Review

Mental Health Response to Community Disasters
A Systematic Review

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IMPORTANCE Exposure to a disaster is common, and one-third or more of individuals severely exposed may develop posttraumatic stress disorder or other disorders. A systematic approach to the delivery of timely and appropriate disaster mental health services may facilitate their integration into the emergency medical response.

OBJECTIVE To review and summarize the evidence for how best to identify individuals in need of disaster mental health services and triage them to appropriate care.

EVIDENCE REVIEW Search of the peer-reviewed English-language literature on disaster mental health response in PsycINFO, PubMed, Cochrane Database of Systematic Reviews, Academic Search Complete, and Google Scholar (inception to September 2012) and PILOTS (inception to February 2013), using a combination of subject headings and text words (*Disasters*, *Natural Disasters*, *Mental Health*, *Mental Health Programs*, *Public Health Services*, *Mental Disorders*, *Mental Health Services*, *Community Mental Health Services*, *Emergency Services Psychiatric*, *Emotional Trauma, Triage*, and *Response*).

FINDINGS Unlike physical injuries, adverse mental health outcomes of disasters may not be apparent, and therefore a systematic approach to case identification and triage to appropriate interventions is required. Symptomatic individuals in postdisaster settings may experience new-onset disaster-related psychiatric disorders, exacerbations of preexisting psychopathology, and/or psychological distress. Descriptive disaster mental health studies have found that many (11%-38%) distressed individuals presenting for evaluation at shelters and family assistance centers have stress-related and adjustment disorders; bereavement, major depression, and substance use disorders were also observed, and up to 40% of distressed individuals had preexisting disorders. Individuals with more intense reactions to disaster stress were more likely to accept referral to mental health services than those with less intense reactions. Evidence-based treatments are available for patients with active psychiatric disorders, but psychosocial interventions such as psychological first aid, psychological debriefing, crisis counseling, and psychoeducation for individuals with distress have not been sufficiently evaluated to establish their benefit or harm in disaster settings.

CONCLUSION AND RELEVANCE In postdisaster settings, a systematic framework of case identification, triage, and mental health interventions should be integrated into emergency medicine and trauma care responses.

JAMA. 2013;310(5):507-518. doi:10.1001/jama.2013.107799

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Section Editor: Mary McGrae McDermott, MD, Senior Editor.

Mental and physical consequences of major disasters[1-4] have garnered increasing attention to the need for an effective community response. It is estimated that much of the US population will be exposed to a "fire, flood, earthquake, or other natural disaster" during their lives[5]; adding technological events such as airplane crashes and intentional human acts such as terrorism to this estimate would yield even higher numbers. Mental health effects of disaster exposures are relevant to informing care for survivors of all forms of trauma, because 9 of 10 people are likely to experience trauma in their lifetimes.[5] These mental health effects are important in their own right, as is reflected in prominent appeals for acute and long-term mental health services for survivors of several recent large-scale US disasters. In the last several years, especially since the September 11, 2001, terrorist attacks, public health expertise has been formally incorporated into disaster and emergency preparedness and response.[1,6] During this period, the importance of integrating mental health into the medical and emergency aspects of disaster response[7] was broadly recognized.

A substantial body of scientific work on the mental health effects of disasters, summarized in several major review articles,[8-15] has provided a fundamental basis for the organization of disaster mental health response. These sources agree that posttraumatic stress disorder (PTSD) is the psychiatric disorder most often associated with disaster trauma exposure, which includes direct endangerment, being an eyewitness to trauma in a disaster, or having a close associate exposed to disaster trauma. PTSD may occur in up to one-third of highly exposed survivors and major depression in up to one-fourth.[9-11,13-15] There is also agreement that new alcohol and drug use disorders do not usually begin following disasters, although preexisting substance abuse problems may worsen or recur.[16,17] Consistently identified predictors of psychopathology after disasters in this literature are female sex, preexisting psychopathology, severity of exposure to disaster trauma, other concurrent stressors, and lack of social support. Disaster-related psychopathology begins soon after a disaster and declines over time, becoming chronic in a substantial minority of individuals. Symptoms and unpleasant emotions not qualifying as a psychiatric disorder are referred to as psychological distress. Distress at some level is nearly universal after disasters and is far more prevalent than psychiatric disorders. The distinction between these 2 entities is critical for effective disaster response, because different interventions are needed for them.[18-21]

This review provides a practical framework for delivering mental health interventions to individuals appropriate to their needs in the wake of a disaster. Much of the existing disaster mental health literature is organized into components of preparedness, response, and recovery,[7] which provides a theoretical framework for disaster planning but is less useful for operationalizing the delivery of mental health services to affected individuals. Established approaches to emergency and medical response to mass casualty incidents include functions of search and rescue, triage and initial stabilization, and definitive medical care as main components of the response.[22] For disaster mental health response, these functions translate into identification of mental health needs and case identification,[23] triage and referral to appropriate services,[24,25] and provision of appropriate mental health interventions,[26] in a framework to guide disaster mental health interventions.

Methods

A literature search was conducted in September 2012 to identify peer-reviewed English-language literature on mental health interventions and service delivery specific to community disasters. A medical librarian searched for citations of relevance in PsycINFO (467 citations), PubMed (234 citations), Cochrane Database of Systematic Reviews (0 citations), Academic Search Complete (EBSCOhost; 42 citations), and Google Scholar (130 citations) using a combination of subject headings and text words (*Disasters*, *Natural Disasters*, *Mental Health*, *Mental Health Programs*, *Public Health Services*, *Mental Disorders*, *Mental Health Services*, *Community Mental Health Services*, *Emergency Services Psychiatric*, *Emotional Trauma*, *Triage*, and *Response*) from the time of the inception of these sources. A search of PILOTS (161 citations) was conducted in February 2013. Additional literature is scattered throughout various institutional reports, books and monographs, and web-based sources not included in this review.

