, and because people prefer to receive support from their families and people whom they know.

In the meanwhile, the authors' opinion is that it is most important that the public health measures that are put in place after disasters include consideration of the social as well as psychological impacts from the event, and especially because evidence suggests that the former can act as protective factors against negative psychological impacts from the disaster. Hence, the term _psychosocial' is growing in its popularity and usage internationally.

Here, this discussion returns to its starting point which is that of recognising the importance of providing effective psychosocial care for most people who are affected by disasters in ways that link seamlessly into effective and timely mental healthcare for people who develop or are at great risk of developing mental disorders. The psychosocial approach is now a mainstream component of planning for all disasters. The authors advise that plans should be made o support everyone who is involved in a flood whether or not they develop a mental disorder. One component of the approach is psychological first aid. In 2011, the World Health Organization, the War Trauma Foundation, and World Vision International have published *Psychological first aid*: Guide for field workers (106).

5.5 The impacts of disasters, including flooding on children and young people,

and older people

There has been debate over an extended period in the last 50 years about whether or not children and young people are less, more or similarly affected psychosocially by disasters as compared with adults of working age and uncertainty about whether young people are more or less vulnerable to developing psychiatric disorders as a consequence of their exposure. There have been similar discussions about the vulnerability of older people.

5.5.1 Children and Young People

The lack of studies which have investigated the impact of flooding on the mental health of children and young people is of great concern. This is especially the case given the context, which is that several decades ago, some authorities held the opinion that children of pre-school age are less vulnerable than are older children and adolescents. More recently, opinions have been expressed with increasing power to suggest that children are more vulnerable than are adults. Much of the research that is reported here estimates the prevalence of disorders as higher than for adults though that is not consistently the case.

Thus, a degree of uncertainty still exists. The authors of this report believe that this situation is not helped by a paucity of high quality research involving children and young people and is fuelled by the limitations of many research projects that they have covered in this report.

The NATO/EAPC guidance says, —... while children are remarkably resilient to traumatic events, they are also ... highly vulnerable. This apparent paradox relates to children being ... even if they are personally resilient ... dependent on adults who may be injured, killed, pre-occupied with coping with events or forcibly separated from their children".

In the light of the evidence as it was in 2008, the authors of the NATO/EAPC guidance concluded, -While children and young people have been shown to be remarkably resilient in the face of disasters and major incidents, the literature and experience also highlight the huge impacts of major incidents and disasters of all kinds on vulnerable groups that include children and young people and older people. This reflects their dependency on the care afforded by others whose own thoughts, feelings, optimism, health and resilience may be compromised. Regarding children and young people in particular, there is the added concern of the psychological significance of events on their development". Children and young people " ... can be readily affected by ... their parent's, caretaker's and teacher's own experiences of disaster and their capacities for coping. Children and young people are also burdened by the care they feel for their parents and other close family members and friends". Thus, "Children and young people are particularly vulnerable to the indirect effects of major incidents of all kinds and that their development may be affected and this may have long- and very long-term consequences".

"Put in other words, children's vulnerability depends on a complex mixture of personal and circumstantial variables. They include their personal resilience, whether or not they have been affected by trauma previously, the direct and indirect effects, the burden that falls on their parents or caretakers, their age, level of development, their capabilities for forming attachments and the nature of the psychosocial support and parenting available to them as well as any lasting effects on their development" (18).

Since the literature review that was conducted for NATO in 2008 and the HPA completed its main review of the literature on flooding in 2011, several papers have been published on the topic of children's resilience and vulnerability to

trauma. While the stressor was not flooding, the authors think that they support the position taken by NATO and suggest that the differential vulnerability of children and young people may relate to changes in the quality of their parenting consequent of their parents involvement in events.

Lieberman's editorial (107) is based on research conducted by Feldman and Vengrober (108) on Israeli children who were exposed to recurrent war-related trauma. She points to findings that mothers of war-exposed children with PTSD were less well educated, and had less family support than mothers of children who did not have PTSD.

Another paper on the impacts of Hurricane Katrina showed that lack of knowledge of a child's safety was a significant predictor of mothers' greater distress or posttraumatic stress after controlling for demographic variables, distress before the disaster evacuation and bereavement (109).

Feldman and Vengrober's (108) study replicates findings which indicate that maternal well-being affects the quality of their caregiving, and that both factors may, separately or in interaction, protect or intensify the negative effects of trauma on children. Both of these studies provides —... a powerful reminder of the intricate relational processes between children and their ... " parents.

The research that the HPA reviewed indicates that children and young people who have good support from their parents and schools fair better, which suggests that not all children need necessarily be vulnerable. The authors recommend that, while public health action should focus on the more vulnerable children, it should also focus on developing universal services to better protect all children and young people.

5.5.2 Older People

While the volume of research on the differential vulnerability of older people to disasters is limited, there is some evidence about how older people respond. Past research has also found that older adults who were inundated by flooding have increased levels of depressive, anxiety and somatic symptoms 18 months afterwards and that the major impact of a hurricane on older adults diminished in about 16 months. However, there are a variety of results; for example, in some studies, men, people of lower occupational status, and people aged 55 to 64 appear to be at greater risk of psychological symptoms after flooding.

Older people are particularly vulnerable to physical danger and injury. About 80% of older adults have at least one chronic condition that makes them more vulnerable than healthy people during a disaster or major incident. Chronic conditions, especially when they are combined with the physiological, sensory, and cognitive changes experienced as part of aging processes, often result in frail older adults having special needs during emergencies. There is evidence that frail older people who live alone or in long-term care settings are particularly vulnerable to emergencies due to their complex needs. Again, these findings convey the intricate inter-relatedness of risk factors and this, in turn,

emphasises that planning and coordination are essential to meet people's needs.

5.6 GUIDANCE ON DESIGNING AND DELIVERING RESPONSES TO THE PSYCHOSOCIAL AND MENTAL HEALTH NEEDS OF PEOPLE WHO ARE AFFECTED BY FLOODING

The guidance material that the HPA has reviewed was identified from contributions made by informants; it includes recent governmental guidance. These documents are introduced in Chapter 1 with reference to the strategic stepped model of care that is common to the guidance issued by NATO/EAPC (18) and the policies and guidance published by the Department of Health (13) as a part of its suite of guidance on emergency planning. The latter applies as much to the psychosocial and mental health effects of flooding as it does to other emergencies.

In 2011, Atkins and Frazier (110) proposed a paradigm shift in mental health research, practice, and training to develop services that are comprehensive, readily accessible, and relevant to a broad range of people's mental health needs and capacities. There is similarity of the approach that they advocate for the USA to that which the current cross-government mental health strategy, *No health without mental health (11),* identifies for the UK in calling for combined and coordinated public health, primary care and specialist mental health service approaches to tackling the mental health agenda.

Atkins and Frazier describe the case for a public health framework and a threetiered approach to —... address the persistent barriers to accessible and effective mental health services … ". They advocate a model of universal mental health promotion that is intended to reduce the risks of communities of people developing mental health problems. Their second tier is targeted interventions for both communities and clinical groups that are intended to prioritise care for people who are at high risk by outreach, screening and service provision. Together, the universal and targeted services are intended to reduce the prevalence of mental disorders. The third tier is provision of more intensive mental health services for people whose needs for mental healthcare warrant more extensive treatment.

The strategic stepped model of care for people who are affected by disasters, including floods, that is advocated by the Department of Health is designed around these same three tiers. It integrates a needs-led public mental health approach to: 1) planning for the requirement to deliver psychosocial and mental health care services after disasters while also taking steps to improve communities' psychosocial resilience (universal psychosocial responses); with 2) providing support for people who are distressed through services that are based on the concepts of psychological first aid (targeted responses) while also 3) offering primary and secondary mental health services to people who may have developed mental disorders as well as being distressed (intensive treatments).

The Department of Health and the Atkins and Frazier approaches align with the increasingly common description of the universal and targeted public mental health approaches after disasters as *psychosocial care* and the intensive approaches as *mental healthcare*.

Strikingly, similar principles for practical approaches to planning and delivering psychosocial and mental health care resonate through the guidance documents that are summarised in the annexes. The principles for developing policy, designing services and delivering them are provided in a document that is referred to in Chapter 1, *Guidance for Responding to the Psychosocial and Mental Health Needs of People Affected by Disasters or Major Incidents (1)*, which was drawn up by an international group to identify together the common principles in several organisations' recommendations.

These philosophies are similar to, if expressed in similar or in different ways, to the approaches adopted by the IASC, the CDC and WHO and a variety of summaries of differing agencies' guidance is provided as annexes to this report.

The HPA's intention is that the summaries of the models from the IASC, CDC and WHO that are offered in the annexes should enable readers to understand how evidence-based guidance now recommends that the responsible agencies should work to prevent or mitigate the psychosocial and mental health impacts of flooding on people who are affected while also providing more intensive services when and where they are required by people who are at greater risk or who have already developed disorders.

Since the HPA completed its work on this aspect of its review, the World Health Organization has published a guide for field workers on psychological first aid that is the work of the World Health Organization, the War Trauma Foundation and World Vision International (106). That guide was published to provide technical guidance to implement the WHO Mental Health Global Action Programme (mhGAP). It contains an approach to psychosocial care for people after disasters that resonates strongly with the material in the annexes and, in the opinion of the authors of this report, the contents could be adapted to enable field staff to respond to people's immediate psychosocial needs after floods.

Whittle et al.(33) say that, as a consequence of their being flooded, *People's* sense of the future also changes in different ways. For some, this means fatalistic attitudes towards rain, climate change and government bodies emerging. However, others are engaging in debates about public participation in how the built environment is managed, and are developing their own *"resilience'* strategies for future floods." Whittle et al. offer suggestions for action to address the recovery gap. They also identified a series of broader issues that frame the ways in which flood recovery is conceptualised and managed and make recommendations that include:

- Developing more flexible notions of recovery in formal frameworks;
- Developing an ethic of care;
- Building in spare capacity and capability;

- Enabling collectives and new forms of learning and engagement with policy;
- Understanding and addressing vulnerability; and
- Building resilience.

On the basis of the research literature reviewed by the HPA, the authors of this report concur with these recommendations as they apply as much to psychosocial and mental health care as they do to the wider spectrum of challenges that face people after flooding.

Evidence Aid, established by the Cochrane Collection after the Indian Ocean tsunami in 2004, provides up-to-date evidence on interventions that might be considered in the context of natural disasters; eight systematic reviews on the effects of interventions aimed at preventing and treating PTSD following natural disasters are now available on the website (111).

Chapter 6 - Conclusion

- 6.1 THE INTENTIONS, AIMS AND OBJECTIVES OF THE REVIEW
- 6.2 COMPLEXITIES AND LIMITATIONS IN THE RESEARCH EVIDENCE
- 6.3 CORE FINDINGS FROM THIS RESEARCH REVIEW

6.4 FINDINGS AND RECOMMENDATIONS DERIVED FROM THIS REVIEW RELATING TO PLANNING, DESIGNING AND DELIVERING HEALTHCARE RESPONSES

6.5 THE WAY FORWARD FOR RESEARCH

6.1 THE INTENTIONS, AIMS AND OBJECTIVES OF THE REVIEW

In 2009-2010, the Department of Health asked the Health Protection Agency (HPA) to contribute to its *New Horizons* policy by:

- Assessing and appraising the evidence on flooding and mental health;
- Distilling the findings into a format which could be used by policymakers at a local level; and
- Providing a more detailed report for policymakers and services highlighting not just the evidence about the impact of flooding on people's mental health, but, where possible, to provide information on practical methods to reduce these impacts, through the work of services and by their collaboration with others.

