



What interventions are effective to support people’s mental health and wellbeing (a) in areas at risk of flooding; and (b) after a flood has occurred: An agile scope of the literature

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Introduction

As a result of climate change and changes in land-use, floods are predicted to become a more frequent occurrence in the United Kingdom, and potentially more severe and hazardous events (Public Health England, 2017; Natural Resources Wales, 2023). Its steep topography and residential proximity to rivers and coastal areas make Wales particularly vulnerable (Welsh Government, 2016), with an estimated 1 in 8 properties at risk of flooding (Natural Resources Wales, 2023). Flooding can have numerous impacts, such as economic and environmental, as well as consequences for both physical and mental health.

Research exploring the impacts of flooding on mental health in England found that people who experienced flooding in their homes were six times more likely to have mental health issues such as probable depression, anxiety, or post-traumatic stress disorder than people who had been unaffected by flooding (Public Health England, 2017). Risk of mental health issues increased with the depth of floodwater and the length of time houses were flooded. Those whose homes were flooded or whose lives were disrupted by flooding were also more likely to seek help and support from any source (such as general practice, friends and family, and voluntary services) than those unaffected by flooding. For some, this request for help was likely to have been prompted by mental health issues (Public Health England, 2017).

The Evidence Service at Public Health Wales were asked to undertake evidence review work investigating climate change, flooding, and health, in order to shape Public Health Wales' future climate change research agenda. This agile scope aims to answer one question from that request; **What interventions are effective to support people's mental health and wellbeing in a) areas at risk of flooding, or b) after a flood has occurred?** A second question around the effectiveness of early warning systems for mitigating the health effects of flooding has also been addressed in a separate paper (Hookway A, et al., 2024).

A scoping search of the literature was undertaken in preparation for this work utilising the Public Health Wales Evidence Service's list of reliable secondary evidence sources.¹ No systematic review that directly addressed the research question was identified using these sources, and therefore the decision was made to broaden our search to look for secondary evidence in a wider range of scientific databases and in the grey literature, using an agile scope approach (as outlined in Appendix A). It should be noted, however, that it is possible that not all evidence relating to this topic was identified, as our searches were not exhaustive. Included studies were critically appraised using appropriate checklists (where possible) and

¹ Sources of guidelines and secondary level evidence that have been produced using a robust methodology (which adheres to systematic review principles and includes critical appraisal using a recognised tool). The list of resources can be found in appendix B.

comments on methodological rigour have been included in the data extraction tables (appendix C) and considered in the narrative summary of findings.

Methodological considerations and limitations:

Agile scoping reviews utilise rapid methodology to provide a broad overview of the evidence base on a topic of interest. They are intended to guide and inform further work rather than to be used for policy and practice. The findings and conclusions included are those of the source authors and not an interpretation by the Evidence Service. Factors relevant to answering the above question identified from the studies have been extracted and briefly summarised within this report. If a specific factor is of interest, it is advisable to read the sources from where they were taken in more detail. If utilising any research included in this scope to inform policy, it is important to consider the methodological quality and generalisability of the findings to your context.

Objectives

This agile scoping review aims to answer the following question:

- What interventions are effective to support people’s mental health and wellbeing:
 - (a) in areas at risk of flooding
 - (b) after a flood has occurred

Key Messages

- Very little secondary research was identified that explores the effectiveness of interventions to support people’s mental health and wellbeing after a flood has occurred, and no research was found which explores the effectiveness of mental health and wellbeing interventions for people in areas at risk of flooding.
- Psychological first aid may provide improvements in depressive symptoms and total social support, but no changes in post-traumatic stress symptoms amongst adolescents (Ramirez M, et al., 2013). However, these findings should be interpreted with caution as the study was rated as being of high risk of bias by the authors of the systematic review (Hermosilla S, et al., 2023).

- One literature review assessed the existing guidance on emergency planning for the impacts of flooding on psychosocial and mental health needs. The authors found that most people’s psychosocial needs are met through their close relationships with their families, friends, and communities; smaller proportions of people are likely to require specialised mental healthcare (Stanke C, et al., 2012).
- Guidance issued by the UK Health Security Agency (2023) recommends a phased four-tiered pyramid response for flood victims to reduce the mental health effects caused by flooding on affected people and communities. The first two activities encompass the actions needed for most of the population and include details on the provision of psychological support, which would be primarily delivered by self, family, friends, local community and/or responders. This may include interventions such as helplines and drop-in sessions. The latter two activities describe more focused and targeted care for those at higher risk, such as mental health support from primary care services, followed by referral to specialist mental health services for significant and enduring psychological problems.
- The findings above should be read with caution due to the quality of the evidence and lack of critical appraisal in some cases.

Findings

No secondary evidence was found that focused on exploring the effectiveness of mental health and wellbeing interventions solely in the realm of flooding. However, a limited number of relevant reviews of the literature were identified which summarised primary studies assessing mental health and wellbeing interventions for disasters more broadly, which include some studies undertaken after flood events. One piece of guidance was also identified. These are summarised below.

Three reviews of the literature are included in this agile scope; one of these was a systematic review and two were non-systematic literature reviews. The systematic review focused on psychological first aid for traumatic events, including flooding (Hermosilla S, et al., 2023). One non-systematic literature review focused on mental health interventions for disasters, and other traumatic events, including flooding (Lotzin A, et al., 2023), and the other non-systematic literature review synthesised the literature on emergency planning for the impacts of flooding on psychosocial and mental health needs (Stanke C, et al., 2012). Although non-systematic literature reviews are not normally considered methodologically robust enough to include in an agile scope, the decision was made to include both publications due to the scarcity of relevant published systematic reviews. One piece of guidance is also included (UK Health Security Agency, 2023). However, the authors do not describe

the research they undertook to develop this guidance. It is included here for information as it is assumed to set out established practice following a flood in the United Kingdom. The research described above was published between 2012 and 2023. A detailed data extraction table of these sources can be found in Appendix C.