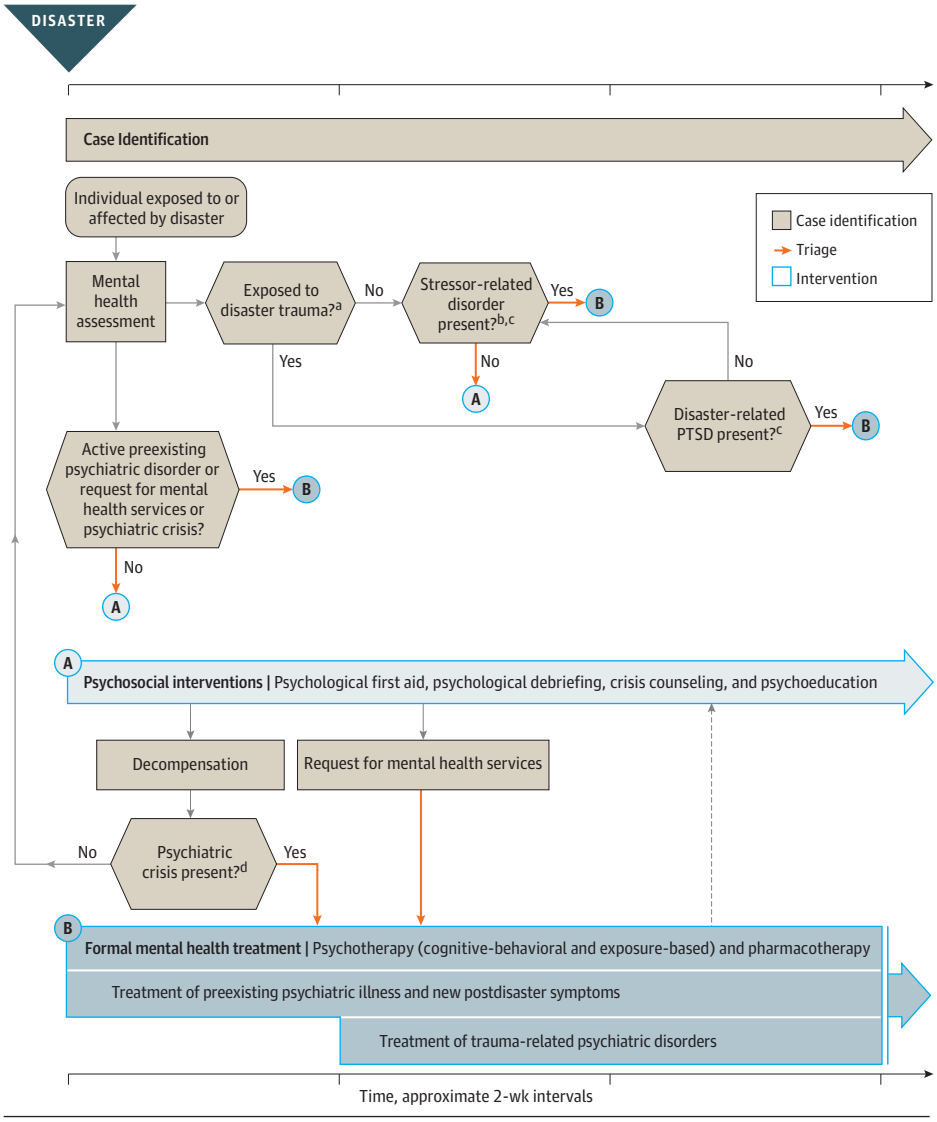
This search yielded 569 unique articles. Exclusion of international studies reduced the number of articles to 427 in the United States. An additional 174 articles in this collection focusing on disaster mental health effects—rather than services, as determined by the first author—were further excluded. The remaining articles were classified by type (original research, reviews, reports, commentary/opinion) based on the system of Hadorn et al,[27] adapted by Redwood-Campbell et al[28] to categorize disaster response studies. The articles were further categorized by focus of article (general disaster mental health response, disaster interventions referring to specific types of clinical techniques, and specific disaster services referring to disaster programs such as Project Liberty) and type of disaster (natural disasters, technological events, and intentional human-caused disasters). Last, 31 articles consisting of anecdotal reports were excluded from the final list, yielding a total of 222 unique articles on disaster and emergency mental health response, interventions, and services included in this review (eTable [Supplement]). The most frequently represented article type was commentaries (n = 88), followed by reviews (n = 49) and by reports of responses, interventions, programs, and services (n = 46). Only 39 articles were classified as original research. The type of disaster featured in the largest number of articles was terrorism, the majority of which was represented by the September 11 attacks. The articles were then organized according to the disaster response framework's components of case identification, triage, and intervention.[29,30]

Findings

A general consensus in this literature was that mental health should be integrated into emergency and medical disaster response.[7,23,31-33]

The flow diagram shown in the **Figure** systematically directs responders through processes of the mental health response, starting with case identification following exposure to trauma, which involves identifying psychopathology and differentiating it from normative emotional distress; proceeding to triage to the appropriate type and level of care; and concluding with delivery of appropriately targeted interventions based on accurately assessed needs.[29,34] For example, an individual directly exposed to a disaster is assessed first for trauma exposure and then for PTSD and other

Figure. Disaster Mental Health Case Identification, Triage, and Interventions



This diagram systematically directs disaster mental health responders through 3 components of psychiatric assessment, starting with identification of psychopathology and differentiating it from normative emotional distress, proceeding to triage to the appropriate type of care, and concluding with delivery of appropriately targeted interventions based on accurately assessed needs. Activities are shown in the general sequence in which they would occur and at the approximate time they would first occur; activities would continue beyond 6 weeks into the indefinite future, as indicated by the particular situation.

[a] Meets *Diagnostic and Statistical Manual of Mental Disorders* (Fifth Edition) for postraumatic stress disorder (PTSD).

[b] Major depression, bereavement, anxiety.

[c] Screening may be conducted as a first step to identify individuals unlikely to develop a psychiatric disorder, but full diagnostic assessment is needed before formal psychiatric decisions are made (2 weeks are required after disaster for diagnosis of new cases of major depression and 1 month for PTSD).