In 2011, the present government published *No Health Without Mental Health*, a cross-government mental health outcomes strategy for people of all ages. Importantly, that current government policy recognises the importance of psychosocial resilience and the authors' interpretation is that it sustains the importance of this report.

The principal aim of the review that is reported in this document is to provide a summary of the evidence on the effects of flooding on people's mental health. In particular, the HPA undertook a review of the literature from 2004:

- On the epidemiological associations between flooding and people's mental health;
- To identify papers which address the impacts of flooding on the mental health of populations that are affected; and
- To assess what guidance on emergency planning exists about responding to the mental health needs of people who are affected.

The specific objectives of the review of effects of flooding on the mental health of populations of people were:

• To understand the range of different diagnostic tools/assessments that are available and to describe the implications for clinical and public health

practice of making them widely known and the world-wide impact that the differences in the performance of the tools might have;

- To review public mental health guidance relating to the impacts of flooding that is underpinned by scientific evidence;
- To improve the links between emergency planning with awareness of the mental health needs of affected people;
- To consult the clinical and public health specialties on best practice for investigating, mitigating, and treating the mental health impacts of flooding; and
- To consider people's mental health responses and the processes of recovery and the indirect associations that flooding can have.

The HPA has adopted a process that has achieved these process objectives and in response to the three core aims. This document reports on the findings. It begins with an introduction to the context that is presented in two chapters. Chapter 1, provides an overview of the governmental policies that offer the framework of the present governmental approach to the psychosocial and mental health impacts of emergencies, major incidents, disasters as well as to providing public mental healthcare and mental health services more broadly. Chapter 2 provides information on the floods that affected the population of parts of England in 2007.

Chapter 3 explains how the literature review was conducted. The HPA has collected evidence through a systematic review of the literature that has been published since 2004. It consists of published research data (including epidemiological, government and non-government data). The HPA identified 48 papers as meeting its inclusion criteria for the literature review component of this project and a substantial amount of the material presented in this report is based on reviewing critically those publications. Experts in the field advised on research in press or in process and guidance published by the government for England, NATO, the IASC, CDC and other agencies as well as on other known sources of information.

Chapter 4 provides a summary of the peer-reviewed epidemiological literature that met the HPA's inclusion criteria. In Chapter 5, the discussion offers the author's appraisal of that evidence and they set the material presented in Chapter 4 alongside their assessment of the methodological limitations of recent research. As one example, the authors of this report recommend that it is important to be aware of the context of each event when attempting to use the research that they have summarised in Chapter 4.

As regards current guidance, Chapter 1 orientates planners, public health, and primary care and mental health practitioners to elements of government policy in England and to the strategic stepped model of care that is recommended in the guidance from the Department of Health. The annexes provide summaries, or information from recent guidance that should assist local planners and healthcare staff in their preparations for, and responses to the psychosocial and mental health needs of people who are affected by flooding. It is evident that there are substantial resonances between the content of the guidance that the authors have appraised with the research that they have appraised.

The contents draw on, and complement approaches that are recommended by the Department of Health for England in four recent, substantial documents:

- The Mental Health Strategy: No health without mental health (2011);
- The Public Health White Paper: Healthy lives, healthy people (2010);
- New Horizons: a shared vision for mental health (2009); and
- The NHS Emergency Planning Guidance: Planning for the psychosocial and mental health care of people affected by major incidents and disasters: Interim national strategic guidance (2009).

6.2 COMPLEXITIES AND LIMITATIONS IN THE RESEARCH EVIDENCE

It became apparent during the epidemiological review that there is a substantial number of methodological complexities and challenges when conducting research and analysing data on the psychosocial, public mental health and mental health impacts of floods. They include:

- The lack of universally agreed statements about the definitions used when researching disasters and the authors found that people may use the same and different terms to describe people's experiences, responses and mental disorders;
- The wide variety of methodologies that are used across the various studies that were scrutinised;
- The broad range of mental disorders that are described and assessed in the literature;
- Diversity in the co-variants that different researchers have assessed;
- The use of a variety of different diagnostic measurement tools; and
- Complexity when classifying the nature of each flood and population that was exposed to it.

The recent literature on disasters, especially that on flooding, has tended to focus on the single and narrow concept of post-traumatic stress disorder (PTSD). The result is that, first, less research has been conducted on the psychosocial needs of people who are distressed rather than disordered. Second, the canon of research has tended to neglect the crucial wider and, sometimes, more prevalent morbidity that is always found in all populations, including that which affects people who are involved in flooding. This is why the Chapters 4 and 5 focus on the evidence that relates to people who develop mental disorders rather than to the much wider group of people who are distressed by events, temporarily or otherwise (a highly relevant matter after flooding) and who have psychosocial needs and needs that relate to them sustaining their mental health and emotional wellbeing.

The longitudinal studies illustrate that it is very difficult to ensure that, when PTSD symptoms are measured, they are attributable to the event in question.

Nonetheless, this document provides:

- An analytical review of current epidemiological studies related to mental health and flooding;
- A synthesis of a wide range of national and international guidance; and
- An analysis of future research needs.

6.3 CORE FINDINGS FROM THIS RESEARCH REVIEW

The studies analysed in this review illustrate the authors' opinion, which is that it is clear that flooding is very stressful and that the stress continues for a long time after the water has receded. Flooding affects people of all ages and it can herald: bereavement; huge economic problems for families; behaviour problems among children; increased substance use and/or misuse; increased domestic violence; as well as exacerbating, precipitating or provoking people's problems with their mental health. Thus, flooding can have a great impact on people's psychosocial needs and mental health and that evidence-based guidance on the factors that could influence the course of an illness are valuable when developing tools to minimise the psychosocial and mental health impacts of flooding.

Often, people's experiences, which reflect the personal and social meanings of the event for them, and the understandings and meaning they derive from it, have more influence on the psychosocial impact of the event than the event itself. Recovery from distress after disasters including flooding is characterised by adaptation to circumstances that have changed and by rebuilding.

Many people experience distress that may be relatively transient after all natures of disaster and that being distressed is not antithetical to people also being resilient. Furthermore, the wider literature shows that the experiences of people who are distressed in the aftermath of all disasters including floods, are not always easy to distinguish from the symptoms of common mental disorders.

On the other hand, the research that the HPA has surveyed for this report also indicates the substantially raised incidences and prevalences of mental disorders after flooding and how long disorders may persist. This stresses the importance of planning for and providing effective and timely clinical responses.

The thresholds between what might be considered a common or anticipated response to an extreme event and what is indicative of a person developing a disorder are difficult to define. Much turns on the severity, duration and impacts of these experiences on people's lives when it comes to differentiating distress and disorders. Thus, the authors recommend adoption of Maj's pragmatic approach to diagnosis because it combines lessons from the contextual and qualitative approaches.

The HPA found that the focus in the literature is on PTSD. While that is valuable, it is also accompanied by relative neglect of the crucial wider morbidity that is always found in all populations, including after disasters. Depression is a diagnosis that is under-represented in the published data.

A consistent finding across many studies is that people's level of exposure to the event and their earlier exposures to other traumatic experiences are strongly associated with PTSD.

There is a lack of studies which have investigated the impact of flooding on the mental health of children, young people and older people, and these are matters of great concern. There are, however, indications that both children and older people suffer PTSD after flooding and that the prevalence figures may well be greater than those that are found for adults of working age.

Children, young people and older people may be more vulnerable than are adults of working age because they are dependant on adults' responses to the floods that affect families. Thus, the direct affects and the indirect effects affect them. Parents' well being, for example, affects the quality of their parenting and both factors may, separately or in interaction, protect or intensify the negative effects of trauma on children.

As regards people who develop mental disorders, the authors found that risk factors and co-variants did not a have a constant association with poorer mental health across all the studies, partly due to methodological differences and partly because of the unique characteristics of each flood. However, as in general population studies, levels of exposure to the event(s), gender, age, and socio-economic status were generally associated with mental ill health.

When considering PTSD specifically, the authors conclude that the symptoms may not decline over time as quickly as was thought previously. The authors found, though, that social cohesion has a significant effect on susceptibility to symptoms of PTSD and it, therefore, must be considered when developing public health strategies.

6.4 FINDINGS AND RECOMMENDATIONS DERIVED FROM THIS REVIEW

RELATING TO PLANNING, DESIGNING AND DELIVERING HEALTHCARE

RESPONSES

Floods may be sudden and short (<u>big</u> bang' events); or prolonged and/or repetitive (<u>ising</u> tide' events) (18). Defining a flood is complex and the definition quoted here is taken from the WHO Regional Office for Europe meeting report on climate change, extreme weather events and public health that was held in Bonn on 29-30 November 2010. The meeting proposed that a flood can be defined as —... an increase of water that has a significant impact on human life and well-being" (9).

This report highlights the authors' central conclusion, which is that people's psychosocial needs, and the mental disorders that they might develop as a

consequence of their being flooded, pose core challenges for public health, primary care and specialist mental healthcare services. Consequently, they examined the strategic paradigms relating to meeting people's psychosocial and mental health needs after flooding that they found in the grey literature and from consultations with informants. Key themes emerge from that guidance, which resonate with and are developed by this review of the research.

The authors' opinion is that it is most important that public health measures that are put in place after floods should include consideration of the social as well as psychological impacts from the event, especially because evidence suggests that the former can act as protective factors against negative psychological and psychiatric impacts from the floods.

People who are affected by flooding need responses that are intended to support their psychosocial resilience and maintain their emotional wellbeing, recognise and respond to their distress, and prevent the onset of additional psychosocial needs, mental health problems and mental disorders, which can develop in the short-, medium- or long-terms. These responses should be flexible and varied according to people's needs and according to their sources of social support as well as their economic and social circumstances. Understanding flooding in these terms should aid and direct the responses from services as well as from communities and other groups. This applies not only to the initial responses but also to support and reconstruction during recovery as many people and communities can experience continuing social and economic disruption after flooding.

A multi-sector approach that involves communities and families as well as agencies is the best way to promote wellbeing, respond to people's psychosocial needs that arise from distress, prevent mental health problems, and promote population-level recovery. It is important to recognise that there are family, community and personal assets, such as social support, that are vitally important to maintaining and promoting personal and collective psychosocial resilience.

Most people's psychosocial needs are met through their close relationships with their families, friends and communities. Everyone is likely to require continuing psychosocial support. However, some people require assessment by the primary care services if their symptoms persist or are associated with dysfunction. A smaller proportion of people are likely to require referral for specialised mental healthcare (as represented in the inner two layers of Diagram 2 in Chapter 1).