The systematic review by Hermosilla S, et al. (2023) aimed to assess the efficacy of psychological first aid in improving the mental health and psychosocial wellbeing of individuals exposed to potentially traumatic events. Psychological First Aid was defined by the review as approaches to provide psychological support to individuals in the immediate aftermath of a stressful event, designed to reduce immediate distress and mitigate psychopathology risk. They involve needs assessment, non-judgemental listening and engagement and service referral where indicated, and techniques can be delivered by non-mental healthcare workers as they do not require specialist training (Hermosilla S, et al., 2023). Twelve studies met the inclusion criteria for the review. However, only one primary study relevant to our research question was included, which assessed a psychosocial intervention after a flood event (Ramirez M, et al., 2013). This primary study was also the only relevant study included in the non-systematic literature review undertaken by Lotzin A, et al. (2023). The Lotzin A, et al. (2023) review aimed to identify brief interventions to reduce psychological distress and/or subclinical symptoms in survivors of disasters, pandemics, and other traumatic events and included a total of twenty-one published primary studies and six ongoing primary studies.

The Ramirez M, et al. (2013) study included in both the reviews described above aimed to pilot an adapted school based psychological first aid intervention for adolescents exposed to flooding or individual trauma in the USA, called the Listen Protect Connect Programme. Listen Protect Connect provides basic psychological support and aims to reduce the initial distress of students and parents following traumatic events, community disasters, emergencies, or personal trauma. It is delivered by non-mental-health professionals and is based on the five-step crisis response strategy “listen, protect, connect – model and teach”. The Ramirez M, et al. (2013) study piloted an adapted version of programme (composed of three steps: listen, protect, and connect) in an uncontrolled pre-post study of 20 children (age 12-17 years, 20% female) impacted by the great flood of Iowa in 2008 and aimed to reduce post-traumatic stress disorder symptoms. The school nurse provided one Listen Protect Connect session to each student (averaging 25 minutes duration).

Ramirez M, et al. (2013) reported a significant decrease in depressive symptoms at 2 weeks follow-up (adjusted mean = 14.3; $p < 0.01$) and 4 weeks follow-up (adjusted mean = 13.2; $p < 0.01$). However, there was a slight increase at 8 weeks follow-up (adjusted mean = 15.2; $p < 0.01$). They also found a non-significant increase in perceived social support from baseline to the 2-week follow-up (adjusted $M = 3.9$; $p = 0.08$), and a significant increase from baseline to 8 week follow-up (adjusted mean

= 4.0; $p < 0.01$). The authors found a non-significant decrease in post-traumatic stress disorder symptoms over time ($p=0.09$) from baseline to 8-week follow-up, and school connectedness was higher at 2- (mean = 63.8; $p = 0.06$) and 4-weeks follow-up (mean = 68.9, $p < 0.01$) than at baseline (mean = 58.6), but this relationship diminished by 8-weeks (stats not reported). However, these findings should be interpreted with caution, as quality appraisal undertaken in the systematic review by Hermosilla S, et al. (2023) rated the Ramirez M, et al. (2023) study as being at high risk of bias. In addition, as a pilot study, it is likely to be underpowered and so the findings may be unreliable.

The non-systematic review conducted by Stanke C, et al. (2012) aimed to assess and appraise the epidemiological evidence on flooding and mental health. This included assessing the existing guidance on emergency planning for the impacts of flooding on psychosocial and mental health needs; providing a detailed report for policymakers and services on practical methods to reduce the impacts of flooding on the mental health of affected people; and identifying where research can support future evidence-based guidance.

Forty-eight primary studies were included in the review; fifteen of which concerned flooding in OECD countries. The authors found that most people's psychosocial needs are met through their close relationships with their families, friends, and communities; smaller proportions of people are likely to require specialised mental healthcare. The authors also identified key themes from reviews of documents describing current policy in planning and delivering healthcare responses for people who experience flooding and general disasters, such as:

- The importance of adopting a multi-sector approach to promoting wellbeing and recovery that involves communities as well as agencies involved in the flood response;
- Evidence that most people's psychosocial needs are met by people who are close to them, but some people may require more substantial psychosocial care and approaches that are based on the principles of psychological first aid are appropriate;
- Findings that a substantial minority of people who are affected by flooding are at risk of developing a mental disorder and they may require healthcare services that include psychosocial care and mental healthcare;
- The Strategic Stepped Model of Care² being a useful tool for support.

² Described as a model of care that "allows planners to take into account sources of personal and collective social support, and how responses to events are developed. It also allows psychosocial care and mental healthcare to be planned and delivered in integrated ways that follow the trajectories of the needs of people who require them. Thereby, the responsible authorities can create a dynamic, flexible and needs-led approach to mounting effective responses to flooding" (Stanke C, et al., 2012).

The UK Health Security Agency (2023) produced guidance on how to recover from flooding, which covers the preventive measures that are needed to reduce the mental health effects caused by flooding on affected people and communities. The guidance was designed for healthcare professionals, local authorities, government bodies and relevant agencies before, during, and after a flood event. **The guidance suggests that for most, distress from a flood is usually temporary, with the majority able to cope with the psychological effects of being flooded by accessing their existing resources and support networks. However, an important minority of people affected by flooding may go on to develop more severe psychological problems or exacerbations of pre-existing mental health conditions. Therefore, a small proportion of individuals may require access to specialist psychological healthcare.** The support each person needs will be different depending on their circumstances and may increase or decrease over time.