[d] Suicidal or homicidal ideation, psychosis, psychiatrically based inability to care for self or dependents.

psychiatric disorders, symptoms, and psychosocial distress. The initial assessment might take place in the disaster setting such as in a mental health clinic embedded in a large evacuee shelter or a family assistance center or in a formal psychiatric care setting such as a psychiatric emergency department or a psychiatrist's office. If PTSD or another disorder is diagnosed, the individual is referred for formal treatment and also may receive other psychosocial interventions. If no psychiatric disorder is identified, the individual is triaged to psychosocial interventions. Additionally, if an individual presents with a psychiatric crisis, has an active preexisting psychiatric disorder, or requests treatment, the individual is triaged or referred to the appropriate level of psychiatric care. Diagnostic assessment of PTSD cannot be completed until 1 month after the disaster (trauma exposure), when PTSD can first be diagnosed.

Identification of Mental Health Problems and Needs

Accurate assessment of mental health problems and related needs among disaster-affected groups is an essential foundation for effective disaster response. This component of disaster mental health response conceptually differs from its counterpart in disaster emergency and medical response, because unlike physical injuries incurred in mass-casualty incidents, psychological wounds are often not apparent and therefore require concerted efforts and different procedures for identification and assessment. Postdisaster assessments of mental health needs include consideration of both community-level and individual-level concerns. Community assessment involves population surveillance[23] to develop accurate prevalence estimates of mental health conditions and related needs, which are fundamental to effective allocation of limited resources, and to inform the planning and delivery of services and interventions.[19] In contrast, individual assessment entails personal clinical evaluation, including full diagnostic assessment for case identification to direct individuals to services appropriately targeted to their needs.[19]

For population and individual assessments, the type of assessment varies in different postdisaster time frames, because new disorders arising after disasters develop over weeks. By definition, PTSD and

Box 1. *DSM-5* Criteria for Posttraumatic Stress Disorder (PTSD)[a]

Criteria

A. **Exposure to trauma** (actual or threatened death, serious injury, sexual violence) in one of the following ways:
   1. Directly exposed
   2. Witnessed (in person) trauma to others (viewing electronic media, television, movies, or pictures does not qualify, unless work-related)
   3. Learned of direct trauma exposure (violent or accidental) of a close family member or close friend
   4. Repeated or extreme exposure to aversive details of trauma (eg, first responders collecting human remains; police officers repeatedly exposed to details of child abuse)

B. **Intrusion** symptoms with content associated with, or beginning after, the trauma (≥1 symptom):
   1. Recurrent, involuntary, and intrusive distressing memories of the trauma
   2. Recurrent distressing dreams with dream content, affect related to the trauma, or both
   3. Dissociative reactions (feeling or acting as if the trauma is recurring, eg, flashbacks)
   4. Psychological distress with reminders of the trauma
   5. Physiological reactions to reminders of the trauma

C. **Avoidance** of reminders of the trauma, persistent and beginning after the trauma (≥1 symptom):
   1. Avoidance of or efforts to avoid distressing trauma-related memories, thoughts, or feelings
   2. Avoidance of or efforts to avoid external reminders (people, places, conversations, activities, objects, situations) that arouse distressing trauma-related memories, thoughts, or feelings

D. **Negative cognitions or mood** associated with, or beginning or worsening after, the trauma (≥2 symptoms):
   1. Inability to remember important parts of the trauma (typically, dissociative amnesia not resulting from head injury, alcohol, or drugs)
   2. Negative beliefs or expectations about oneself, others, or the world (eg, "I am bad," "No one can be trusted," "The world is completely dangerous")
   3. Distorted cognitions about the trauma's cause or consequences, leading to blaming self or others
   4. Negative emotional state (fear, horror, anger, guilt, shame)
   5. Markedly diminished interest or participation in significant activities
   6. Feeling detached or estranged from others
   7. Inability to experience positive emotions (happiness, satisfaction, love)

E. **Arousal** and reactivity associated with, or beginning or worsening after, the trauma (≥2 symptoms):
   1. Irritable behavior and angry outbursts (with little or no provocation) expressed as verbal or physical aggression
   2. Reckless or self-destructive behavior
   3. Hypervigilance
   4. Exaggerated startle response
   5. Problems with concentration
   6. Sleep disturbance (eg, difficulty falling or staying asleep; restless sleep)

F. **Duration** of the disturbance (criteria B, C, D, and E) is longer than 1 month

G. **Clinically significant distress or impairment** in social, occupational, or other important areas of functioning result from the disturbance

H. **Not attributable to physiological effects** of a substance (eg, medication, alcohol) or another medical condition

Specifiers: (1) with dissociative symptoms (depersonalization or derealization); (2) with delayed expression (full diagnostic criteria are not met until >6 months after the trauma, although the onset and expression of some symptoms may be immediate)

Major changes to PTSD criteria in *DSM-5*

Substantial changes made to PTSD criteria

Moved from Anxiety Disorders section to new Trauma- and Stressor-Related Disorders section

Criterion A (trauma exposure) made more specific; A2 (subjective reaction) criterion eliminated

Symptom clusters expanded from 3 to 4 with avoidance/numbing cluster (prior symptom group C) divided into avoidance cluster (new symptom group C) and persistent negative cognitions/mood alteration cluster (new symptom group D)

DSM-5 criteria specifically address dissociation, aggression, distorted cognitions, and a wider range of negative emotions (with reinclusion of formerly eliminated survivor guilt)

More developmentally sensitive for children or adolescents (lowered diagnostic thresholds and new separate criteria for children 6 years or younger)

[a] Adapted from *Diagnostic and Statistical Manual of Mental Disorders* (Fifth Edition) (*DSM-5*).[35]

major depression, the psychiatric disorders most likely to develop after disaster exposure,[9-11,13-15] take 4 and 2 weeks, respectively, to develop and be diagnosed. Assessments during the first 2 to 4 weeks therefore can meaningfully address distress and psychosocial issues arising in the early postdisaster phases, as well as preexisting psychiatric disorders such as alcohol addiction and bipolar disorder, but are too early to fully capture new psychiatric disorders. Criteria for diagnosis of PTSD and major depressive disorder based on the *Diagnostic and Statistical Manual of Mental Disorders* (Fifth Edition) (*DSM-5*) criteria[35] are summarized in **Box 1** and **Box 2**.

