

# Child disaster mental health interventions, part II

## Timing of implementation, delivery settings and providers, and therapeutic approaches

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**T**his review summarizes current knowledge on the timing of child disaster mental health intervention delivery, the settings for intervention delivery, the expertise of providers, and therapeutic approaches. Studies have been conducted on interventions delivered during all phases of disaster management from pre event through many months post event. Many interventions were administered in schools which offer access to large numbers of children. Providers included mental health professionals and school personnel. Studies described individual and group interventions, some with parent involvement. The next generation of interventions and studies should be based on an empirical analysis of a number of key areas.

### Introduction

While numerous studies have documented the reactions of children to disasters, only recently has the field begun to systematically evaluate the therapeutic interventions employed to address these reactions. Among the existing reviews of child trauma interventions,<sup>1-6</sup> few have focused specifically on interventions used in the context of disasters and terrorism.<sup>5,6</sup> In their qualitative review of child disaster mental health intervention techniques, Pfefferbaum and colleagues<sup>6</sup> concluded that the extant research provides preliminary evidence of the efficacy of various

child disaster mental health interventions in reducing symptoms and the more enduring psychological morbidities associated with disaster exposure in children. To date, however, delivery issues in child interventions have not been examined systematically. This paper summarizes these issues and identifies gaps in the literature that may guide future research and ultimately clinical efforts.

### The Literature Search and Current Review

This report was based on a systematic review of child disaster mental health intervention studies identified through a literature search using the following terms: adolescent(s), child(ren), disaster(s), intervention(s), terrorism, terrorist event(s), terrorist incident(s), therapy, and treatment(s). The search was conducted in the winter of 2013 using EMBASE, ERIC, Medline, Ovid, PILOTS, PsycINFO, and Social Work Abstracts databases. The searches were confined to materials on children and adolescents, aged 0 to 18 y, and to English language sources. Titles and abstracts identified in the searches were examined to select material for inclusion in this review which focused on research studies of interventions for children in the context of natural disasters and terrorism. The research investigations were conducted in sites around the world, primarily with school-aged children and adolescents. A

**Keywords:** children, disaster, intervention, parent, posttraumatic stress, posttraumatic stress disorder, recovery, terrorism, therapy, treatment

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**Table 1.** Selected Features of the Interventions (Total = 48 studies)

Author	Event	Timing of intervention delivery	Setting of intervention delivery	Providers	Approach	Parent Involvement
Berger et al. (2007) <sup>8</sup>	Chronic terrorism including suicide bombings in Hadera, Israel (2000–2003)	Ongoing terrorism	School	TSP	G	PI
Berger et al. (2012) <sup>9</sup>	Chronic terrorism including multiple rocket attacks in Sderot, Israel (2000–2008)	Ongoing terrorism	School	TSP	G	PH and PI
Berger and Gelkopf (2009) <sup>10</sup>	Indian Ocean tsunami, Sri Lanka (2004)	14.5 mo	School	TSP	G	PH
Brown et al. (2004) <sup>11</sup>	September 11 terrorist attack (2001)	NS <sup>a</sup>	HMHS	MHP	I	PA and PI
Brown et al., (2006) <sup>7</sup> Classroom intervention	September 11 terrorist attack (2001)	29 mo <sup>b</sup>	School	MHP	G	PA
Brown et al., (2006) <sup>7</sup> Individual intervention	September 11 terrorist attack (2001)	31 mo <sup>b</sup>	HMHS	MHP	I	PA
Cain et al. (2010) <sup>12</sup>	Hurricane Katrina (2005)	23 mo	School and Other (Disaster trailer parks)	MHP and TSP	G	No
Catani et al. (2009) <sup>13</sup>	Indian Ocean tsunami, Sri Lanka (2004)	3 wk	Other (Camps)	MHP and TSP	I	No
CATS Consortium (2010) <sup>14</sup>	September 11 terrorist attack (2001)	NS	School and HMHS	MHP	NS	PI
Chemtob et al. (2002a) <sup>15</sup>	Hurricane Iniki (1992)	3.5 y	School	MHP	NS	No
Chemtob et al. (2002b) <sup>16</sup>	Hurricane Iniki (1992)	2 y	School	MHP	G and I	No
Cohen et al. (2009) <sup>17</sup>	Hurricane Katrina (2005)	15 mo	School and HMHS	MHP	G and I	PA and PI
de Roos et al. (2011) <sup>18</sup>	Explosion at a fireworks factory in Enschede, Netherlands (2000)	6 mo (from 2001 to 2004)	HMHS	MHP	I	PA and PI
Fernandez (2007) <sup>19</sup>	Earthquake in Molise, Italy (2002)	Three treatment cycles (1, 3, and 12 mo post disaster)	School	MHP	I	PA and PI
Field et al. (1996) <sup>20</sup>	Hurricane Andrew (1992)	1 mo	NS	MHP	I	No
Galante and Foa (1986) <sup>21</sup>	Earthquake in Central Italy (1980)	6 mo	School	MHP	G	No
Gelkopf and Berger (2009) <sup>22</sup>	Chronic terrorism including multiple terror attacks in Beer Sheba, Israel (2000–2006)	Ongoing terrorism	School	TSP	G	PI
Giannopoulou et al. (2006) <sup>23</sup>	Earthquake in Athens, Greece (1999)	2–4 mo	HMHS	MHP	G	PA, PH, and PI
Gilboa-Schechtman et al. (2010) <sup>24</sup>	Heterogeneous including terrorist attacks, motor vehicle accidents, and sexual and nonsexual assaults in Israel	NS	HMHS	MHP	I	PA and PI
Goenjian et al. (1997) <sup>25</sup>	Earthquake in Spitak, Armenia (1988)	18 mo	School	MHP	G and I	F <sup>d</sup>