The guideline suggests a specific, four-tiered pyramid for flood response. This is a phased approach where the first two activities encompass the actions needed for the majority of the population, followed by more focused and targeted care for those at higher risk:

1. Provide support to address immediate physical and social needs during and in the aftermath of a flood. Communicate key public mental health messages which normalise the distress caused by flooding and destigmatise the possible effects on mental health.
2. Psychological support: some practical support required, unstructured psychosocial support primarily delivered by self, family, friends, local community and/or responders. This may involve helplines and drop-in sessions.
3. Primary care: support from GP and potential referral to local NHS Talking Therapies services. This also includes recognising the specific needs of children through an active screening programme for those exposed and providing mental health support as appropriate.
4. Referral to specialist mental health services for significant and enduring psychological problems.

No information was given on the source of evidence underpinning this guidance, meaning it was not possible to conduct a critical appraisal. Therefore, the information should be treated with caution. It should also be noted that this guidance appears specific to England. Therefore, its generalisability should be considered as some NHS specialist services may differ in Wales.

Discussion, limitations, and conclusions

The limited evidence described in this agile scope suggests that for some people who have experienced flooding, interventions to support mental health and wellbeing may be beneficial, with one pilot study indicating that psychological first aid may have a positive effect on reducing depressive symptoms amongst adolescents exposed to flooding (Ramirez M, et al., 2013 described by Hermosilla S, et al., 2023 & Lotzin A, et al., 2023). For others, existing support networks, such as family and friends, may provide a sufficient coping mechanism (Stanke C, et al., 2012; UK Health Security Agency, 2023). A stepped model of care is also suggested as an appropriate way in which to identify and provide targeted mental health support to individuals with varying needs after a flood (Stanke C, et al., 2012; UK Health Security Agency, 2023).

This agile scope has some limitations which should be taken into consideration when interpreting the findings. Firstly, our searches focused on identifying secondary research, and we did not identify any systematic reviews which met our inclusion criteria that were focused wholly on mental health and wellbeing interventions for those impacted by, or at risk of, flooding. There may, however, be primary studies which evaluate the effectiveness of mental health and wellbeing interventions for those impacted by, or at risk of, flooding that have not yet been included in secondary research. To identify if a true gap in research evidence exists or if the gap is just within secondary literature, a further search for primary studies could be undertaken.

Secondly, evidence presented in this agile scope comes from one pilot study which was rated as high risk of bias by the authors of the systematic review; from one literature review which did not carry out critical appraisal of the included primary studies; and from one piece of guidance which did not describe the methods used to develop the work. Therefore, any conclusions described above should be read with caution, as we cannot be sure of their methodological quality or validity as no critical appraisal was conducted.

Thirdly, our search strategy used terms specific to flooding in order to narrow down the results and identify secondary literature focusing on interventions for those who had experienced, or were at risk of, flooding. The narrow terms used in the search may have resulted in us missing some broader reviews looking at mental health interventions for natural disasters that may have included flooding. However, we made the decision to use more specific terms in order to conduct a *rapid* search of the evidence, which is a stated aim of agile scopes (see Appendix A for more information).

Finally, the four pieces of evidence described in this agile scope only look at one part of the research question; we were unable to find any secondary research which looked at mental health interventions for those at risk of flooding.

In conclusion, this agile scope has identified very little evidence that directly addresses the research question, and what was identified was either at high risk of bias or was unable to be critically appraised due to the study design. It is therefore difficult to reach a firm conclusion about the effectiveness of mental health and wellbeing interventions for those at risk of flooding or for those who have experienced a flood.

Options for further work

In order to understand more about the effectiveness of interventions to support people's mental health and wellbeing in areas at risk of flooding or after a flood, further evidence review work could be undertaken. This could involve:

- **widening the current search to capture primary studies**, in order to locate all available evidence on the subject and confirm whether a gap in primary research does exist in this area.
- **exploring whether mental health interventions for other natural disasters or traumatic events may be transferrable** to those who have experienced flooding.
- **broadening the search to look at other flooding interventions that may be effective for mitigating the mental health impacts on those at risk of flooding, or who have experienced flooding, such as property adaptations or community interventions.** The current agile scope specifically focused on psychosocial interventions, but it is quite possible that other interventions may also help to mitigate the negative effects that flooding can have on people's mental health and wellbeing. This may in part have been addressed by our agile scope exploring the effectiveness of flood early warning systems for mitigating the health effects of flooding (Hookway A, et al. 2024). However, further work could still be undertaken to look at other types of flood risk management interventions.

Methods

Appendix A (technical appendix) provides an outline of the general rationale and methods used to develop agile scopes. The following methodology outlines the approach undertaken for this agile scoping report.

As this is a broad topic, this agile scope was limited to only include secondary research. This is an acceptable way to rapidly assess the majority of the evidence base, and although it does not intend to identify every publication on a topic, it would allow for the production of an overview. Primary studies were excluded as including both primary and secondary sources of evidence on such a broad topic would have made this report unmanageable within the timeframe of this research.

Data sources: Sixteen reliable evidence sources were searched that adhere to robust systematic review principles³, along with Medline, Epistemonikos, PsycInfo and Google Scholar. Search terms and strategies were designed specifically for each data source. Searches were conducted using a combination of the following terms:

- Flood, disaster, natural disaster, natural hazard, extreme weather, weather;
- Intervention, programme, policy, strategy, support, community support, psychosocial intervention, crisis intervention, social support;
- Mental health, wellbeing, anxiety, anxiety disorder, quality of life, fear, worry, trauma, depression, resilience, cope(coping), stress, stress disorder, psychological effect, post-traumatic stress, psychological adaption.

An additional four sources were also searched for grey literature (details in appendix B). A full search strategy for Medline, along with a full list of resources searched is included in appendix B (search appendix).