Additionally, the conditional nature of PTSD dictates that the disorder by definition cannot occur in the absence of sufficient exposure to a qualifying traumatic event.[36,37] Disaster-related PTSD is limited to trauma-exposed groups either located within a circumscribed trauma zone or having trauma-exposed close associates. In a study of 379 survivors of the September 11 attacks on the World Trade Center in New York, PTSD symptom criteria at any time after the disaster were met by 35% of people directly exposed to danger, 20% of those exposed only through directly witnessing trauma, and 35% of those exposed only through a close associate's direct exposure. Outside of these exposure groups, few possible sources of exposure were evident among the few individuals who were symptomatic, most of whom had preexisting psychiatric illness.[38] However, disasters of extreme magnitude, such as the September 11 attacks, have far-reaching emotional effects[39-41] extending beyond trauma-exposed groups to others affected by disaster-related losses, hardships, perceived threat, identification with victims, or sociopolitical changes. A national survey found that 17% of the US population residing outside of New York City reported attack-related psychological symptoms 2 months after the September 11 attacks,[39] which was associated in another study[40] with the amount of time spent viewing television coverage of the attacks. Posttraumatic symptoms in people unexposed to the disaster trauma or otherwise not meeting PTSD criteria may represent psychological

Box 2. *DSM-5* Criteria for Major Depressive Disorder[a]

Criteria

A. **Depressive episode**: Five or more symptoms representing a change from previous functioning and not attributable to another medical condition present during a 2-week period (≥1 of the symptoms is either item 1 or item 2 below):
   1. Depressed mood most of the day, nearly every day
   2. Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day
   3. Significant loss or gain of weight or appetite (not when dieting) nearly every day
   4. Insomnia or hypersomnia nearly every day
   5. Psychomotor agitation or retardation nearly every day
   6. Fatigue or loss of energy nearly every day
   7. Feelings of worthlessness or excessive or inappropriate guilt nearly every day
   8. Diminished ability to think or concentrate, or indecisiveness, nearly every day
   9. Recurrent thoughts of death, recurrent suicidal ideation or a specific plan for committing suicide, or suicide attempt

B. **Clinically significant distress or impairment** in social, occupational, or other important areas of functioning result from the symptoms

C. **Not attributable to physiological effects** of a substance or to another medical condition

D. **Not better explained** by schizoaffective disorder, schizophrenia, schizophreniform disorder, delusional disorder, or other specified and unspecified schizophrenia spectrum and other psychotic disorders

E. **No manic or hypomanic** episode history

Specifiers: with anxious distress, mixed features, melancholic features, atypical features, mood-congruent psychotic features, mood-incongruent psychotic features, catatonia, peripartum onset, seasonal pattern

Major Changes to Major Depressive Disorder Criteria in *DSM-5*

Few changes made to major depressive disorder criteria

Bereavement exclusion criterion (major depressive episode applied to depressive symptoms lasting <2 months following the death of a loved one) eliminated, with provision of a detailed footnote to aid clinicians in making the critical distinction between symptoms characteristic of bereavement and those of major depressive disorder

[a] Adapted from *Diagnostic and Statistical Manual of Mental Disorders* (Fifth Edition) (*DSM-5*).[35]

distress,[30] symptoms of a different psychiatric disorder such as major depression, or preexisting psychopathology.[18,37]

Whether for community needs assessment or for individual case finding, diagnostic assessment is resource intensive, especially if the numbers to be assessed are large.[10,42-44] In such instances, screening can identify individuals at risk for psychiatric problems.[10,42] Screening tools should be brief and uncomplicated, appropriate in content reflecting the context and disaster phase, acceptable to those being screened, and easily administered and scored.[45,46] Symptom measures used to screen for PTSD[42,45] and depression are listed in **Table 1**.[47-58] Potential screening locations include workplaces, primary care settings, schools, and other venues where large numbers of affected individuals are accessible. Systematic screening of population groups can facilitate efforts to direct large numbers of symptomatic individuals into care, as illustrated by a screening program implemented after the 2005 London bombings that generated more referrals to a treatment center than did existing clinical channels. Of 596 individuals participating in the screening program, 62% screened positive for a bombing-related mental disorder. Based on a subsequent full clinical assessment, 43% of the 596 participants in the screening were referred for treatment and 32% had a psychiatric disorder, most often PTSD.[24]

The literature clearly emphasizes that symptom-screening instruments do not provide psychiatric diagnosis, either for assessment of individuals or for estimating the population prevalence of disorders; a positive screen result needs to be followed by full clinical assessment.[10,20,42-44] Screening instruments emphasize sensitivity rather than specificity to cast a wide net for affected individuals, but clinical evaluation is necessary to make psychiatric diagnoses based on specific combinations of qualifying symptoms, sufficient symptom duration, and detrimental effects on functioning.[20]

Community Assessment

Knowledge of the community's mental health, vulnerabilities, and resources and capacities before a disaster is important to inform the postdisaster response.[59-61] Critical to valid estimation of community mental health needs after a disaster are careful selection of respondents and use of appropriate measures. Measuring PTSD in unexposed populations is fraught with potential for overestimation. Various strategies for collecting relevant data after a disaster include case reporting, conducting surveys (eg, random-digit-dial telephone surveys), holding focus groups, and consulting private and public databases (eg, to identify surges in clinic enrollments or alcoholic beverage sales). However, self-report symptom surveys can provide only rough estimates of the mental health of a community, because they are designed to identify individuals at risk for mental disorders and to maximize sensitivity over specificity. Consequently, self-report screening instruments do not provide valid prevalence estimates of psychiatric disorders from the symptoms they measure.[10,20,42-44] Moreover, because most disaster survivors with psychiatric disorders do not utilize mental health treatment services, this must also be factored into planning for treatment resource allocation based on prevalence estimates of psychiatric disorders in affected populations.[61,62]

Individual Assessment

Individual assessments in the first few days and weeks after a disaster can identify psychosocial issues, symptoms, level of functioning, attitudes and beliefs, and current status of preexisting psychiatric disorders. The case-identification procedures in the Figure provide guidance for directing individual postdisaster mental health assessments, based on initial inquiry about qualifying trauma exposures (vs other disaster-related stressors). For example, only people with exposure to disaster trauma through either direct endangerment, directly witnessing others being injured or killed, or having a close associate who had been exposed as defined in the *DSM-5* criteria for PTSD would warrant assessment for PTSD, and major depression and anxiety are also of potential concern for them. Those who sustained major losses in the disaster warrant assessment for bereavement or major depression.