These findings support the requirement for a public mental health approach that comprises universal and targeted plans and interventions, which are well coordinated with adequate, timely access for people in need to intensive primary care and specialist mental health services. The public mental health services should be planned to recognise the long duration of the stress that affects people after they are inundated and the high frequency of secondary stressors. The latter services must be planned to respond to the HPA's finding that PTSD does not remit rapidly after flooding and long-term responses are required.

These requirements are core features within the guidance from NATO/EAPC and the Department of Health. Both provide a strategic framework for planning and delivering both psychosocial and mental healthcare after disasters within an integrated strategic stepped model of care. The Principles for Disaster and Major Incident Psychosocial Care that were developed by an international group in 2009-10 provide brief and itemised guidance for planners and practitioners.

Together, the Annexes A, B and C provide entry points to the contents of the extant guidance and they describe:

- The nature of disasters and psychosocial trauma; core concepts and definitions; and patterns of response;
- strategic stepped model of care that includes assessment and intervention;
- Important aspects of strategic leadership, management and workforce development needed when planning response to psychosocial and mental health needs.

Annex D provides access to more focused guidance on information, advice and resources provided by the Centers for Disease Control and Prevention in the USA and which can be given to planners and people whose area is affected by or involved in disasters. The PsySTART model, in Annex E, offers an approach to psychosocial triage.

Other findings and recommendations are themes that emerge from the guidance include the following matters:

- a. It is important to understand stress, and the stressors that are inflicted upon people by a flood and how they can cause short-term distress in many people and influence the medium- and longer-term wellbeing of persons and populations. Stress has been variously defined as the external stressor, or as the internal response to the external pressure or event. In this context, we are using the term to refer to the challenge that might arise from untoward events that are of such a nature and severity that they might cause people psychosocial trauma (11). Such external stressors may give rise to greater resilience or may provoke serious mental disorders.
- b. Primary stressors are inherent in all disasters and encompass any experiences directly related to people's exposure to the disaster.
- c. Secondary stressors follow on from, or are consequential to the primary stressor: they can include infrastructure failure and challenges to returning to normality and repairing structures, or failure to adjust to the new normality that ensues after disasters. After the most major catastrophes, it is not realistic to expect the situation to return to that which existed before events. Rather, situations and public expectations may be substantially

changed by events. Often, they are changed for the worse, but, sometimes, for the better.

- d. People's psychosocial experiences can be shaped by the origin and delivery of care and the timeframes of stressor activation. This can make it possible to describe how and where the public health response can be delivered.
- e. People psychosocial experiences in the aftermath can oscillate between distress and recovery. Personal and collective psychosocial resilience are inherent in each population. Families, communities and non-statutory and statutory services offer protection for people against psychosocial adversity during extreme events and in the aftermath of the primary stressing effects of disasters. Secondary stressors often arise during the responses to the clean up, recovery and rebuilding phase after flooding.

The aftermath of flood recovery tends to be a transient phase of, at least, medium-term duration, which can endure for days, weeks, months or years. It can be described as a <u>concertina</u> effect' in which people may move between distress and recovery as different stressors arise. People can draw on their family and collective community resources for psychosocial support, as well as the social care and healthcare systems (as described in the inner four rings of Diagram 2 and the secondary prevention layer in Diagram 1).

A majority of people experience distress in this phase. However, some people's experiences may be of the quantity, severity and duration or are associated with sustained dysfunction such that it would be appropriate to call them symptoms of mental health problems or of mental disorders. Wider support networks may not provide enough support for a small proportion of people, or some people may not recover from distress even though stressors are removed. In this situation, more persistent problems, including mental disorders, can develop, or pre-existing ones are provoked. People who are affected in this way may need to be assessed by the primary care services and treated by the specialist mental health services, (represented by the inner two rings of Diagram 2).

- f. The Strategic Stepped Model of Care is a very useful tool for conceptualising the holistic approach to people's psychosocial and mental health needs after flooding. There is likely to be overlap between the steps in the model. Understanding the overlaps between the steps can be facilitated by incorporating knowledge of:
 - The nature of each flood and its consequences;
 - The primary and secondary stressors; and
 - The means of delivering care.

This model of care allows planners to take into account sources of personal and collective social support, and how responses to events are developed. Thereby, the responsible authorities can create a dynamic,

flexible and needs-led approach to mounting effective responses to flooding.

6.5 THE WAY FORWARD FOR RESEARCH

Finally, the authors identify significant research gaps, which, if filled, could support design of future psychosocial/public mental health responses and primary and secondary mental healthcare responses to people's needs before and after flooding.

In general terms, more research is required, which studies:

- The responses of, and impacts on populations before and after untoward and extreme events, major incidents and disasters including flooding;
- The impacts of major incidents and disasters, including flooding, on people's psychosocial experiences in the short-, medium- and longerterms;
- The contextual and subjective, qualitative features of peoples experiences which distinguish distress after disasters from the symptoms of mental disorders; and
- The longitudinal effects of major incidents and disasters, including floods, on people's mental health and ill health.

The methodological variables and limitations that the authors have identified in this report point to a requirement for more, high-quality research. In particular, the HPA identified numerous methods and tools for assessing mental health impacts from flooding and other extreme events. Further research should focus on:

- Using overt definitions of psychosocial need, mental health and mental ill health that are agreed, understood and used internationally;
- Achieve better scientific understanding of the psychosocial and mental health impacts of floods;
- Achieve development of systems for cross comparison of research findings; and
- Take forward findings to formal meta-analysis to identify better welfare and public health guidance and professional practice.

The authors have identified the vital requirement for more longitudinal studies to understand the true impacts and trajectories of the impacts of floods on people's mental health. Longitudinal studies that collect information on the sample population before the disaster strikes are rare, difficult to conduct and plan in advance (2). Nonetheless, the authors are aware anecdotally of endeavours that are being made to pioneer this work and to do so in conjunction with research ethics committees. Better use could be made of the national psychiatric morbidity survey programme, which could provide some useful baseline data for populations that are flooded subsequently, as well as providing control data in non-flooded areas. Better design of research instruments would help researchers to appraise people's common experiences and symptoms rather than a narrow subset, and might provide better information about the duration, severity and effects of people's experiences and/or symptoms. Subsequently, it will be possible to look at the public health impact of people's psychosocial experiences and needs as well as the effects on populations of mental disorders.

The authors identify the requirement for more research on: children and young people; older people; and people who respond to others needs in the aftermath of major events or disasters. This would help the research community to address:

- Who or which groups of people are more at risk;
- Whether or not vulnerability is a useful term (112);
- How and why certain groups of people suffer more; and
- What should be done in addition to current interventions to respond effectively to people's needs?

In this review, the HPA did not explore the secondary health impacts of disasters, the pathways from disasters to mental ill health, or the consequential impacts of developing a mental disorder. The authors considered one study that researched the somatic effects of mental ill health, another that researched substance misuse, and others that have considered gender-based violence. However, more clarification is required about what constitutes best practice in each of these areas.

The authors recommend that reviews should be considered on:

- The advantages, disadvantages and consequences of diagnosing PTSD after people are flooded; and
- How people develop and the consequences of them having PTSD in relation to flooding.

More research is required on:

- Prearranged, well-designed prospective longitudinal studies that engage with people's psychosocial needs and all relevant diagnoses of mental disorders should be agreed and implemented appropriately in the UK.
- Co-morbidity of mental disorders and how this can affect treatment plans each disorder is assessed discretely in most of the papers that the HPA reviewed. However, the authors are clear that, when specific plans or protocols are developed for intervening with people who have particular disorders, they should reflect real situations in which comorbidity is an important matter for treatment algorithms;
- The psychosocial needs and the impact on the mental health of responders to floods; and

• The epidemiology and best practice regarding the somatic effects, the extent of substance misuse, and gender-based violence that may be related to flooding.

Reference List

- (1) Williams R, Bisson J, Ajdukovic D, Kemp V, Olff M, Alexander D et al. Guidance for Responding to the Psychosocial and Mental Health Needs of People Affected by Disasters or Major Incidents. 2009.
- (2) Weems CF, Watts SE, Marsee MA, Taylor LK, Costa NM, Cannon MF et al. The psychosocial impact of Hurricane Katrina: Contextual differences in psychological symptoms, social support, and discrimination. Behaviour Research and Therapy 2007; 45(10):2295-2306.
- (3) HM Government Department of Health: Mental Health Division. New Horizons. Confident Communities, Brighter Futures. A framework for developing wellbeing. 25-3-2010.
- (4) Mental Health Division DoH. New Horizons: A Shared Vision for Mental Health. 7-12-2009.
- (5) The Marmot Review. Fair Society, Health Lives. Strategic Review of Health Inequalities in England post-2010. 2010.
- (6) WHO Regional Office for Europe. Floods: Climate Change and adaptation strategies for human health. 2002.
- (7) Inter-Ågency Standing Committee. Guidelines on Mental Health and Psychosocial Support in Emergency Settings. 2007. Geneva, IASC.
- (8) Tapsell SM. Vulnerability to Flooding: Health and Social Dimensions. Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences 360, 1511-1525. 2002.
- (9) WHO Regional Office for Europe. Climate change, extreme weather events and public health; Bonn, 29-30 November 2010. 2010.
- (10) Ahern M, Kovats RS, Wilkinson P, Few R, Matthies F. Global health impacts of floods: Epidemiologic evidence. Epidemiologic Reviews 2005; 27:36-46.
- (11) HM Government Department of Health: Mental Health Division. No Health Without Mental Health: A Cross-Government Mental Health Outcomes Strategy for People of All Ages. 2011.
- (12) HM Government Department of Health. Healthy Lives, Healthy People: Our strategy for public health in England. 2010.
- (13) Department of Health Emergency Preparedness Division. NHS Emergency Planning Guidance: Planning for the psychosocial and mental health care of people affected by major incidents and disasters: Interim national strategic guidance. 30-7-2009.
- (14) Williams R, Hazell P. Austerity, poverty, resilience, and the future of mental health services for children and adolescents. Current Opinion in Psychiatry 2011; 24(4):263-266.
- (15) WHO. International Statistical Classification of Diseases and Related Health Problems, 10th Revision. 2007.
- (16) American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition. Fourth, Text Version ed. Washington DC: American Psychiatric Association, 2000.
- (17) Flood and Water Management Act 2010: Chapter 29. 2010.
- (18) Psychosocial Care for People Affected by Disasters and Major Incidents: A Model for Designing, Delivering and Managing Psychosocial Services for People Involved in Major Incidents, Conflicts, Disasters and Terrorism. 2009. NATO Joint Medical Committee.