Study selection: Search results were assessed for inclusion. Two reviewers independently screened the results for relevance at title, abstract and full-text level against the inclusion criteria outlined in Table 1.

Data extraction: Where possible, data reporting relevant characteristics were extracted from the included reviews into a data extraction table (Table 2, Appendix c). A second reviewer checked the extracted data. Disagreements at any stage were resolved through discussion with a third reviewer.

³ Follows core systematic review principles: comprehensive and stated search strategy, selection of sources based on objective criteria, assessment of risk of bias of primary sources and/or is a methodology developed by an expert body e.g., NICE. For a full list of sources searched, please refer to Sources searched section of the report.

Quality assessment: Where possible, the included studies were critically appraised for their quality using the Public Health Wales in-house critical appraisal checklist for systematic reviews. Details of the checklist used and the methodological rigour of the studies are included in the data extraction tables in Appendix C.

Table 1. Inclusion criteria

Review question 2:		
What interventions are effective to support people’s mental health and wellbeing: a) in areas at risk of flooding b) after a flood has occurred		
	Include:	Exclude:
Participants	Adults or children or any particular communities/population groups at risk of flooding or who have experienced flooding.	
Intervention / exposure	Psychosocial interventions to support people's mental health and wellbeing.	Pharmacological interventions Physical health interventions
Comparison	No intervention or no comparison	
Outcomes	Any measures of mental health and wellbeing, whether measured using a validated measure or subjectively.	Physical health outcomes Patient satisfaction
Other Study Considerations		
Systematic reviews of quantitative, qualitative, or mixed methods studies of any design. OCED countries (comparable to UK)		

References

Hermosilla, S. et al., (2023). We need to build the evidence: A systematic review of psychological first aid (PFA) on mental health and well-being. *Journal of traumatic stress*. 36(1), 5-16.

Hookway, A. et al., (2024). *Are flood early warning systems effective for mitigating the health impacts of flooding: An agile scope of the literature*. Cardiff: Public Health Wales.

Lotzin, A, Franc de Pommereau, A & Laskowsky I. (2023). Promoting Recovery from Disasters, Pandemics, and Trauma: A Systematic Review of Brief Psychological Interventions to Reduce Distress in Adults, Children, and Adolescents. *International journal of environmental research and public health*. 20(7).

Natural Resources Wales (2023). *Natural Resources Wales Flood Risk Management Plan: National overview*. [Natural Resources Wales Flood Risk Management Plan: National overview](#)

Public Health England. (2017). *The English National Study for Flooding and Health: First year report*. [English National Study for Flooding and Health: First year report \(publishing.service.gov.uk\)](#)

Ramirez M, et al. (2013). Listen protect connect for traumatized schoolchildren: A pilot study of psychological first aid. *BMC Psychology*, 1(1), 26.

Stanke, C, et al., (2012). The effects of flooding on mental health: outcomes and recommendations from a review of the literature. *PLoS currents*. 4.

UK Health Security Agency (2023). *Guidance: how to recover from flooding. Assessment and management of mental health [chapter]*. UK Government website. [How to recover from flooding - GOV.UK \(www.gov.uk\)](#)

Welsh Government (2016). *Wales Flood Response Framework. December 2016*. Welsh Government. [wales-flood-response-framework.pdf \(gov.wales\)](#)

Appendix A: Technical document

AGILE SCOPES are stakeholder-driven, rapid, systematic overviews of the evidence on a topic. They provide a transparent and reliable overview of the evidence landscape and are useful to:

- establish what literature exists
- help to refine a broad question
- identify gaps in the evidence
- inform further work by stakeholders.

The scopes employ a process of *up to* three steps, depending on what evidence is available for the topic. Progress from one step to another is discussed and agreed with stakeholders.

1. The first step is to draw on existing systematic review evidence identified from trusted sources⁴ (secondary evidence sources that use robust methodologies) where this exists. The Evidence Service does not undertake critical appraisal of these reviews. A brief report outlining evidence identified is produced.
2. If little or no evidence has been identified at this stage, a very simple search will be conducted in Medline using key words only to establish the benefit of conducting further searches in a broader range of databases. A summary of the search results (i.e., number, study design, relevancy etc.) will be provided in the agile scope to help inform stakeholders.
3. Where little or no trusted secondary evidence exists, and if identified as potentially beneficial from the Medline search conducted in step 2, the scope may be extended, at the request of the stakeholder to include a search for systematic reviews or primary literature in Google Scholar, Scopus or Medline, as appropriate. At this and any subsequent step, quality assessment of the identified evidence would be required.
4. Primary studies are not usually included, unless few or no systematic reviews are identified in the preliminary phase of step 1, or stakeholders request it following earlier work they have undertaken.

Considerations

- The scope does not attempt to identify all evidence on a given topic.

⁴ The sources on the Evidence Service list of trusted secondary evidence resources are provided in Table 1

- Not all outcomes identified in the literature will necessarily be included in this scoping report for a number of reasons, including:
 - Outcomes included in the scope are limited to those that are relevant to the stakeholders' original question.
 - Outcomes may not have been reported in the secondary sources, although it may exist in the primary literature. These outcomes will therefore not be included within the scoping report.
- Findings within included reviews are not assessed for generalisability to the Welsh context. *[It would be a complex process as secondary evidence is likely to include studies from multiple countries.]* This would need to be considered by stakeholders if using secondary evidence to inform policy and practice. Additional work could be requested if necessary.
- The scope summarises the findings and conclusions of the source authors. If a specific element of the report is of particular interest, it is advisable to read the source(s) from which it originates in more detail, as this will provide more context. Further work may be undertaken on specific areas if required.
- Hyperlinks to the included evidence are provided in the data summary table. In many instances, that evidence is freely available. If not, your Trust's Knowledge and Library service can help. [NHS Wales Library Service | NHSWLS](#)

Methods

All agile scopes follow a broad methodology and structure, with only small variations according to the question and evidence base identified. Through discussions with stakeholders, a research question and inclusion/exclusion criteria are developed using the PICO/PECO format (population, intervention/exposure, comparator, outcome). **Note: stakeholders are requested to indicate evidence/information they have already identified.**

As noted above, the methodology utilised is designed to provide rapid information to stakeholders. In the first step, restricting the search to sources from the trusted secondary evidence resources list reduces the time taken both in terms of search scope and by excluding the need for critical appraisal.