Clinical evaluation is achieved through a personal interview by a clinician to determine the most appropriate intervention based on diagnostic and psychosocial assessment. Especially in the early postdisaster phases, this evaluation may be conducted in nontraditional

Table 1. Examples of Screening Tools for PTSD, Major Depression, and Trauma Exposure[a]

Tool	Condition Assessed	Description	Psychometric Properties	Population Tested
PTSD Checklist (PCL)	PTSD	Self-report (17 items) corresponding to *DSM-IV* PTSD symptoms scored on 5-point Likert scale	Cronbach α = .90 for internal consistency; optimal cutoff score of 39 for firefighters (44 in general); sensitivity, 0.85; specificity, 0.82; area under ROC curve, 0.91 vs PTSD diagnosis by structured interview (Diagnostic Interview Schedule)	September 11–exposed firefighters[47]; New York City–area residents after September 11 attacks[48]
National Women's Study Posttraumatic Stress Disorder module (NWS-PTSD)	PTSD	Lay interview; 20 items assessing *DSM-IV* PTSD symptoms	Cronbach α = .83 for internal consistency; κ = .85 vs Structured Clinical Interview for *DSM-IV* diagnosis; interrater κ = .71 for current and .77 for lifetime PTSD	New York City–area residents after September 11 attacks; field trial[48]
Civilian Mississippi Scale for PTSD	PTSD	Self-report (35 items) scored on 5-point Likert scale	Cronbach α = .74 for internal consistency (.86 with reversed questions removed); α coefficients for 30-item scale, .38-.92	Loma Prieta earthquake (1989)[49]; college students[50]
Impact of Event Scale-Revised (IES-R) and brief 6-item version (IES-6)	PTSD	IES-R: self-report (22 items), 5-point Likert symptom measure of subjective distress following trauma; IES-6: 6-item subset	Pooled correlation = .95 for brief 6-item (IES-6) version vs IES-R	Mixed trauma-exposed samples[51]
Beck Depression Inventory II (BDI-II)	Major depression	Self-report measure (21 items) of depressive symptom severity, rated on 4-point scale (range, 0-3; total score range, 0-63)	Cronbach α = .54-.74 for internal consistency; ROC analysis: cutoff score of 18 yields best balance between sensitivity and specificity in primary care, with overall correct classification rate of 92%	Primary care patients[52]; combat veterans with PTSD[53]
Center for Epidemiologic Studies Depression Scale (CES-D)	Major depression	Questionnaire (20 items), symptom frequency in past month scored on 3-point Likert scale	Thirty-six percent diagnosis with cutoff score of 16; 23% diagnosis with cutoff score of 22, with sensitivity = .84, specificity = .82, and area under ROC curve = .89 vs structured diagnostic interview (Diagnostic Interview Schedule)	September 11–exposed firefighters[54]
Quick Inventory of Depressive Symptomatology-Self-Report (QIDS-SR)	Major depression	Self-report questionnaire (16 items)	Cronbach α >.81 for internal consistency; highly correlated (c = .83) vs structured diagnostic interview (Structured Clinical Interview for *DSM-IV* diagnosis); highly sensitive to symptom change, indicating high concurrent validity	Combat veterans[55]; outpatients with major depression[56]
Traumatic Exposure Severity Scale (TESS)	Trauma exposure	Self-administered instrument (24 items) with 5 subscales: resource loss, damage to home and goods, personal harm, concern for significant others, and exposure to grotesque	Total Cronbach α for internal consistency: total, .78; subscales, .63-.73	Earthquake survivors in Turkey[57]

Abbreviations: *DSM-IV*, *Diagnostic and Statistical Manual of Mental Disorders* (Fourth Edition); PTSD, posttraumatic stress disorder; ROC receiver operating characteristic.

[a] These screening tools do not provide psychiatric diagnoses and should not be used for diagnosis in assessment of individuals or for direct determination of population prevalence of psychiatric disorders. Screening tools can be used to identify individuals at risk for psychiatric disorders and to reduce assessment burden by limiting full diagnostic evaluation to groups with identified risk, but treatment decisions require accurate diagnostic assessment for selection of appropriate interventions. Additionally, screening tools for assessment of PTSD should be used only for individuals with qualifying trauma exposures as defined in criterion A for PTSD in the *Diagnostic and Statistical Manual of Mental Disorders* (Fifth Edition), because most PTSD screening tools do not assess trauma exposure or necessarily anchor the symptoms to a qualifying trauma exposure.

locations such as in shelters or evacuation centers; after referral to treatment, it will likely occur in a more traditional setting such as in the clinician's office. The chaos associated with acute disaster situations and time pressures may limit the content of the history but should not sacrifice identification of constellations of symptoms and related criteria that constitute psychiatric illness and that represent the focus for treatment, as well as other relevant information. At a minimum, abbreviated diagnostic evaluation should cover details of the individual's disaster experience, full diagnostic assessment for PTSD and other disorders, a mental status examination, and history of preexisting disorders and other trauma exposures and stressors. Psychiatric assessments providing these essential elements were successfully conducted with 421 sheltered Hurricane Katrina evacuees in the first 2 weeks after the disaster[63] and with 848 people in a community-based psychiatrist response program at a family assistance center during the first 2 months after the September 11 attacks.[64] Potential sources of mental status changes that may need to be considered in disaster settings are head injury, toxic exposures, medical illness, delirium, dehydration, drug withdrawal or intoxication, and interruption of previously established medication regimens.[26]

Triage and Referral to Services

Following adequate assessment, the next major component of the disaster mental health response, as in general emergency disaster response, is triage to appropriate care (Figure).[24,25] Individuals identified as having active psychiatric disorders will require referral to formal mental health services. This is particularly relevant as days to weeks pass after the disaster, when new disaster-related cases of PTSD and major depression emerge and can be diagnosed.