- (19) TENTS. The TENTS Guidelines for Psychosocial Care Following Disasters and Major Incidents. 2008.
- (20) Marsh T, Hannaford J. The summer 2007 floods in England and Wales-a hydrological appraisal. 32pp. 2007. Centre for Ecology and Hydrology.
- (21) Pitt M. The Pitt Review: learning lessons from the 2007 floods. 2008. The Cabinet Office.
- (22) Blackburn M, Methven J, Roberts N. Large-scale context for the UK floods in summer 2007. Weather 2008; 63:280-288.
- (23) Paranjothy S, Gallacher J, Amlot R, Rubin G J, Page L, Baxter T et al. Psychosocial impact of the summer 2007 flood in England. BMC Public Health 2011; 11(145).
- (24) Environment Agency. Review of the 2007 summer floods. 2007.
- (25) Guy Carpenter. The wrong type of rain: Impact and implications of 2007 UK floods. 2007. London.
- (26) Fewtrell L, Kay D. An attempt to quantify the health impacts of flooding in the UK using an urban case study. Public Health 2008; 122(5):446-451.
- (27) Growth from Knowledge. Qualitative research undertaken during October 2007 in areas affected by the 2007 summer floods. 2007. The Cabinet Office.
- (28) Department for Environment Food and Rural Affairs (DEFRA). Delivering benefits through evidence: The costs of the summer 2007 floods in England. 2010. Bristol, Environment Agency.
- (29) Convery I, Balogh R, Carroll B. 'Getting the kids back to school': education and the emotional geographies of the 2007 Hull floods. Journal of Flood Risk Management 2010; 3(2):99-111.
- (30) Environment Agency. Flooding in England: A National Assessment of Flood Risk. 2009. Bristol, Environment Agency.
- (31) Whiteley D. 2007 NHS Flood Response Report. 2008. Department of Health.
- (32) Caldin H, Murray V. Health Impacts of Flooding. In: Lamond J, Booth C, Hammond F, Proverbs D, editors. Flood Hazards, Impacts and Responses for the Built Environment. CRC Press, 2011.
- (33) Whittle R, Medd W, Deeming H, Kashefi E, Mort M, Twigger Ross C et al. After the Rain - learning the lessons from flood recovery in Hull. Final project report for 'Flood, Vulnerability and Urban Resilience: a real-time study of local recovery following the floods of June 2007 in Hull'. 2010. Lancaster UK, Lancaster University.
- (34) Reacher M, McKenzie K, Lane C, Nichols T, Kedge I, Iversen A et al. Health impacts of flooding in Lewes: a comparison of reported gastrointestinal and other illness and mental health in flooded and non-flooded households. Commun Dis Public Health 2004; 7(1):39-46.
- (35) ArmyNet. Carbon Monoxide: The Silent Killer. Available at: <u>http://dev1.acms.mod.uk/armysafety/features/carbon_monoxide.htm</u>.
- (36) Communities and Local Government. Planning Policy Statement 25: Development and Flood Risk. 2010. London, The Stationery Office.
- (37) Health Protection Agency UK. Health Advice: General information following floods. Available at: <u>http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1194947339369</u>.
- (38) McNaught R. Personal photograph. 2007.
- (39) Hayes J, Mason J, Brown F, Mather R. Floods in 2007 and older adult services: Lessons learnt. Psychiatric Bulletin 2009; 33(9):332-336.

- (40) Weisler RH, Barbee IV JG, Townsend MH. Mental health and recovery in the Gulf Coast after hurricanes Katrina and Rita. Journal of the American Medical Association 2006; 296(5):585-588.
- (41) Ruggiero KJ, Amstadter AB, Acierno R, Kilpatrick DG, Resnick HS, Tracy M et al. Social and psychological resources associated with health status in a representative sample of adults affected by the 2004 Florida hurricanes. Psychiatry 2009; 72(2):195-210.
- (42) Acierno R, Ruggiero KJ, Galea S, Resnick HS, Koenen K, Roitzsch J et al. Psychological sequelae resulting from the 2004 Florida hurricanes: implications for postdisaster intervention. American Journal of Public Health 2007; 97 Suppl 1.
- (43) Hensley L, Varela RE. PTSD symptoms and somatic complaints following Hurricane Katrina: The roles of trait anxiety and anxiety sensitivity. Journal of Clinical Child and Adolescent Psychology 2008; 37(3):542-552.
- (44) Kessler RC, Galea S, Gruber MJ, Sampson NA, Ursano RJ, Wessely S. Trends in mental illness and suicidality after Hurricane Katrina. Molecular Psychiatry 2008; 13(4):374-384.
- (45) Kishore V, Theall KP, Robinson W, Pichon J, Scribner R, Roberson E et al. Resource loss, coping, alcohol use, and posttraumatic stress symptoms among survivors of Hurricane Katrina: a cross-sectional study. American journal of disaster medicine 2008; 3(6):345-357.
- (46) Pina AA, Villalta IK, Ortiz CD, Gottschall AC, Costa NM, Weems CF. Social support, discrimination, and coping as predictors of posttraumatic stress reactions in youth survivors of Hurricane Katrina. Journal of Clinical Child and Adolescent Psychology 2008; 37(3):564-574.
- (47) Scheeringa MS, Zeanah CH. Reconsideration of harm's way: Onsets and comorbidity patterns of disorders in preschool children and their caregivers following Hurricane Katrina. Journal of Clinical Child and Adolescent Psychology 2008; 37(3):508-518.
- (48) Harville EW, Xiong X, Pridjian G, Elkind-Hirsch K, Buekens P. Postpartum mental health after Hurricane Katrina: A cohort study. BMC Pregnancy and Childbirth 2009; 9.
- (49) Norris FH, VanLandingham MJ, Vu L. PTSD in Vietnamese Americans following Hurricane Katrina: Prevalence, patterns, and predictors. Journal of Traumatic Stress 2009; 22(2):91-101.
- (50) Weems CF, Taylor LK, Cannon MF, Marino RC, Romano DM, Scott BG et al. Post Traumatic Stress, Context, and the Lingering Effects of the Hurricane Katrina Disaster among Ethnic Minority Youth. Journal of Abnormal Child Psychology 2009; 38(1):49-56.
- (51) Sprang G, LaJoie AS. Exposure, avoidance, and PTSD among hurricane katrina evacuees. Traumatology 2009; 15(2):10-19.
- (52) Coker AL, Hanks JS, Eggleston KS, Risser J, Tee PG, Chronister KJ et al. Social and Mental Health Needs Assessment of Katrina Evacuees. Disaster Management and Response 2006; 4(3):88-94.
- (53) Galea S, Brewin CR, Gruber M, Jones RT, King DW, King LA et al. Exposure to hurricane-related stressors and mental illness after Hurricane Katrina. Archives of General Psychiatry 2007; 64(12):1427-1434.
- (54) Kessler RC, Galea S, Jones RT, Parker HA. Mental illness and suicidality after Hurricane Katrina. Bulletin of the World Health Organization 2006; 84(12):930-939.

- (55) Wang PS, Gruber MJ, Powers RE, Schoenbaum M, Speier AH, Wells KB et al. Mental health service use among Hurricane Katrina survivors in the eight months after the disaster. Psychiatric Services 2007; 58(11):1403-1411.
- (56) Abramson D, Stehling-Ariza T, Garfield R, Redlener I. Prevalence and predictors of mental health distress post-katrina: Findings from the gulf coast child and family health study. Disaster Medicine and Public Health Preparedness 2008; 2(2):77-86.
- (57) Wang PS, Gruber MJ, Powers RE, Schoenbaum M, Speier AH, Wells KB et al. Disruption of existing mental health treatments and failure to initiate new treatment after Hurricane Katrina. American Journal of Psychiatry 2008; 165(1):34-41.
- (58) Madrid PA, Garfield R, Jaberi P, Daly M, Richard G, Grant R. Mental Health Services in Louisiana School-Based Health Centers Post-Hurricanes Katrina and Rita. Professional Psychology: Research and Practice 2008; 39(1):45-51.
- (59) Vigil JM, Geary DC. A Preliminary Investigation of Family Coping Styles and Psychological Well-Being Among Adolescent Survivors of Hurricane Katrina. Journal of Family Psychology 2008; 22(1):176-180.
- (60) Acierno R, Ruggiero KJ, Kilpatrick DG, Resnick HS, Gale S. Risk and protective factors for psychopathology among older versus younger adults after the 2004 Florida hurricanes. American Journal of Geriatric Psychiatry 2006; 14(12):1051-1059.
- (61) Larrance R, Anastario M, Lawry L. Health Status Among Internally Displaced Persons in Louisiana and Mississippi Travel Trailer Parks. Annals of Emergency Medicine 2007; 49(5):590-601.
- (62) Anastario MP, Larrance R, Lawry L. Using mental health indicators to identify postdisaster gender-based violence among women displaced by Hurricane Katrina. Journal of Women's Health 2008; 17(9):1437-1444.
- (63) Anastario M, Lawry L, Shehab N. Increased gender-based violence among women internally displaced in mississippi 2 years post-Hurricane Katrina. Disaster Medicine and Public Health Preparedness 2009; 3(1):18-26.
- (64) Weems CF, Pina AA, Costa NM, Watts SE, Taylor LK, Cannon MF. Predisaster trait anxiety and negative affect predict posttraumatic stress in youths after Hurricane Katrina. Journal of Consulting and Clinical Psychology 2007; 75(1):154-159.
- (65) Terranova AM, Boxer P, Morris AS. Factors influencing the course of posttraumatic stress following a natural disaster: Children's reactions to Hurricane Katrina. Journal of Applied Developmental Psychology 2009; 30(3):344-355.
- (66) Mills MA, Edmondson D, Park CL. Trauma and stress response among Hurricane Katrina evacuees. American Journal of Public Health 2007; 97 Suppl 1.
- (67) Stepien A, Hadrys T, Kantorska-Janiec M. Posttraumatic stress disorder (PTSD) as a result of the 1997 flood - Incidence and clinical picture. Archives of Psychiatry and Psychotherapy 2005; 7(2):29-39.
- (68) Strelau J, Zawadzki B. Trauma and temperament as predictors of intensity of posttraumatic stress disorder symptoms after disaster. European Psychologist 2005; 10(2):124-135.
- (69) Norris FH, Murphy AD, Baker CK, Perilla JL. Postdisaster PTSD over four waves of a panel study of Mexico's 1999 flood. Journal of Traumatic Stress 2004; 17(4):283-292.