The search strategy developed is based on the inclusion criteria and uses key words. The scope is restricted to including only English language evidence and publication date limits may be imposed when the search results are too large to manage in a short timeframe, or where the stakeholder requires work to be completed within a specific timeframe. Additionally, the countries included may be limited, particularly where generalisability to a Welsh context is a particular concern.

All search results and screening for relevant systematic reviews are maintained in an EndNote library or suitable reference management system. Inclusion at title and

abstract are calibrated by two reviewers independently screening the first 10% to 20% of systematic reviews for relevance, with the remainder being screened by a single reviewer. Full text screening decisions are made by two reviewers. Data on study characteristics and findings relevant to the question are extracted by one reviewer and checked by a second. The evidence is then summarised narratively to answer stakeholder questions. Evidence gaps within the secondary literature are reported.

If none, or limited evidence is identified from the trusted secondary sources list, a brief search is conducted in Medline using basic key word searches to establish the benefit of conducting further searches in a broader range of databases. A summary of the search results (i.e., number, study design, relevancy etc.) will be provided in the agile scope.

Findings

The agile scoping report contains a narrative summary and a data table. The narrative summary is a broad overview of the evidence identified, with a particular focus on elements highlighted as important by stakeholders. Data tables include the reference (with a hyperlink), information on study characteristics and findings. The information in the data tables will vary according to the question, types of included studies and requirements of stakeholders. The table also includes a comment section highlighting any elements of particular interest to stakeholders along with any limitations that should be considered.

The report concludes with an 'options for further work' section. These suggestions are based on the evidence identified and provide an explicit rationale where further evidence review work is recommended. This information will be informed by the additional brief search conducted in Medline to help assess how much additional information, and the likely benefits of conducting additional work are. These findings will be provided to stakeholders to ensure they can make an informed decision on what to do next.

Appendix B: Search Appendix

Table 1: Resources searched	
Cochrane database of systematic reviews - https://www.cochranelibrary.com/cdsr/reviews	Date of search: 28/02/24
NICE – https://www.nice.org.uk/guidance	Date of search: 28/02/24
Joanna Briggs Institute	Date of search: 28/02/24
Prospero – https://www.crd.york.ac.uk/prospero/	Date of search: 28/02/24
National Institute for Health Research (NIHR) Public Health Research – https://www.journalslibrary.nihr.ac.uk/phr/about-the-phr-journal.htm	Date of search: 14/02/24
The Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) – http://eppi.ioe.ac.uk/cms/	Date of search: 14/02/24
Campbell Collaboration systematic reviews - https://www.campbellcollaboration.org/better-evidence.html	Date of search: 28/02/24
What Works Centre for Wellbeing – https://whatworkswellbeing.org/about-us/	Date of search: 15/02/24
What Works Centre for Local Economic Growth – https://whatworksgrowth.org/about-us/	Date of search: 15/02/24
Health Technology Wales – https://healthtechnology.wales/	Date of search: 15/02/24
Health Technology Assessments (Ireland) – https://www.hiqa.ie/areas-we-work/health-technology-assessment	Date of search: 15/02/24

National Institute for Health Research Health (NIHR) Technology Assessment (HTA) Journal – https://www.journalslibrary.nihr.ac.uk/hta/about-the-hta-journal.htm	Date of search: 15/02/24
Agency for Healthcare Research and Quality (AHRQ)	Date of search: 15/02/24
Canadian Agency for Drugs and Technologies (CADTH) – https://www.cadth.ca/evidence-bundles-view	Date of search: 15/02/24
Evidence Synthesis Program Reports (va.gov) – https://www.hsrp.research.va.gov/publications/esp/reports.cfm	Date of search: 15/02/24
Scottish Intercollegiate Guidelines Network (SIGN) clinical guidelines – https://www.sign.ac.uk/our-guidelines/	Date of search: 15/02/24
Google Scholar – https://scholar.google.com/	Date of search: 28/02/24
Epistemonikos - https://www.epistemonikos.org/	Date of search: 28/02/24
Medline – https://www.scopus.com/search/form.uri?display=basic#basic	Date of search: 28/02/24
Psycinfo - https://www.apa.org/pubs/databases/psycinfo/	Date of search: 28/02/24

Grey literature sources searched	
The European Environment Agency-https://www.eea.europa.eu/en	Date of search: 20/02/24
CEE Database of Evidence Reviews (CEEDER) – Environmental Evidence - https://environmentalevidence.org/ceeder/	Date of search: 20/02/24

Greenfile https://www.ebsco.com/products/research-databases/greenfile	Date of search: 20/02/24
Climate Adapt Home — Climate-ADAPT (europa.eu)	Date of search: 20/02/24

Medline final search string:

Ovid MEDLINE(R) Epub Ahead of Print and In-Process, In-Data-Review & Other Non-Indexed Citations <February 27, 2024>