Additionally, acute psychiatric crisis (suicidal or homicidal ideation, psychosis, psychiatrically based inability to care for oneself or one's dependents) and recurrence or worsening of preexisting psychiatric illness[24] require referral to appropriate care (triage processes for these are also shown in the Figure). Preexisting psychiatric disorders can sometimes represent a substantial proportion or even most of the emerging psychopathology. For example, among sheltered Hurricane Katrina evacuees assessed in a mental health clinic, 40% were treated for preexisting mental illness and 24% for a new postdisaster disorder.[63] Among directly exposed Oklahoma City bombing survivors with a postbombing diagnosis, 63% had a preexisting psychiatric disorder.[16]

Table 2. Mental Health Interventions in General Trauma Care and in Disaster Response Situations, for Selected Conditions Relevant to Disaster Exposure

	General Trauma Care		Disaster Response	
Condition and Intervention Type	Specific Intervention	Evidence Level[a]	Specific Intervention	Evidence Level[a]
PTSD				
Psychotherapy				
	Cognitive-behavioral	A[65-68]	Cognitive-behavioral	A[69-71]
	Exposure-based	A[67,68]	Exposure-based	A,[72] B[73]
	Other[b]	A[68,74]	Other[b]	C[75]
Pharmacotherapy				
	Antidepressants, especially serotonin-selective	A[67,76]	Antidepressants	C[63,64]
	Adjunctive medications[c]	A[67,76]	Adjunctive medications[c]	C[63,64]
Major depression				
Psychotherapy				
	Cognitive-behavioral	A[77-80]	Cognitive-behavioral	B[77-80]
	Other[d]	A[77-81]	Other	
Pharmacotherapy				
	Antidepressants	A[67,80,81]	Antidepressants	C[63,64]
	Adjunctive medications[e]	A[80]	...	
	Neurostimulation[f]	A[80,82]	...	
Traumatic grief				
Psychotherapy	...	B[83]	...	D[84]
Pharmacotherapy	...	A[83,85]	...	
Psychological distress				
Psychosocial interventions	Debriefing	B (possible harm)[86,87]	Debriefing	D[26,88]
	Psychoeducation	B (ineffective, possible harm)[89]	Psychoeducation	D[26,88]
	Supportive psychosocial care	B[89]	Psychological first aid	D[88]
			Crisis counseling	D[88]
Pharmacotherapy	...	B[90,91]	...	C[63,64]

Abbreviations: PTSD, posttraumatic stress disorder. Ellipses (...) indicate no specific intervention for that intervention type.

[a] Level of evidence graded A through D based on description by Shekelle et al[92]: A, based on category I evidence (from randomized controlled trials); B, based on category II evidence (from nonrandomized or quasi-experimental studies or extrapolated from category I evidence); C, based on category III evidence (from nonexperimental descriptive studies, such as comparative, correlation, or case-controlled studies; or extrapolated from category I/II evidence); D, based on category IV evidence (from expert committee reports or opinions or clinical experience of respected authorities or extrapolated from category I/II/III evidence).

[b] Includes eye movement desensitization and reprocessing therapy, narrative therapy, interpersonal psychotherapy, psychodynamic psychotherapy, brief eclectic psychotherapy, and hypnotherapy.

[c] Includes antiadrenergic agents (prazosin, propranolol, clonidine, guanfacine), anticonvulsants, benzodiazepines, other serotonergic agents (cyproheptadine, buspirone), and atypical antipsychotics.

[d] Includes psychoanalytic psychotherapy, psychodynamic psychotherapy, interpersonal therapy, behavior therapy, brief dynamic therapy, emotion-focused therapy, and family-focused therapy.

[e] Includes lithium, thyroid hormones, and atypical antipsychotics.

[f] Includes electroconvulsive therapy, magnetic seizure therapy, transcranial magnetic stimulation, transcranial direct current stimulation, vagus nerve stimulation, direct cortical stimulation, and deep brain stimulation.

In the Project Liberty crisis counseling program in New York City after the September 11 attacks, use of an enhanced services referral tool (the 12-item expanded Short Post-Traumatic Stress Disorder Rating Interview [SPRINT-E]) resulted in referrals to enhanced services for 543 of 800 participating individuals in the program, 71% of whom accepted the referral.[25] An additional 9 individuals were identified as being at risk for suicide and triaged to immediate psychiatric intervention. The strongest predictor of referral acceptance was the number of intense reactions (defined on a 1-5 point rating scale as a score of 4 [quite a bit] or 5 [very much]).

Disaster Mental Health Interventions

Disaster mental health interventions include formal psychiatric treatment for psychiatric disorders and an array of wellness- and resilience-based psychosocial interventions for emotional distress and social problems (**Table 2** and Figure).[26,63-72,74-92] The most effective interventions are those chosen appropriately for the type of need determined in the clinical assessment. Although most people affected by disasters do not develop psychiatric disorders, almost everyone with exposure to severe disaster trauma will experience distress for at least a brief period. For example, although less than one-half of survivors directly exposed to the Oklahoma City bombing developed a psychiatric disorder after the bombing, 96% reported having at least 1 posttraumatic symptom.[16] Thus, early interventions are indicated for the majority of survivors to reduce distress, provide emotional support, educate, and normalize emotional responses, even before new psychiatric disorders have time to develop and be diagnosable.[20,34,88] Among the most commonly described interventions in the disaster mental health lit-

Box 3. Commonly Applied Early Psychosocial Interventions

Psychological First Aid

Definition: A set of practical early interventions and principles administered by clinicians or nonclinicians to address emotional distress

Goals: Stabilize psychological and behavioral functioning, facilitate psychological and behavioral adaptation, promote access to further care if indicated

Elements: Establish contact, address basic needs, protect from further harm, listen and gather information related to mental health needs and psychosocial concerns, provide reassurance and education, respond to distress and psychological symptoms, assist with coping and problem solving, and connect with support systems and formal services.

Psychological Debriefing

Definition: An intervention consisting of 1 or more individual or group sessions provided hours or days after a traumatic event

Goals: Normalize survivors' reactions, process their trauma experiences, address psychological distress, enhance resilience

Elements: Assist survivors in sharing their experiences and ventilating their emotional reactions, provide education about common reactions, encourage further intervention if appropriate

Crisis Counseling

Definition: Poorly defined, brief strengths-based mental health intervention delivered by trained, experienced crisis workers and paraprofessionals

Goals: Support survivors, enhance coping, connect with other services

Elements: Conduct outreach in nontraditional community settings, provide public education, offer supportive individual and group counseling, conduct assessment and referral, link to resources and other services if needed

erature reviewed are psychological first aid, psychological debriefing (eg, critical incident stress debriefing), and crisis counseling (eTable [Supplement] and Box 3).