- (70) Norris FH, Baker CK, Murphy AD, Kaniasty K. Social support mobilization and deterioration after Mexico's 1999 flood: Effects of context, gender, and time. American Journal of Community Psychology 2005; 36(1-2):15-28.
- (71) Feng S, Tan H, Benjamin A, Wen S, Liu A, Zhou J et al. Social Support and Posttraumatic Stress Disorder among Flood Victims in Hunan, China. Annals of Epidemiology 2007; 17(10):827-833.
- (72) Huang P, Tan H, Liu A, Feng S, Chen M. Prediction of Post Traumatic Stress Disorder among adults in flood district. BMC Public Health 2010; 10(207).
- (73) Liu A, Tan H, Zhou J, Li S, Yang T, Wang J et al. An epidemiologic study of posttraumatic stress disorder in flood victims in Hunan China. Canadian Journal of Psychiatry 2006; 51(6):350-354.
- (74) Amstadter AB, Acierno R, Richardson LK, Kilpatrick DG, Gros DF, Gaboury MT et al. Posttyphoon prevalence of posttraumatic stress disorder, major depressive disorder, panic disorder, and generalized anxiety disorder in a Vietnamese sample. Journal of Traumatic Stress 2009; 22(3):180-188.
- (75) Dewaraja R, Kawamura N. Trauma intensity and posttraumatic stress: Implications of the tsunami experience in Sri Lanka for the management of future disasters. 1287, 69-73. 2006.
- (76) Nitschke M, Einsle F, Lippmann C, Simonis G, K+Âllner V, Strasser R. Emergency evacuation of the Dresden Heart Centre in the flood disaster in Germany 2002: Perceptions of patients and psychosocial burdens. International Journal of Disaster Medicine 2006; 4(3):118-124.
- (77) Heo JH, Kim MH, Koh SB, Noh S, Park JH, Ahn JS et al. A prospective study on changes in health status following flood disaster. Psychiatry Investigation 2008; 5(3):186-192.
- (78) Carroll B, Morbey H, Balogh R, Araoz G. Flooded homes, broken bonds, the meaning of home, psychological processes and their impact on psychological health in a disaster. Health and Place 2009; 15(2):540-547.
- (79) Stimpson JP, Wilson FA, Jeffries SK. Seeking help for disaster services after a flood. Disaster Medicine and Public Health Preparedness 2008; 2(3):139-141.
- (80) Stimpson JP. Short communication: Prospective evidence for a reciprocal relationship between sense of control and depressive symptoms following a flood. Stress and Health 2006; 22(3):161-166.
- (81) Taft CT, Monson CM, Schumm JA, Watkins LE, Panuzio J, Resick PA. Posttraumatic stress disorder symptoms, relationship adjustment, and relationship aggression in a sample of female flood victims. Journal of Family Violence 2009; 24(6):389-396.
- (82) North CS, Kawasaki A, Spitznagel EL, Hong BA. The course of PTSD, major depression, substance abuse, and somatization after a natural disaster. Journal of Nervous and Mental Disease 2004; 192(12):823-829.
- (83) Di Fiorino M, Massimetti G, Corretti G, Paoli RA. Post traumatic stress psychopathology 8 years after a flooding in Italy. Bridging Eastern and Western Psychiatry 2005; 3(1):49-57.
- (84) Tunstall S, Tapsell S, Green C, Floyd P, George C. The health effects of flooding: Social research results from England and Wales. Journal of Water and Health 2006; 4(3):365-380.
- (85) Mimura N, Yasuhara K, Kawagoe S, Yokoki H, Kazama S. Damage from the great east Japan earthquake and tsunami-- A quick report. Mitig Adapt Strateg Glob Change 2011; 16:803-818.

- (86) Galea S, Maxwell AR. Methodological Challenges in Studying the Mental Health Consequences of Disasters. In: Neria Y, Galea S, Norris FH, editors. Mental Health and Disasters. Cambridge University Press, 2009: 579-593.
- (87) Horowitz M, Wilner N, Alvarez W. Impact of Event Scale: A Measure of Subjective Stress. Psychosomatic Medicine 1979; 41(3):209-218.
- (88) Defra/Environment Agency. The Appraisal of Human related Intangible Impacts of Flooding. R&D Technical Report FD2005/TR. 2004. Joint Defra/EA Flood and Coastal Erosion Risk Management R&D Programme.
- (89) Kessler RC, Chiu WT, Demler O, Walters EE. Prevalence, Severity, and Comorbidity of 12-Month DSM-IV Disorders in the National Comorbidity Survey Replication . Archives of General Psychiatry 2005; 62(6):617-627.
- (90) Galea S, Nandi A, Vlahov D. The Epidemiology of Post-Traumatic Stress Disorder after Disasters. Epidemiologic Reviews 2005; 27:78-91.
- (91) Reijneveld S. Psychosocial Implications of Disaster on Children and Pediatric Care. Pediatrics 2006; 117(5):1865-1866.
- (92) Schroeder J, Polusny M. Risk factors for adolescent alcohol use following a natural disaster. Prehosp Disaster Med 2004; 19(1):122-127.
- (93) Rosen G, Spitzer R, McHugh P. Problems with the post-traumatic stress disorder diagnosis and its future in DSM-V. The British Journal of Psychiatry 2008; 192:3-4.
- (94) Neria Y, Nandi A, Galea S. Post-traumatic stress disorder following disasters: A systematic review. Psychological Medicine 2008; 38(4):467-480.
- (95) Norris FH. Range, Magnitude and Duration of the Effects of Disasters of Mental Health: Review Update 2005. Research Education Disaster Mental Health . 2005. Dartmouth College.
- (96) Norris FH, Friedman MJ, Watson PJ, Byrne CM, Diaz E, Kaniasty K. 60,000 Disaster Victims Speak: Part 1. An Empirical Review of the Empirical Literature, 1981-2001. Psychiatry 2002; 65(3):207-239.
- (97) Spielberger CD. *Manual for the State–Trait Anxiety Inventory for Children.* Palo Alto, CA, USA: Consulting Psychologists Press, 1973.
- (98) Maj M. When does depression become a disorder? Keynote address to the International Congress of the Royal College of Psychiatrists. 2011.
- (99) Masten A. Ordinary magic: resilience processes in development. American Psychologist 2001; 56(3).
- (100) National Collaborating Centre for Mental Health. Post-traumatic stress disorder: The management of PTSD in adults and children in primary and secondary school. National Clinical Practice Guideline Number 26. 2005. Gaskell and the British Psychological Society.
- (101) Kutchins H, Kirk S. Making us crazy: DSM: The psychiatric bible and the creation of mental disorders. New York: Free Press, 1997.
- (102) Horwitz A, Wakefield J. The Loss of Sadness: How Psychiatry Transformed Normal Sorrow into Depressive Disorder. Oxford: Oxford University Press, 2007.
- (103) Regier D, Kaelber C, Rae D, Farmer M, Knauper B, Kessler R et al. Limitations of Diagnostic Criteria and Assessment Instruments for Mental Disorders:Implications for Research and Policy . Archives of General Psychiatry 1998; 55(2):109-115.
- (104) Freedy J, Steenkamp M, Magruder K, Yeager D, Heuston W, Carek P. Posttraumatic stress disorder screening test performance in civilian primary care. Family Practice 2010; 27(6):615-624.

- (105) Norris F, Alegria M. Mental Health Care for Ethnic Minority Individuals and Communities in the Aftermath of Disasters and Mass Violence. CNS Spectrums 2005; 10(2):132-140.
- (106) WHO, War Trauma Foundation, World Vision International. Psychological first aid: Guide for field workers. 2011. Geneva, WHO.
- (107) Lieberman A. Infants remember: war exposure, trauma, and attachment in young children and their mothers. Journal of the American Academy of Child Adolescent Psychiatry 2011; 50(7):640-641.
- (108) Feldman R, Vengrober A. Posttraumatic stress disorder in infants and young children exposed to war-related trauma. Journal of the American Academy of Child and Adolescent Psychiatry 2011; 50(7):645-658.
- (109) Lowe S, Chan C, Rhodes J. The impact of child-related stressors on the psychological functioning of lower-income mothers after Hurricane Katrina. Journal of Family Issues 2011; 32(10):1303-1324.
- (110) Atkins M, Frazier S. Expanding the toolkit or changing the paradigm: are we ready for a public health approach to mental health? Perspectives on Psychological Science 2011; 6(5):483-487.
- (111) Cochrane Evidence Aid: resources for post-traumatic stress disorder following natural disasters. Website . 2011. 28-9-2011.
- (112) Durant T. The utility of vulnerability and social capital theories in studying the impact of Hurricane Katrina on the elderly. Journal of Family Issues 2011; 32(10):1285-1302.
- (113) MICRODIS. Social Impact Conceptual Model and Framework. D1.2.3. 2008.
- (114) MICRODIS Health Working Group. The health and health care system impacts of earthquakes, windstorms and floods – A systematic review. 2008. MICRODIS.
- (115) MICRODIS. Health Impact Conceptual Model. D1.1.4. 2008.
- (116) Norris FH, Phifer J, Kaniasty K. Individual and community reactions to the Kentucky floods: Findings from a longitudinal study of older adults. In: Ursano RJ, McCaughey BG, Fullerton CS, editors. Individual and community response to trauma and disaster: The structure of human chaos. Cambridge: Cambridge University Press, 1994: 378-400.
- (117) Greenberg N, Langston V, Jones N. Trauma Risk Management (TRiM) in the UK Armed Forces. Journal of Royal Army Medical Corps 2008; 154(2):123-126.
- (118) CDC Centers for Disease Control and Prevention. Coping with a disaster or traumatic event.
- (119) UCLA Center for Public Health and Disasters. PsySTART rapid mental health triage and incident management system.
Annex A: The Effects of Flooding on Mental Health

Guidance from the Inter-Agency Standing Committee (IASC)

The reference to this guidance is: IASC Reference Group for Mental Health and Psychosocial Support in Emergency Settings (7).

The Inter-Agency Standing Committee issued these guidelines to enable humanitarian agencies to plan, establish and coordinate a set of minimum multisectoral responses to protect and improve people's mental health and psychosocial wellbeing in the midst of an emergency.

For the purposes of this paper a useful and different piece of guidance is a list of actions that are advisable and others that should typically be avoided.

Dos	Don'ts			
Establish one overall coordination mechanism or group on mental health and psychosocial support.	Do not create separate groups on mental health or on psychosocial support that do not talk or coordinate with one another.			
Support a coordinated response, participating in coordination meetings and adding value by complementing the work of others.	Do not work in isolation or without thinking how one's own work fits with that of others.			
Collect and analyse information to determine whether a response is needed and, if so, what kind of response.	Do not conduct duplicate assessments or accept preliminary data in an uncritical manner.			
Tailor assessment tools to the local context.	Do not use assessment tools that are not validated in the local, emergency-affected context.			
Recognise that people are affected by emergencies in different ways. More resilient people may function well, whereas others may be severely affected and may need specialised supports.	Do not assume that everyone in an emergency is traumatised, or that people who appear resilient need no support.			
Ask questions in the local language(s) and in a safe, supportive manner that respects confidentiality.	Do not duplicate assessments or ask very distressing questions without providing follow- up support.			

Table 8: Operational Dos and Don'ts (taken from IASC Reference Group for MentalHealth and Psychosocial Support in Emergency Settings) (7)

Table 8, continued.