- 1 flood*.ti. or floods/ 8778
- 2 Disasters/ or Natural Disasters/ or Extreme Weather/ or Weather/ 34386
- 3 (Disaster* or "natural hazard*").ti. 15468
- 4 1 or 2 or 3 48691
- 5 (intervention* or program* or polic* or strateg* or support*).ti,ab. 5415661
- 6 community support/ or policy/ or psychosocial intervention/ or Crisis Intervention/ or social support/ 96571
- 7 5 or 6 5438644
- 8 ("mental health" or wellbeing or anxiety or "quality of life" or fear or worry or trauma* or depression or resilience or cope or coping or stress or "psychological effect*").ti,ab. 2494461
- 9 Stress Disorders, Post-Traumatic/ or Stress Disorders, Traumatic/ or Stress, Psychological/ or Mental Health/ or "Quality of Life"/ or Anxiety Disorders/ or Anxiety/ or Depression/ or fear/ or Resilience, Psychological/ or Adaptation, Psychological/ 796067
- 10 8 or 9 2690143
- 11 4 and 7 and 10 4058
- 12 ("systematic review" or "meta analysis" or "scoping review" or "rapid review" or "review of reviews" or "review of systematic reviews" or "umbrella review").ti,ab. 439452
- 13 systematic review/ or meta analysis/ 339458
- 14 12 or 13 481447
- 15 11 and 14 170

Appendix C: Data extraction

Table 2: Data extraction of the reviews identified in the scoping search (in alphabetical order)			
Reference	Aim/Question	Abstract or summary	Comments
<p>Hermosilla, S. et al., (2023). We need to build the evidence: A systematic review of psychological first aid (PFA) on mental health and well-being. <i>Journal of traumatic stress</i>. 36(1), 5-16.</p>	<p>This systematic review assessed PFA efficacy in improving the mental health and psychosocial well-being of individuals exposed to potentially traumatic events.</p>	<p>Study design: Narrative systematic review</p> <p>Location: UK; USA; Palestine; Japan; Canada; Israel; Australia</p> <p>Method: PubMed, PsycINFO, PTSDpubs, and EMBASE were searched for peer reviewed studies evaluating programmatic outcomes of PFA, or an adapted intervention, published in English before March 9, 2021. Studies evaluating training outcomes or program feasibility were excluded. The primary outcomes were reported measures of participant mental health and psychosocial well-being, with narrative results presented for each. The Cochrane Risk of Bias tool was applied.</p> <p>Results: 12 studies with a total of 1,437 participants met the inclusion criteria. Only one study was a randomized controlled trial. Only one study looked at PFA interventions for flooding. The findings from all studies suggest a positive impact of PFA, with most reporting reduced symptoms of anxiety, depression, posttraumatic stress, and distress, as well as improved ratings of mood, the experience of safety, connectedness, and a sense of control, among youth and adults. Risk of bias was generally high.</p> <p><u>Flooding-specific study</u></p> <p>Ramirez et al. (2013) conducted a pilot quasi-experiment where the PFA intervention was delivered to adolescents in urban areas (USA) who had experienced flood or individual trauma. They reported improvements in</p>	<p>Generalisability: The one study which looked at flooding was conducted in the USA.</p> <p>Methodological rigour: This systematic review appears to be of good methodological quality.</p> <p>However, the one study that is relevant for this agile scope was graded as high risk of bias.</p>

		<p>depressive symptoms ($\Delta M = 7.0, p < .01$) and total social support ($\Delta M = 0.4, p < .01$), but no changes in post-traumatic stress symptoms.</p> <p>Conclusion: Inconsistent intervention components, insufficient evaluation methodologies, and a high risk of bias within the reviewed studies present challenges in assessing PFA efficacy, and an imbalance between popular support for PFA and scant evidence of outcome data exists. Further research is needed to justify the proliferation of PFA.</p>	
<p>Lotzin, A, Franc de Pommereau, A & Laskowsky I. (2023). Promoting Recovery from Disasters, Pandemics, and Trauma: A Systematic Review of Brief Psychological Interventions to Reduce Distress in Adults, Children, and Adolescents. <i>International journal of environmental research and public health</i>. 20(7).</p>	<p>This review aimed to:</p> <ol style="list-style-type: none"> 1) Systematically identify brief interventions to reduce psychological distress and/or subclinical symptoms in survivors of disasters, pandemics, and other traumatic events 2) Describe their effectiveness. 	<p>Study design: Systematic review</p> <p>Location: Various. Of those in groups who have experienced flooding, one took place in the USA, one in Haiti and one in Nepal.</p> <p>Method: MEDLINE, PsycINFO, PSYINDEX, PTSDpubs and web of science were searched from 1 Jan 2010 to 1 Oct 2021. Reference list searching was also conducted. Studies were included in the systematic review if they were published in English or German, evaluated a brief psychosocial support, self-help or brief psychotherapeutic intervention for survivors of disasters, pandemics and other traumatic events. Or described or examined interventions to reduce psychological distress, subclinical symptoms of any type of mental disorder or symptoms of adjustment disorder. Protocols of ongoing studies were also included.</p> <p>Two reviewers screened studies for inclusion and characteristics were extracted into excel. Results of studies are summarised narratively. No quality assessment of the included studies has been undertaken as part of this review.</p> <p>Results: Twenty-one published studies and six ongoing studies (protocols) were included in the review. Included studies covered a range of interventions in participants who had survived natural hazards (n=11), man-made disasters (n=3), pandemics (n=8) and other types of trauma (n=5). Three of the included studies were in people who had experienced flooding (one RCT, one cluster-RCT and one uncontrolled pre-post study).</p>	<p>Generalisability: The one study which looked at flooding was conducted in the USA.</p> <p>Methodological rigour: No assessment of the quality of the included studies has been conducted as part of this review. Therefore, we would not describe this as a true systematic review.</p>