"Psychological first aid" is a popular term used to describe a set of practical early interventions and principles administered by clinicians or nonclinicians to address emotional distress.[88] Psychological first aid is akin to physical first aid, with parallel goals: to stabilize psychological and behavioral functioning by meeting basic physical needs and then addressing psychological needs; to mitigate psychological distress and dysfunction; to facilitate return to adaptive psychological and behavioral functioning; and to promote access to further care.[93] Psychological first aid should be embedded in public health, mental health, medical, and emergency response systems.[94] It can be delivered in diverse settings including homes as well as shelters, medical-triage areas, disaster-assistance centers, family-reception and assistance centers, workplaces, schools, and other community settings.[95] The elements of psychological first aid are establishing contact through a calm, comforting, and compassionate presence; meeting basic physical needs and protecting individuals from further harm; listening and information-gathering; fostering articulation of survivors' needs and concerns; meeting basic psychological needs; delivering accurate and timely information about disaster operations and available resources; providing social support and coping assistance; and facilitating connections to social-support networks and referrals for ongoing care.[88,96,97] Several available psychological first aid toolkits provide a common set of basic principles and techniques.[97-100] Psychological first aid was developed from expert consensus but has not been empirically tested.[101]

"Psychological debriefing" consists of 1 or more individual or group sessions provided hours or days after a traumatic event. Its main elements are emotional ventilation, trauma processing, and psychoeducation. This intervention garnered considerable popularity internationally, without empirical evidence of its effectiveness.[86] A review of 11 randomized controlled trials of single-session debriefing for individuals subsequently found the intervention to be ineffective for PTSD prevention or treatment.[87] Two longer-term follow-up studies covered in this review documented significantly worse posttraumatic symptom outcomes in individuals who received debriefing—by as much as a factor of 3, but only in those at most risk for PTSD.[87] Psychological debriefing was not intended to prevent or treat PTSD or as a treatment or stand-alone intervention; rather, it was designed to provide opportunities for processing the trauma, facilitating normal recovery, providing education, and linking with resources.[102] Those at risk for PTSD or other psychopathology may worsen with debriefing, and these individuals should be identified and referred for psychiatric services instead.[86,87]

"Crisis counseling" is a poorly defined, brief mental health intervention delivered by trained, experienced crisis workers and paraprofessionals in acute disaster settings,[32,88] especially in the context of the federally funded Crisis Counseling Assistance and Training Program.[103] This strengths-based program reaches out to provide support to individuals in nontraditional community settings such as shelters, faith-based organizations, and homes.[103,104] Crisis counseling shares many fundamental elements with psychological first aid. It can be delivered to individuals or groups to help survivors understand their reactions, enhance coping, consider options, and connect with other services. Norris and Rosen[105] have cautioned that although crisis counseling can be broadly helpful for postdisaster distress, it is not sufficient for the needs of some individuals who will require formal treatment for psychiatric illness emerging after disasters.

The early psychosocial interventions described above are not considered formal treatment for psychiatric disorders, although they may sometimes be appropriate interventions in addition to treatment or before treatment can be initiated. Treatment of psychiatric disorders and other psychological conditions is provided by mental health professionals. This treatment typically occurs in traditional office or clinic settings for patients referred for these services, particularly as time evolves and psychiatric problems have had time to develop and be identified. In early postdisaster phases, however, formal psychiatric treatment may be provided in the disaster setting, ideally integrated into the disaster medical response. For example, a mental health clinic was embedded in a medical unit in a large hurricane evacuation shelter that housed 2500 evacuees in Dallas, Texas, for 2 weeks, allowing integrated psychiatric, psychological, and medical care.[63] This arrangement provided psychiatric care to 421 individuals in 503 separate contacts by 152 psychiatric professionals including 72 psychiatrists; another approximately 500 individuals received some undocumented form of mental health contact. Severe and persistent mental illness represented 28% of the psychiatric problems treated. The 40% rates of preexisting psychopathology presenting for treatment eclipsed the rates of 11% with acute stress disorder and 24% with any posttraumatic stress–related problems identified. After the September 11 World Trade Center attacks, 268 psychiatrist volunteers who were colocated with other disaster responders at a family assistance center evaluated 848 distressed individuals, most of whom (14%-38%) were assessed as having stress-related and adjustment disorders; however, bereave-

ment, major depression, and substance use disorders were also observed in 1% to 12%.[64] Although psychiatric diagnoses could not be confirmed in the crisis setting, most of the assessed individuals were perceived to have a psychiatric diagnosis, and a substantial proportion received psychotropic medication. A follow-up evaluation as part of this project concluded that psychiatrists have unique and specific roles in the early postdisaster setting. Placement of mental health services in disaster recovery areas may help address the surge of mental health needs among evacuee populations in the face of already overcrowded emergency departments and overburdened mental health care systems.[63]

Pharmacotherapy and psychotherapy are the standard treatments for psychiatric disorders related to trauma in general and to disasters specifically. Usual clinical practice for management of trauma-related disorders and symptoms is generally appropriate. A timeline for addressing mental health problems arising after disasters is provided in the Figure. In early postdisaster phases, sedating medications may be provided transiently for sleep and anxiety symptoms, and medication refills may be provided to prevent interruption of ongoing treatment for preexisting psychiatric disorders.[63,64] After passage of sufficient time for diagnosis of incident trauma-related disorders, psychopharmacotherapy may be initiated for disorders including PTSD and major depression in clinical settings.[106] Psychotherapy also may be provided for disaster-related psychiatric disorders. The most commonly recommended psychotherapies in the trauma treatment literature include trauma-focused cognitive-behavioral therapies and exposure-based therapies.[106] Cognitive-behavioral therapies help patients learn to identify and correct unrealistic negative thoughts and perceptions that contribute to unpleasant emotions and maladaptive behaviors, including those related to trauma.[107] Exposure-based therapies introduce individuals to memories and reminders of their traumatic experiences to help them modify their emotional reactions.[107]

A substantial literature is devoted to describing and testing the effectiveness of interventions including psychotherapies and pharmacotherapy for PTSD, but the strongest evidence (eg, randomized controlled trials) for these modalities has emerged from studies of populations with other types of trauma, such as that resulting from motor-vehicle crashes in nondisaster settings. Table 2 describes empirical evidence for mental health interventions in general trauma care and in disaster response situations for conditions relevant to disaster exposure. Considerable evidence has been gained for cognitive-behavioral and exposure-based therapies in disaster-affected populations.[69,70] However, little or no empirical evidence of benefit for many mental health interventions commonly used in disaster settings is available.