Operational Dos and Don'ts				
Dos	Don'ts			
Pay attention to gender differences.	Do not assume that emergencies affect men and women (or boys and girls) in exactly the same way, or that programmes designed for men are of equal help or accessibility for women.			
Check references in recruiting staff and volunteers and build the capacity of new personnel from the local and/or affected community.	Do not use recruiting practices that severely weaken existing local structures.			
After trainings on MHPSS, provide follow- up supervision and monitoring to ensure that interventions are implemented correctly.	Do not use one-time, stand-alone trainings or very short trainings without follow-up if preparing people to perform complex psychological interventions.			
Facilitate the development of community- owned, managed and run programmes.	Do not use a charity model that treats people in the community mainly as beneficiaries of services.			
Build local capacities, supporting self-help and strengthening the resources already present in affected groups.	Do not organise supports that undermine or ignore local responsibilities and capacities.			
Learn about and, where appropriate, use local cultural practices to support local people.	Do not assume that all local cultural practices are helpful or that all local people are supportive of particular practices.			
Use methods from outside the culture where it is appropriate to do so.	Do not assume that methods from abroad are necessarily better or impose them on local people in ways that marginalise local supportive practices and beliefs.			
Build government capacities and integrate mental health care for emergency survivors in general health services and, if available, in community mental health services.	Do not create parallel mental health services for specific sub-populations.			
Organise access to a range of supports, including psychological first aid, to people in acute distress after exposure to an extreme stressor.	Do not provide one-off, single-session psychological debriefing for people in the general population as an early intervention after exposure to conflict or natural disaster.			
Train and supervise primary/general health care workers in good prescription practices and in basic psychological support.	Do not provide psychotropic medication or psychological support without training and supervision.			
Use generic medications that are on the essential drug list of the country.	Do not introduce new, branded medications in contexts where such medications are not widely used.			
Establish effective systems for referring and supporting severely affected people.	Do not establish screening for people with mental disorders without having in place appropriate and accessible services to care for identified persons.			
Develop locally appropriate care solutions for people at risk of being institutionalised.	Do not institutionalise people (unless an institution is temporarily an indisputable last resort for basic care and protection).			

Table 8, continued.

Operational Dos and Don'ts				
Dos	Don'ts			
Use agency communication officers to promote two-way communication with the affected population as well as with the outside world.	Do not use agency communication officers to communicate only with the outside world.			
Use channels such as the media to provide accurate information that reduces stress and enables people to access humanitarian services.	Do not create or show media images that sensationalise people's suffering or put people at risk.			
Seek to integrate psychosocial considerations as relevant into all sectors of humanitarian assistance.	Do not focus solely on clinical activities in the absence of a multi-sectoral response.			

Annex B: The Effects of Flooding on Mental Health

MICRODIS

INTRODUCTION

MICRODIS is a project with the overall goal to strengthen preparedness, mitigation and prevention strategies in order to reduce the health, social, and economic impacts on communities of extreme events (113-115). This work of this project included research on, and in disaster-affected communities to assess the health, economic and social impacts at the micro-level.

SYSTEMATIC REVIEW

In 2008, MICRODIS conducted a systematic review of evidenced-based knowledge on the health and health systems impacts of natural disasters, specifically earthquakes, windstorms and floods. The project distinguished between psychosocial, psychological, and psychiatric symptomatology, stating that the former is the most common, the latter the least (114).

In the immediate aftermath of a disaster, psychosocial problems are rife: such as increased looting, discrimination, behavioural problems among children, increased substance misuse and increased domestic violence.

The project concluded that the majority of disaster victims experience one or more psychological symptoms. These are diverse and include: anxiety, emotional distress, sleeping difficulty, severe emotional distress, worry, temper outbursts, bereavement, and survivor guilt. Most of these experiences abate over time. However, in a small number of people, these symptoms may persist and, if left untreated, can become pathological (114).

THE SOCIAL IMPACT CONCEPTUAL MODEL AND FRAMEWORK AND HEALTH IMPACT CONCEPTUAL MODEL

The natural hazards paradigm forms the basis from which MICRODIS conceptualises disasters and their impact on humans and human health. The major themes of the natural hazards paradigm are:

- Identification and mapping of the human inhabitation of the disaster zone;
- Identification of the full range of adaptations to the hazard;
- Description of how mitigation measures are adopted; and
- Identification of the optimum set of adjustments to the hazards what is known and what is actually done.

A critique of this paradigm has resulted in the socio-political, or structural, approach, which is situated at the societal level and focuses on the ways that social, economic

and political systems create and perpetuate hazards and vulnerability. This requires a shift in understanding from the natural hazards paradigm of what are the risk factors. It assumes that vulnerability and resilience of the individual persons, households, and communities can be understood as a result of systemic pressures which influence their ability to cope, adapt and recover.

Disasters exert different effects at the personal and community levels. Negative effects are increased in particular people, whereas positive effects are decreased in the community (116). This implies that the health of the community is affected, which is expressed through stress (113).

The figure included here summarises the health impact conceptual model, which is built on the concepts that we have summarised. It incorporates the elements that affect health in the wake of a disaster (115).



Figure 3: Health Impact Conceptual Model (115)

* K-A-P-B: knowledge, attitude, practice, and belief

Annex C: The Effects of Flooding on Mental Health

Psychosocial Care for People Affected by Disasters and Major Incidents (NATO/EAPC and Department of Health)

INTRODUCTION

The material presented in this chapter is taken from two guidance documents. The full title of the first document referred to in this chapter is: Psychosocial care for people affected by disasters and major incidents (18).

The title of the second document is: National Health Service Emergency Planning Guidance: planning for the psychosocial and mental health care of people affected by major incidents and disasters (13).

Readers may also wish to consider the principles for psychosocial and mental health care after disasters and major incidents that were developed by an international group in 2009-10 (1). This document combines principles that were developed when the NATO Guidance was being researched with principles developed by the TENTS programme that was funded by the EU.

THEORY

The NATO Guidance was published by NATO/EAPC in 2008. Subsequently, several experts came together to extract and, then combine the principles that are contained in the NATO Guidance and in Guidelines that were developed in the TENTS project for intervening with people who suffer traumatic stress that was funded by the EU. This group of people took into their document principles that were drawn from the IASC Guidance. The resulting principles document covers four levels of policy, which are:

- Governance policy (i.e. the principles provide evidential guidance whereby governments can develop effective policies);
- Strategic policy (i.e. the principles should assist the responsible authorities to design and commission the services that are required);
- Operational policy (i.e. the principles should assist agencies to deliver effective responses to the psychosocial and mental health needs of the populations of people that they serve); and
- Good clinical practice.

Thereafter, these principles were used to underpin development of the guidance that was published by the Department of Health for England in 2009.

These three documents provide conceptual and practical resources for developing policy and strategy and for planning, designing services and

delivering services according to the best evidence that was available in 2009 (13). In particular, the NATO Guidance describes:

- The nature of disasters and psychosocial trauma; core concepts and definitions; and patterns of response;
- A strategic stepped model of care that includes public health approaches to developing the personal and collective resilience of people, families and communities and approaches to assessing and intervening with people in need;
- Important aspects of strategic leadership, management and workforce development that are required when planning and delivering responses to people's psychosocial and mental health needs after major incidents and disasters.

This chapter extracts aspects of the theoretical element of the guidance, which also summarises the epidemiological research that provides the evidential platform that underpins the guidance (see Chapter 6).

The three resources are based on a core principle, which is that psychosocial distress occurs when a person's natural coping threshold is challenged. The personal meaning and experience of the event has more influence on the psychological impact of the event rather than the event itself. This is why some more groups are more vulnerable than others – if their normal life is stretching their ability to cope (chronic disease sufferer or carer for example) then an extra event may be too much for their natural resources.

Also, these three reports accept that different patterns of mental health response can occur over time following an event depending the trajectory of response that each person follows. The three most frequent trajectories are the resilient, recovery and resistant responses (18). Figure 4, included on the next page, illustrates how the initial response can be similar, which is why cohort studies that follow people over time are needed to distinguish between groups.

Psychosocial patterns after flooding follow this broad pattern. However, and highly importantly, the longevity of the primary stressor and the frequency of secondary stressors after flooding are such that the pace of response may be much slower. This can have the effect of drawing out the response lines from the right with each stage being delayed. This fits with our understanding that may be prolonged and peak later, at about 9 months after the flooding.

People respond to major incidents and disasters in four main ways and they may:

- Be shocked upset immediately afterwards (resilient and resistant people);
- Be temporarily and proportionally distressed but able to function purposefully in the short- and medium-terms (resilient people);
- Become disproportionately distressed or dysfunction in the short- to medium-terms; and/or

• Develop a mental disorder in the short-, medium- and longer-terms.



Figure 4: Resilience, resistance and recovery mental health pathways or trajectories (13)

Figure 5 illustrates people's common psychosocial responses to major incidents and disasters. They constitute the spectrum of distressed experiences.

Figure 5: Anticipated responses to major incidents and disasters (18)



There is international consensus that the development of psychological impacts over the first month after a disaster is the best indicator of predicting peoples' prognosis. If distress is in the process of diminishing 4 weeks after the event, then recovery is more likely. But if distress is remaining at a stable level, increasing or causing serious problems then a mental health assessment is needed.

The next list summarises factors that may affect people's responses to disasters.

Factors that affect psychosocial response to disaster (18):

- Demographic characteristics of affected community members
- Racial and ethnic distribution of the various neighbourhoods
- Primary languages spoken by the residents of the different communities
- Age distribution of the survivors
- Range of family composition within neighbourhoods
- At risk and medically fragile populations
- Structure of the local economy and range of jobs lost, and those still available
- Specific populations with limited resources (for example, migrants)
- Educational resources, including schools, that are located in the area
- Resources for childcare in the communities
- Spiritual life of the community including:
 - Churches and church schools destroyed
 - Churches as part of the primary community infrastructure for communities and neighbourhoods
- Resources for older people including nursing homes, retirement communities and community centres
- Educational level and professional training within the communities
- Number of insured versus uninsured homes and businesses
- Number and state of the habitable properties in the area including:
 - Number of rental properties as primary residences versus owned/mortgaged homes
 - Number and locations of residences that are primarily temporary homes
 - Availability of housing stock
 - The extent of relocation including:
 - Number of whole communities relocated
 - Number of survivors displaced and living with relatives or living in temporary housing in other communities
 - Number of survivors relocating to other areas
- Previous community experience with catastrophe
- Personal and community expectations about the occurrence of, for example, hurricanes, floods, tornadoes, and/or earthquakes
- Awareness of population with the response and recovery processes related to the frequency of natural disasters or terrorist attacks

Additionally, there is evidence that factors influencing the philosophy of psychosocial and mental healthcare that is espoused by this guidance include (18):

- Substantial resilience of persons and communities is the expected response to a disaster, but is not inevitable
- Often, the responses that are experienced by resilient people can be difficult to distinguish from symptoms of acute stress disorders and later post-traumatic conditions
- The risk of psychiatric morbidity is greatest for those people who:
 - Have high perceived threat to life
 - Are faced with a circumstance of low controllability and predictability
 - Have experienced high loss and physical injury
 - Have to live with the possibility that the disaster might recur
 - Have been exposed to dead bodies and grotesque circumstances
 - Have endured higher degrees of community destruction

Further principles include the evidence which finds that the psychological and behavioural consequences of disasters result from interactions of the (18):

- Direct impact of the disaster or major incident, for example, destruction and death
- Consequences of the response, for example, economic loss, disruption, etc.
- Impact of subsequent preparedness or counter-terrorism strategies, for example, behavioural and social ramifications of new security procedures
- People's personal and community circumstances, past experiences and resilience
- Health affects on people who are involved directly or indirectly or who carry the burden of worry and care for survivors

PRACTICAL GUIDANCE

The three guidance documents that are considered in this chapter take it as axiomatic that:

- How psychosocial issues are handled may define the longevity of people's distress, their recovery, and the effectiveness of community recovery after a major incident or disaster. Actions that bring life back to normal as quickly as possible are vital effective response by protecting social and community functions and signposting to additional services.
- Restoring the social structure of communities, understanding and protecting vulnerability is an important factor for effective response to psychosocial and mental impacts.
- Decision makers must make understand the risk factors that dictate a community's ability to cope health, vulnerable groups, mental ill health that might develop and their symptoms, the stress factors that exist.