		<p>Only one of these studies took place in an OECD country (USA), and the results are summarised below:</p> <p>The Listen Protect Connect (LPC) programme was a school-based psychological first aid programme in children. LPC provides basic psychological support and aims to reduce the initial distress of students and parents following traumatic events, community disasters, emergencies, or personal trauma. LPC is delivered by non-mental-health professionals and is based on the five-step crisis response strategy “listen, protect, connect – model and teach”. An adapted version of the LPC (composed of three steps: listen, protect and connect) was piloted in an uncontrolled pre-post study in 20 children (age 12-17 years, 20% female) impacted by the great flood of Iowa in 2008 and aimed to reduce PTSD symptoms. The school nurser provided 1 LPC session to each student (averaging 25 minutes duration).</p> <p>The study found:</p> <ul style="list-style-type: none"> - Non-significant decrease in PTSD symptoms over time (p=0.09). 3.7 points from baseline to 8-week f/up (measured using Child PTSD symptom scale) - Significant decrease in depressive symptoms at 2 week f/up (adjusted mean = 14.3; p<0.01) and 4 weeks f/up (adjusted mean = 13.2; p<0.01). However slight increase at 8 week f/up (adjusted mean = 15.2; p<0.01), (measured using CES-D). - Non-significant increase in perceived social support (measured using MSPSS) from baseline to the 2-week f/up (adjusted M = 3.9; p = 0.08), and significant increase from baseline to 8=week f/up (adjusted mean = 4.0; p < 0.01) - School connectedness (measured using the health kids’ resilience measure of school connectedness) was higher at 2 (mean = 63.8; p = 0.06) and 4-weeks follow-up (mean = 68.9, p < 0.01) than at baseline (mean = 58.6), but this relationship diminished by 8-weeks (stats not reported). <p>Conclusion: The systematic review identified novel brief self-help programmes, psychological support programmes, or brief psychotherapeutic interventions that addressed distress and/or sub-</p>	
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		clinical symptoms in survivors of disasters, pandemics, and other severe stressors. A few interventions showed the first evidence of being effective in reducing psychological distress and/or subclinical PTSD symptoms. Effective interventions mostly covered psychosocial support programs and brief psychotherapeutic interventions that focused on disasters or other severe stressors. Interventions that focused on the COVID-19 pandemic mainly involved self-help programs that showed limited evidence of effectiveness. Future research should further investigate the effectiveness of psychosocial support interventions and brief psychotherapeutic interventions for COVID-19 survivors.	
<p>Stanke, C, et al., (2012). The effects of flooding on mental health: outcomes and recommendations from a review of the literature. <i>PLoS currents</i>. 4.</p> <p>AND</p> <p>Murray, V., Caldin, H., Amlot, R., Stanke, C., Lock, S., Rowlatt, H., & Williams, R. (2011). The effects of flooding on mental health. <i>Health Protection Agency</i>.</p>	<p>The Health Protection Agency (HPA) undertook a review of the literature published from 2004 to 2010. This paper presents a summary of the outcomes and recommendations from this review. The aim of the review was to assess and appraise the epidemiological evidence on flooding and mental health; assess the existing guidance on emergency planning for the impacts of flooding on psychosocial and mental health needs; provide a detailed report for policymakers and services on practical methods to reduce the impacts of flooding on the mental health of affected people; and identify where research can support future evidence-based guidance.</p>	<p>Study design: Literature review</p> <p>Location: USA, Poland, Mexico, China, Vietnam, Sri Lanka, Germany, Korea, UK, and Italy</p> <p>Method: The authors collected evidence through a systematic review of the literature that was published between 2004 and 2010. The authors developed an algorithm and used the Scopus search engine to search for all papers with the specified search terms in their titles, abstracts or as keywords. Two main types of sources were used to examine the effects of flooding on people’s mental health. First, a review of the published academic literature and, second, guidance from governmental, non-governmental and other authoritative sources and selected papers that describe how services might be mounted in response to people’s psychosocial and mental health needs after flooding.</p> <p>Results: 48 studies were included in the review. The review indicates that flooding affects people of all ages, can exacerbate or provoke mental health problems, and highlights the importance of secondary stressors in prolonging the psychosocial impacts of flooding. The distressing experiences that the majority of people experience transiently or for longer periods after disasters can be difficult to distinguish from symptoms of common mental disorders. This emphasises the need to reduce the impact of primary and secondary stressors on people affected by flooding and the importance of narrative approaches to differentiate distress from mental disorder. Much of the literature focuses on post-traumatic stress disorder;</p>	<p>Generalisability: Out of the 20 flooding studies, 15 were conducted in OECD countries, including four in the UK.</p> <p>Methodological rigour: The authors did not assess the quality of the included studies. Therefore, we would not describe this as a true systematic review.</p>