Discussion

The primary purpose of this review is to organize the disaster mental health literature into an operational framework for the delivery of mental health services to individuals affected by disasters. The 3 components of case identification, triage, and intervention are consistent with established approaches to emergency and medical response to mass casualty incidents and may therefore facilitate integration of mental health services into the medical disaster response. Principles of triage to appropriate interventions for psychiatric illness and other psychosocial issues are established. A number of trauma-focused psychiatric treatments have been developed and tested in other populations (including randomized controlled trials) and successfully applied to disaster-exposed groups. Thus, this literature includes the ingredients to inform policies and planning for disaster mental health, but it has not previously been organized into a framework to logically guide the response from case identification to triage to intervention.

Despite the availability of these ingredients for disaster mental health response, few articles in this literature search underscored the need to start with assessments that include psychiatric diagnosis; instead, most articles proceed with recommending various strategies and interventions without emphasizing this fundamental foundation. Most of the literature has focused on providing interventions for distress with a wellness-based focus, neglecting to include care plans for people with psychiatric disorders. Provision of services without assessment of psychiatric illness creates potential for failure to treat psychiatric disorders as well as potential for doing harm, such as was found with the extensive history of use of debriefing indiscriminant to psychopathology.[18,73,108] Traditionally, federally funded programs such as the Crisis Counseling Assistance and Training Program have provided primarily low-intensity services aimed at psychological distress and have not sufficiently addressed psychiatric disorders arising after disasters. Communities facing disasters in the future will be challenged to provide assessment-directed referral and formal treatment for individuals who need more than the federally funded crisis counseling services.[103,109] Survivors requiring formal treatment usually represent a minority of those affected, but their suffering compels the most sincere consideration of those responsible for disaster response. Conversely, treatments for psychiatric illness are not necessarily appropriate for psychological distress, and because the majority of disaster survivors do not develop a psychiatric illness, targeting psychiatric treatment services for psychiatric disorders and directing other less intensive interventions for distress is cost effective, conserves scarce resources in disaster settings, and avoids the potential harm of unneeded treatments.[18,69,101] This point highlights the importance of conducting well-designed disaster mental health needs assessments, because, for example, failure to differentiate PTSD from distress in unexposed populations who have been affected by disasters with massive scope and magnitude such as the September 11 attacks has the potential to overestimate need for psychiatric services and related costs by magnitudes as high as 10.[110]

The limitations of this review reflect the current state of the research and the literature on disaster mental health response. Recent reviews of the observational research that comprises much of the general disaster emergency and medical response literature have characterized this literature as having a limited evidence base and lacking methodological rigor.[28,111] Scientific investigation of disaster and emergency response is inherently difficult to conduct in the characteristically chaotic and pressured settings of community catastrophes.[30,112] This review addresses the mental health response for the community as a whole and does not specifically address the needs or interventions for rescue personnel (such as emergency medical services, police, fire, or other first responders) or personnel involved with care of patients in disasters (such as emergency and surgical staff), who may have intense disaster-related exposures of a different character. This review of mental health response to disaster trauma exposure was further informed by numerous rigorously conducted studies of interventions in populations exposed to other types of trauma and a large body of less rigorous disaster-oriented articles.

In conclusion, the extant literature has identified the importance of integrating these interventions and services in public health and clinical systems of care. Compelling issues that must be addressed in improving disaster mental health response capacities focus on matching interventions and services to specified mental health outcomes (eg, psychiatric illness vs disaster-related distress) for exposed and unexposed groups, encouraging the use and integration of appropriate assessment and referral, and evaluating the effectiveness of the interventions and services offered. The model and flow diagram in this article provide a framework for this work and place proper emphasis on the role of accurate assessment in all disaster response proceeding through triage and treatment.

ARTICLE INFORMATION

Author Contributions: Dr North had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.
Study concept and design: North, Pfefferbaum.
Acquisition of data: North.
Analysis and interpretation of data: North.
Drafting of the manuscript: North, Pfefferbaum.
Critical revision of the manuscript for important intellectual content: North, Pfefferbaum.
Statistical analysis: North.
Administrative, technical, or material support: North, Pfefferbaum.

Conflict of Interest Disclosures: The authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Dr North reported receiving research support from the National Institute on Alcohol Abuse and Alcoholism, the National Institute of Diabetes and Digestive and Kidney Diseases, the Department of Veterans Affairs, the American Psychiatric Association, and the Orthopaedic Trauma Association; receiving consultant fees from the University of Oklahoma Health Sciences Center and from the Tarrant County, Texas, Department of Health; and receiving speaker's fees from the Pueblo City-County Health Department. Dr Pfefferbaum reported receiving support from the Substance Abuse and Mental Health Services Administration.

Funding/Support: Dr Pfefferbaum's work on this article was supported in part by a grant from the Substance Abuse and Mental Health Services Administration (1 U79 SM57278), which established the Terrorism and Disaster Center (TDC) at the University of Oklahoma Health Sciences Center. The TDC is a partner in the National Child Traumatic Stress Network.

Additional Contributions: We gratefully acknowledge the assistance of Shirley Campbell. MLS, BS (Dallas VA Medical Center), in conducting the literature searches, Richard V. King, PhD (Department of Surgery, Division of Emergency Medicine, UT Southwestern Medical Center, Dallas), for reviewing and commenting on manuscript drafts, and independent contractor Richard A. Olson, MS, for consultation on the flow diagram. None of these individuals received any extra compensation for their contributions.

Submissions: We encourage authors to submit papers for consideration as a Review. Please contact Mary McGrae McDermott, MD, at mdm608@northwestern.edu.

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