The guidance from the Department of Health and NATO set out a model of care that links the evidence with: the impact of events; the core components that are contained in the model of care; as well as with the processes of assessment and intervention that are required by people who are affected. This is the basis for the emergency planning guidance that the Department of Health for England has developed and published in 2009 (13).

NATO recommends a strategic stepped model of care which has six main components:

- Strategic planning: multi-agency planning, preparation and training;
- Prevention services that develop the psychosocial resilience of people, families and communities;
- Basic humanitarian and welfare services that are focused on families should be made universally available;
- Providing psychological first aid that is delivered by lay people under supervision form mental healthcare services;
- Providing screening, assessment and intervention for people who do not recover from the immediate or short-term effects; and
- Providing access to primary and secondary healthcare services for people who are in need of them.

All three resource reports also agree that the cornerstone of the plan should be to support people's resourcefulness (18):

- The psychosocial responses that are provided should recognise the important aspects to people's recovery of sustaining their resilience and assisting their recovery. This means that:
 - Services should recognise people's inherent resourcefulness but also their need for informally provided support and responsive services
 - The public should be actively engaged in delivering disaster responses
 - The emphasis of interventions should be on empowering communities and people who are affected
 - The public must be trusted with accurate information that is provided regularly by credible persons
 - Services that offer psychosocial and mental health interventions should be made available to support survivors' resilience and to complement personal and collective resilience and coping
 - It is important to take a positive and co-operative stance to responding effectively to enquiries from the media
 - Avoiding the corrosive effects of rumour is also important

They also advise basing the plan on the principles of psychological first aid as the basis for psychosocial responses. This is because research shows that two key features of resilience are the availability of social support and the ability of people to accept and use it.

The guidance also calls for a coordinated approach for affected populations of people across emergency response and rescue, social care, healthcare, the voluntary and NGO sector agencies as an essential part of the approach. The Department of Health's guidance builds that strategic stepped model of care and offers additional practical advice. It advises that the building blocks of good planning are (18):

- Strategic, operational and tactical preparedness
- Timeliness
- Flexibility
- Integration
- Good communications
- Timely and trusted sharing of information with the public and among the responding agencies
- Efficiency and effectiveness
- Effective planning and co-ordination of service responses may maximise the collective resilience of the public and communities and the personal resilience of affected persons and responders

The strategic stepped model of care is summarised in Diagram 2 on page 16 of this report. Diagram 3 depicts its components and principles appearing in the NATO Guidance and it is reproduced here:

Figure 6: Roles of services in delivering the model of care (${\rm \@}$ Williams R and Kemp V and reproduced with the permission of the copyright holders) (18)

Approach	Humanitarian and Population Healthcare		Personal Healthcare Services	
	Level 1	Level 2	Level 3	Level 4
Nature of Problems	TRANSIENT & SHORT-TERM DISTRESS Resistant & Resilient People	MEDIUM-TERM DISTRESS Resilient People	LONGER-TERM DISTRESS OR MENTAL DISORDER People with Persisting Distress that is Sustained by Persisting Stressors and Mental Disorders	MENTAL DISORDER People with Mental Disorders
Nature of Care	Universal Programmes of Prevention and Care	Universal and Selective Programmes of Prevention and Care	Universal, Selective and Indicated Programmes of Care	Universal, Selective and Indicated Programmes of Care
	Restoration of Psychosocial Environment by Normalising Relationships and Services Informed by the Principles of Psychological First Aid	Restoration of Psychosocial Environment by Normalising Relationships and Services Psychological First Aid	Primary Healthcare Mental Health Assessment and Access to Psychological Therapies	Specialist Mental Healthcare
Agents	First Responders, Families, Friends, Neighbours, Communities, Schools and Workplaces	Trained Lay Therapists with Professional Supervision	Trained Lay Therapists with Professional Supervision Augmented Primary Care Services (primary healthcare teams working with staff of community mental health services)	Specialist Mental Health Services
Indicative Time Line (days post incident, if appropriate)	0 to 14	3 to 30	28 to 365	28 and continuing
Roles of Mental Health Professionals	Provision of specialised advice to the Commanders of the Response Services at Strategic (Gold), Tactical (Silver) and Operational (Bronze) Levels Provision of a Liaison Mental Health Service for Responders (requires training in disaster mental healthcare)	Direction, Management and Supervision of Lay Therapists Provision of a Liaison Mental Health Service for Responders (requires training in disaster mental healthcare and supervision)	Advice to Primary Healthcarers Direction, Management and Supervision of Lay Therapists Advice to Specialist Mental Healthcare Services Conducting Some Specialist Assessments Supervision of Other Healthcarers (requires training in disaster mental healthcare and consultation techniques)	Delivery of Specialist Mental Healthcare

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INTERVENTIONS

General Principles

The general principles for intervention include (18):

- Providing integrated multi-agency services;
- Integrating referral and care pathways;
- Providing prevention by promoting the psychosocial resilience of persons, families and communities;
- Providing effective assessment and intervention services that are able to offer rapid responses with a view to assisting recovery and which are able to offer long-term and holistic approaches.

Psychological First Aid (PFA)

Psychological First Aid (PFA) is not a specific or single intervention and it is not a treatment (18). It is an approach to reduce initial distress immediately after an event and encourage adaptive processes. It recognises that a broad range of early reactions (physical, behavioural, psychological and spiritual) may occur after an event, that distress is very common, compatible with a resilient trajectory of response and that continuing support reduces the risks of people's distress giving way to continuing problems and to mental disorders.

The core components of PFA are:

- Protecting people from immediate further threat;
- Providing immediate physical care;
- Providing comfort ;
- Encouraging people to resume control of their lives (restoring agency);
- Restoring connections for people with their families and friends;
- Facilitating sharing experiences (but not forced);
- Linking survivors to other available sources of support; and
- Providing psychosocial triage identifying people who might need further help.

Psychosocial Triage

Psychosocial triage should occur at a later stage and should distinguish between those people who do have the experiences of distress and people whose experiences and symptoms indicate that they might have a clinical disorder. People who fall into the former category require continuing social support. Similarly, people who are thought as possibly being in the latter group because of their clinical symptoms should be offered social support, but, in addition, access for further assessment in the clinical services through referral for augmented primary care. Other people who have mental disorders should have access to immediate intervention that includes assessment and treatment.

One method for conducting this form of triage is in use by the UK's armed services. It is the Trauma Risk Management Programme.

The Trauma Risk Management Programme (TRiM) in the UK armed services

Greenberg et al.(117) describe the Trauma Risk Management (TRiM) Programme. Its intention is to assess people after major traumatic events, normalise people who are transiently distressed but resilient and identify people who may require more substantial psychosocial care or mental healthcare (18). It is a management strategy that is delivered by peer practitioners who are trained to use a structured questioning format. That interview is based on asking interviewees about risk factors for mental disorders and the technique avoids asking about emotional reactions in ways that risk encouraging interviewees to re-experience their feelings. The intention is to reduce the risks of interviewees being re-traumatised. One interview occurs immediately after the event and the second about a month later.

TRiM practitioners' list of risk factors for later psychological disorder (13)

- 1. The person perceives that they were out of control during the event
- 2. The person perceives that their life was threatened during the event
- 3. The person blames others for what happened
- 4. The person reports shame/guilt about their behaviour during the event
- 5. The person experienced acute stress following the event
- 6. The person has been exposed to substantial stress since the event
- 7. The person has had problems with day to day activities since the event
- 8. The person has been involved in previous traumatic events
- 9. The person has poor social support, (family, friends, unit support)
- 10. The person has been drinking alcohol excessively to cope with distress

Debriefing and Peer Support

There is debate about whether responders and survivors should be offered routine Critical Incident Stress Debriefing (CISD). Many experts question the therapeutic validity of one-off debriefings. There is some evidence that debriefing in this way is ineffective and some research shows that there is a risk of harm. This may because there is doubt about whether asking people to remember their experiences is helpful or not.

The risk of pressing people to talk before they are ready to do so may lie in the prospect of their re-experiencing leading to their re-traumatisation. Few sources of guidance recommend single-event psychological debriefing sessions for people who are affected by major incidents and disasters.

Assessment

There is evidence that people whose experiences of distress do not resolve within a month of a major incident or disaster may need assessment for possible mental disorders with a view to specialist interventions if they are thought to be required.

The NATO guidance suggests this should include the following:

- History taking
- Examination of mental state
- Assessment of relationships before the event
- Risk assessment
- Social assessment available network and support
- Information from other sources

Interventions for PTSD

The evidence-based interventions for people who have PTSD that is confirmed by clinical assessment include:

- Trauma-focused cognitive behavioural therapy (TFCBT) (the intervention of first choice); and
- Eye movement desensitisation and reprocessing (EMDR).

There is also some evidence that some people may require prescription of carefully selected pharmacological treatments. Additionally, treatment with psychopharmacological as a first line has not ruled out in certain circumstances by NICE, and particularly if distress precludes patients' involvement in other therapies, or clinicians and practitioners are unavailable (13).

Annex D: The Effects of Flooding on Mental Health

Guidance from the Centers for Disease Control and Prevention in the USA

INTRODUCTION

This chapter describes the guidance from the Centers for Disease Control and Prevention (CDC) in the USA and signposts readers to further guidance that can be accessed (118)

We have extracted and minorly adjusted material that may be useful to readers and put it in this chapter. As a result, this chapter may appear as a set of notes, reminders or other resources.

COPING WITH A TRAUMATIC EVENT: INFORMATION FOR THE PUBLIC

The following statements are provided by the CDC for circulation to affected people.

- Traumatic events often cause feelings of helplessness, anxiety, and aggression.
- It will take time before you start to feel better.
- There are many things you can do to cope with traumatic events, including talking to family, friends, and clergy for support.
- You may need to consider seeking professional help if you feel sad or depressed for more than two weeks, or if you are not able to take care of your family or do your job.
- A traumatic event turns your world upside down
 - After surviving a disaster or act of violence, people may feel dazed or even numb. They may also feel sad, helpless, or anxious. In spite of the tragedy, some people just feel happy to be alive.
 - It is not unusual to have bad memories or dreams. You may avoid places or people that remind you of the disaster. You might have trouble sleeping, eating, or paying attention. Many people have short tempers and get angry easily.
 - These are all normal reactions to stress.
- It will take time before you start to feel better.
 - You may have strong feelings right away. Or you may not notice a change until much later, after the crisis is over.
 - Stress can change how you act with your friends and family.
 - It will take time for you to feel better and for your life to return to normal.
 - Give yourself time to heal.