		<p>diagnosable depressive and anxiety disorders and substance misuse are under-represented in the published data. Most people’s psychosocial needs are met through their close relationships with their families, friends and communities; smaller proportions of people are likely to require specialised mental healthcare. When considering PTSD, findings reveal 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. As regards people who develop mental disorders, risk factors and co-variants did not 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. There is a lack of studies which have investigated the impact of flooding on the mental health of children, young people and older people. Finally, there are a number of methodological challenges that arise when conducting research and when analysing and comparing data on the psychosocial and mental health impacts of floods.</p> <p>Documents that set out current policy in planning, designing and delivering healthcare responses for people who experience flooding and general disasters were reviewed. The key themes that emerge from this guidance include:</p> <p>The importance of adopting a multi-sector approach to promoting wellbeing and recovery that involves communities as well as agencies;</p> <p>Most people who are affected by flooding are remarkably resilient;</p> <p>Many people who are affected face psychosocial challenges and most have distressing experiences for which they require psychosocial support; these responses can be anticipated, as should be their needs for support;</p> <p>Most people’s psychosocial needs are met by people who are close to them, but some people may require more substantial psychosocial care</p>	
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		<p>and approaches that are based on the principles of psychological first aid are appropriate;</p> <p>A substantial minority of people who are affected by flooding are at risk of developing a mental disorder and they may require healthcare services that include psychosocial care and mental healthcare;</p> <p>The Strategic Stepped Model of Care is a very useful tool.</p> <p>KEY THEMES: Core findings and recommendations that emerged from the guidance inform the themes that follow.</p> <ol style="list-style-type: none"> 1. It is important to understand stress, and the stressors that are inflicted upon people by floods and how they cause short-term distress in many people, influence their medium- and longer-term wellbeing, and affect the mental health of persons and populations. 2. Primary stressors are inherent in all disasters and encompass any experiences that people have that are directly related to, or consequent on their exposure to disasters. 3. A majority of people experience distress after disasters. But personal and collective psychosocial resilience are inherent in each population, and families, communities and non-statutory and statutory services offer protection for people against psychosocial adversity during and after extreme events. 4. Secondary stressors follow on from, or are consequential on primary stressors: they include infrastructure failure and challenges to people, families and communities returning to normality and repairing buildings, or failure to adjust to the 'new normality,' i.e., the new set of living circumstances, that ensues after disasters. 5. People's psychosocial experiences can be shaped by the origin and delivery of care and the timeframes of activation of stressors: this makes it possible to describe how and where public health responses should be delivered. 6. People's psychosocial experiences in the aftermath can oscillate between distress and recovery, and the aftermath of their recovery from floods tends to be a phase of, at least, medium-term duration, which can 	
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		<p>endure for weeks, months or years. This is because: Secondary stressors often arise during the responses to the clean-up, recovery and rebuilding phases after flooding. Some people's experiences may be of the quantity, severity and duration or are associated with sustained dysfunction such that it is appropriate to call them symptoms of mental disorders. 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, or mental disorders, can develop, or pre-existing ones are provoked.</p> <p>Conclusion: The HPA's findings showed that a multi-sector approach that involves communities as well as agencies is the best way to promote wellbeing and recovery. Agreeing and using internationally understood definitions of and the thresholds that separate distress, mental health and mental ill health would improve the process of assessing, analysing and comparing research findings. Further research is needed on the longitudinal effects of flooding on people's mental health, the effects of successive flooding on populations, and the effects of flooding on the mental health of children, young people and older people and people who respond to the needs of other persons in the aftermath of disasters.</p>	
<p>UK Health Security Agency (2023). <i>Guidance: how to recover from flooding. Assessment and management of mental health [chapter]</i>. UK Government website. How to recover from flooding - GOV.UK (www.gov.uk)</p>	<p>The assessment and management of mental health chapter of the UK Health Security Agencies Guidance on how to recover from flooding covers the preventive measures that are needed to reduce the mental health effects caused by flooding on affected people and communities.</p> <p>The guidance should be used by healthcare professionals, local authorities, government</p>	<p>Study design: Guidance</p> <p>Location: UK Specific Guidance</p> <p>Method: Not discussed</p> <p>Results: The guidance suggests that for most, distress from a flood is usually temporary, with the majority able to cope with the psychological effects of being flooded by accessing their existing resources and support networks. However, an important minority of people affected by flooding may go on to develop more severe psychological problems or exacerbations of pre-existing mental health conditions. Therefore, a small proportion of individuals may require access to specialist psychological healthcare. The support each person needs will be different depending on their circumstances and may increase or decrease over time.</p>	<p>Generalisability: Generalisable to Wales-UK guidance.</p> <p>Methodological rigour: It was not possible to carry out CA as this is a piece of guidance. No information is given on the evidence used to develop this guidance.</p>

	<p>bodies and relevant agencies before, during and after a flood event.</p>	<p>The guideline suggests a four-tiered pyramid for flood response. This is a phased approach where the first two activities encompass the actions needed for the majority of the population, followed by more focused and targeted care for those at higher risk.</p> <ol style="list-style-type: none"> 5. Provide support to address the immediate physical and social needs during and in the aftermath of a flood. Communicate key public mental health messages. 6. Psychological support: some practical support required, unstructured psychosocial support primarily delivered by self, family, friends, local community and/or responders. This may involve helplines and drop-in sessions. 7. Primary care: support from GP and potential referral to local NHS Talking Therapies services. 8. Referral to specialist mental health services for significant and enduring psychological problems. <p>Tier 1 interventions discussed in the guidance include:</p> <ul style="list-style-type: none"> • Addressing the immediate practical needs of people directly or indirectly affected (e.g., encouraging people to leave dangerous areas, restoring utilities, supporting the flood recovery process). • Public health messaging to normalise the distress caused by flooding and destigmatise the possible effects on mental health. • Promoting uptake of flood insurance. <p>Tier 2 interventions discussed in the guidance include:</p> <ul style="list-style-type: none"> • ‘Light touch [psychological] support’ provided by appropriately trained responders. For example, psychological first aid, short term one to one support and active monitoring, utilising voluntary or community sector organisations and continuing to offer practical measures to support flood recovery. <p>Tier 3 interventions discussed in the guidance include:</p> <ul style="list-style-type: none"> • Providing active monitoring and seeking to identify and support individuals with more acute psychological needs. 	
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		<ul style="list-style-type: none"> • Recognising the specific needs of children through an active screening programme for those exposed and providing mental health support as appropriate. <p>Tier 4 interventions discussed in the guidance include:</p> <ul style="list-style-type: none"> • Advising individuals with severe or long-lasting symptoms on how to access psychological support – referrals to specialist teams ensuring support is given as soon as possible. • Ensuring mental health and social care specialists continue to offer advice to responder organisations. 	
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