- These steps may help you feel better
 - A traumatic event disrupts your life. There is no simple fix to make things better right away.
 - But there are actions that can help you, your family, and your community heal. Try to:
 - Follow a normal routine as much as possible.
 - Eat healthy meals. Be careful not to skip meals or to overeat.
 - Exercise and stay active.
 - Help other people in your community as a volunteer. Stay busy.
 - Accept help from family, friends, co-workers, or clergy. Talk about your feelings with them.
 - Limit your time around the sights and sounds of what happened. Don't dwell on TV, radio, or newspaper reports on the tragedy.
- Sometimes the stress can be too much to handle alone. Ask for help if you:
 - Are not able to take care of yourself or your children.
 - Are not able to do your job.
 - Use alcohol or drugs to get away from your problems.
 - Feel sad or depressed for more than two weeks
 - Think about suicide.
- If you or someone you know is having trouble dealing with the tragedy, ask for help. Talk to a counselor, your doctor, or community organization.

INFORMATION FOR HEALTH PROFESSIONALS

What Is a Traumatic Event?

An event, or series of events, that causes moderate to severe stress reactions, is called a traumatic event. Traumatic events are characterized by a sense of horror, helplessness, serious injury, or the threat of serious injury or death.

Traumatic events affect survivors, rescue workers, and friends and relatives of victims who have been directly involved. In addition to potentially affecting those people who suffer injuries or loss. They may also affect people who have witnessed the event either firsthand or on television.

Stress reactions immediately following a traumatic event are very common. However, most of the reactions are likely to resolve within ten days.

Common Responses to a Traumatic Event

The CDC's guidance on common responses are summarised in Table 9.

Table 9: Common Responses to a Traumatic Event (118)					
Cognitive	Emotional	Physical	Behavioral		
 poor concentration confusion disorientation indecisiveness shortened attention span memory loss unwanted memories difficulty making decisions 	 shock numbness feeling overwhelmed depression feeling lost fear of harm to self and/or loved ones feeling nothing feeling abandoned uncertainty of feelings volatile emotions 	 nausea light headedness dizziness gastro-intestinal problems rapid heart rate tremors headaches grinding of teeth fatigue poor sleep pain hyperarousal jumpiness 	 suspicion irritability arguments with friends and loved ones withdrawal excessive silence inappropriate humor increased/decreased eating change in sexual desire or functioning increased smoking increased substance use or abuse 		

How Do You Interact with Patients after a Traumatic Event?

Clinicians should be alert to the various needs of traumatised persons:

- Listen and encourage people to talk about their reactions when they feel ready.
- Validate the emotional reactions of the people. Intense, painful reactions are common responses to a traumatic event.
- De-emphasize clinical, diagnostic, and pathological language.
- Communicate, person to person rather than expert to victim using straightforward terms.

What Can You Do to Help People to Cope with a Traumatic Event?

Explain that the experiences of affected people may be normal, especially right after the traumatic event, and then encourage them to:

- Identify concrete needs and attempt to help. Traumatised persons are often preoccupied with concrete needs (e.g. how do I know if my friends made it to the hospital?).
- Keep to their usual routine.
- Help them to identify ways to relax.
- Face situations, people and places that remind them of the traumatic event and not shy away.
- Take the time to resolve day-to-day conflicts so they do not build up and add to their stress.
- Identify sources of support including family and friends. Encourage talking about their experiences and feelings with friends, family, or other support networks (e.g. clergy and community centers).

Who Is at Risk for Severe and Longer Lasting Reactions to Trauma?

Some people are at greater risk than others for developing sustained and longterm reactions to a traumatic event including disorders such as post traumatic stress disorder (PTSD), depression, and generalized anxiety. Factors that contribute to the risk of long-term impairment such as PTSD are listed.

- Proximity to the event. Closer exposure to actual event leads to greater risk (dose-response phenomenon).
- Multiple stressors. More stress or an accumulation of stressors may create more difficulty.
- History of trauma.
- Meaning of the event in relation to past stressors. A traumatic event may activate unresolved fears or frightening memories.
- Persons with chronic medical illness or psychological disorders.

What Can You Do to Treat Patients in Response to a Traumatic Event?

Helping survivors of traumatic events, their family members, and emergency rescue personnel requires preparation, sensitivity, assertiveness, flexibility and common sense.

- Refer patients to a mental health professional in your area who has experience treating the needs of survivors of traumatic events.
- Provide education to help people identify symptoms of anxiety, depression, and PTSD (see resources).
- Offer clinical follow-up when appropriate, including referrals to mental health professionals.

Emergency Mental Health and Traumatic Stress

Tips for teachers for talking about disasters:

- <u>Marking Disaster Anniversaries in the Classroom</u> suggests activities for teachers to use with students of different grade levels to commemorate disaster anniversaries.
- <u>Questions to Help Children Talk About a Disaster</u> provides examples of "open-ended" questions to encourage children to talk about their feelings and experiences following a disaster.
- <u>When Talking Doesn't Help: Other Ways to Help Children Express Their</u> <u>Feelings Following a Disaster</u> provides ideas for helping children express themselves in ways other than talking to help them through the recovery process following a disaster.
- <u>The Role of Culture in Helping Children Recover from a Disaster</u> offers words of advice and guidance for teachers helping children from diverse cultural and ethnic backgrounds through the recovery process following a disaster.

Tips related to children and adolescents:

- <u>Tips for Talking to Children After a Disaster</u> offers tips to parents on how to talk to children about terrorist events.
- <u>After a Disaster: What Teens Can Do</u> provides information for teens to help understand some of their reactions as well as others, to terrorist events. Suggestions are also provided to help ease the unfamiliar feelings related to the event.
- <u>Tips for Talking to Children After a Disaster: A Guide for Parents and</u> <u>Teachers [PDF]</u> offers tips to parents on how to talk to children about terrorist events.

Tips relating to adults:

- <u>Recognizing and Reducing Anxiety in Times of Crisis</u> provides tips for dealing with stress from traumatic events.
- <u>A Guide for Older Adults</u> provides suggestions for older adults attempting to understand terrorist events.
- <u>Mental Health Aspects of Terrorism</u> describes typical reactions to terrorist events and provides suggestions for coping and helping others.
- <u>Disaster Counseling</u> provides suggestions for disaster counselors on establishing rapport and active listening.
- How to Deal With Grief

Tips for families:

- <u>Tips for Talking to Children in Trauma: Interventions at Home For</u> <u>Preschoolers to Adolescents [PDF]</u> suggests activities arranged by age group to help children share recovery feelings and experiences at home. Includes activities for preschoolers, elementary age children, and preadolescents and adolescents.
- <u>Self-Care Tips for Survivors of a Traumatic Event: What to Expect in Your</u> <u>Personal, Family, Work, and Financial Life [PDF]</u> cites examples of personal uncertainties, family relationship changes, work disruptions, and financial worries that may contribute to the long-term impact of a traumatic event. Also includes tips on how to survive the road to recovery from a traumatic event.
- <u>Anniversary Reactions to a Traumatic Event: The Recovery Process</u> <u>Continues</u> describes common anniversary reactions among victims of traumatic events and explains how these reactions can be a significant part of the recovery process.

Tips for emergency and disaster response workers

• <u>Tips for Managing and Preventing Stress: A Guide for Emergency and</u> <u>Disaster Response Workers [PDF]</u> provides suggestions for those who are at the scene. It outlines facts, indicators of stress, and stress management strategies.

Annex E: The Effects of Flooding on Mental Health

PsySTART (Psychological Simple Triage and Rapid Treatment) Guidance from the Inter-Agency Standing Committee (IASC)

THE THEORY FOR, AND OBJECTIVES OF PSYSTART

PsySTART is reported in a paper titled Paediatric disaster management: Special health care needs patients and mental health issues (119).

Paediatric patients may be vulnerable to mental ill health after disasters for various reasons. Their cognitive skills are immature, so younger people find it more difficult to process and understand the experiences they have been through and to cope with unforeseen events. They have not developed a full set of coping mechanisms to deal with psychological stress. Some may have not developed abstract reasoning, so they might not be able to understand that the event will come to an end because their concepts of time may not be mature. Children with special health care needs, or mental health needs may face greater obstacles.

The PsySTART rapid mental health triage and incident management system does not measure symptoms but objective indicators of the extent of direct exposure to events, injury, traumatic loss, and secondary aftermaths (e.g. loss of home, relocation, parental distress). It has been shown to predict which children are at greatest mental health risk. PsySTART uses the paediatric disaster systems of care model' and, by using an evidence-based, brief, objective mental health triage tag and an information technology system, it links the key systems in real time (emergency departments, public health agencies) and mental health agencies).

This approach permits timely data sharing between emergency and disaster settings to definitive mental health response assets.

The system is designed to provide seamless linkage between specific Emergency Departments (EDs) or disaster settings and the range of local, state and national mental health response assets, which all use the same data metric for a common operational picture. Currently, the model is part of the American Red Cross Disaster Response System. It is being developed for Los Angeles County Emergency Medical Services Agency and 14 Los Angeles County Disaster Resource Centre' hospitals, and has been used by the US Public Health Service Rapid Deployment Force, and Mental Health Teams. It is recommended for use by the National Disaster Medical System (NDMS) Mental Health Sub-Working Group and is recommendation IA of the Disaster Mental Health Subcommittee of the National Biodefense Science Board. The system was successfully used by the Centers for Disease Prevention and Control in support of efforts by the Thai Ministry of Health following the Tsunami and by

the American Red Cross during the TOPOFF national terrorism exercise and more recently in the American Red Cross Hurricane Ike response in the first real world, large event disaster mental health rapid triage and incident management demonstration effort.

MENTAL HEALTH RECOMMENDATIONS FROM PSYSTART

The recommendations from this project include:

- Development of local <u>p</u>ediatric disaster systems of care' that link paediatric emergency and primary care settings with public health agencies, EDs, public mental health services, the American Red Cross, and schools;
- Evidence based rapid triage in paediatric emergency care settings (e.g. the PsySTART Rapid MH Triage and Incident Management System);
- Training ED providers in the PsySTART rapid triage system and basic psychological first aid strategies;
- Identification of a graded range of acute interventions:
 - Referral for definitive mental health care for high-risk children;
 - Provision of parent coping information such as parent provided psychological first aid for children; and
 - Provision of general coping information for children.

Other recommendations are that promotion of education and research for mental health emergencies should include:

- Expansion of the data on epidemiology, best practices, treatment outcomes, and cost/benefit issues for paediatric mental health emergencies in the ED;
- Evaluation of the adequacy of patients' access to paediatric mental health services;
- Evaluation of children with behaviour crisis to understand gaps in primary care and community resources;
- Development of mental health support networks that minimize reliance on acute crisis management;
- Development and validation of paediatric mental health screening tools for use in various settings and best practices for follow-up programs for paediatric mental health patients; and
- Enhancement of the paediatric mental health curriculum for emergency medicine and paediatric residency training programs and paediatric emergency medicine fellowships

PsySTART measures the impact of severe or extreme stressors or <u>d</u>ose of exposure factors' in terms of what happened and symptoms, and so it is based on objective exposure features:

• Traumatic exposure;

- Traumatic loss;
- Ongoing stressors;
- Injury or illness; and
- Peri-traumatic severe panic (subjective risk).