**Table 1.** Selected Features of the Interventions (Total = 48 studies) (continued)

Author	Event	Timing of intervention delivery	Setting of intervention delivery	Providers	Approach	Parent Involvement
Goenjian et al. (2005) <sup>26</sup>	Earthquake in Spitak, Armenia (1988)	18 mo	School	MHP	G and I	F
Goodman et al. (2004) <sup>27</sup>	September 11 terrorist attack (2001)	6 mo	HMHS	MHP	I	PA and PI
Hardin et al. (2002) <sup>28</sup>	Hurricane Hugo (1989)	NS	School	MHP	G	No
Jaycox et al. (2010) <sup>29</sup>	Hurricane Katrina (2005)	20 mo for CBITS <sup>b</sup> and 21.5 mo for TF-CBT <sup>p</sup>	School and HMHS	MHP	G and I	PI
Karairmak and Aydin (2008) <sup>30</sup>	Earthquake in the Marmara region, Turkey (1999)	10 mo	School	MHP	G	No
Lesmana et al. (2009) <sup>31</sup>	Terrorist attack in Bali, Indonesia (2002)	6 wk	NS	MHP	G	No
Mahmoudi-Gharaei et al. (2009) <sup>32</sup>	Earthquake in Bam, Iran (2003)	6 and 8 mo	Other (Tents)	MHP	G	No
Mahmoudi-Gharaei et al. (2009) <sup>33</sup>	Earthquake in Bam, Iran (2003)	NS	Other (Tents)	MHP	G	No
March et al. (1998) <sup>34</sup>	Heterogeneous including car accidents, severe storms, accidental and gunshot injury, severe illness, and fires	NS	School	MHP	G and I	No
Plummer et al. (2009) <sup>35</sup>	Hurricane Katrina (2005)	7 mo	School	MHP	G	PA
Ronan and Johnston (1999) <sup>36</sup>	Volcanic eruptions of Mount Ruapehu, New Zealand (1995)	3 mo	School	MHP	G	No
Ronan and Johnston (2003) <sup>37</sup>	Hazard education-preparedness, New Zealand	NA (preparedness)	School	TSP	G	PH and PI
Sahin et al. (2011) <sup>38</sup>	Earthquake in the Marmara region, Turkey (1999)	10 mo	School	MHP	G	PI
Salloum and Overstreet (2008) <sup>39</sup>	Hurricane Katrina (2005)	7 mo <sup>b</sup>	School	MHP	G and I	PA and PI
Salloum and Overstreet (2012) <sup>40</sup>	Hurricane Katrina (2005)	40 mo <sup>b</sup>	School	MHP	G and I	PA and PI
Scheeringa et al. (2011) <sup>41</sup>	Heterogeneous including Hurricane Katrina (2005), acute injury, and witness to domestic violence	22.5 mo <sup>bc</sup>	NS	MHP	I	PA, PH, and PI
Shen (2002) <sup>42</sup>	Earthquake in Taiwan (1999)	NS	School	MHP	G	PA
Shoostary et al. (2008) <sup>43</sup>	Earthquake in Bam, Iran (2003)	4 mo	NS	MHP	G	No
Taylor and Weems (2011) <sup>44</sup>	Hurricane Katrina (2005)	4 y	School	MHP	I	PA
Vijayakumar et al. (2006) <sup>45</sup>	Indian Ocean tsunami, Srinivasapuram, India (2004)	15 mo <sup>b</sup>	Other (Community center)	MHP and Other (Volunteers)	G	No
Vila et al. (1999) <sup>46</sup>	School hostage crisis in Paris, France (1995)	1 d and 6 wk	School	MHP	G and I	PA and PI

**Table 1.** Selected Features of the Interventions (Total = 48 studies) (continued)

Author	Event	Timing of intervention delivery	Setting of intervention delivery	Providers	Approach	Parent Involvement
Weems et al. 2009 <sup>47</sup>	Hurricane Katrina (2005)	Wave 1: 13 mo Wave 2: 16 mo	School	MHP	G	No
Wolmer et al. (2011) <sup>48</sup>	Second Lebanon War (Chronic terrorism) (2006)	5 mo	School	TSP	G	PA
Wolmer et al. (2011) <sup>49</sup>	Chronic terrorism with preventive intervention before rocket attacks, Operation Cast Lead, Israel (2008–2009)	3 mo before rocket attacks	School	TSP	G	No
Wolmer et al. 2005 <sup>50</sup>	Earthquake in the Marmara region, Turkey (1999)	4.5 mo	School	TSP	G	PA
Wolmer et al. (2003) <sup>51</sup>	Earthquake in the Marmara region, Turkey (1999)	4.5 mo	School	TSP	G	PI
Yule (1992) <sup>52</sup>	Jupiter cruise ship sinking at the Greek port of Piraeus (1988)	10 d for debriefing and thereafter for CBT	School	MHP	G	No
Yule and Udwin (1991) <sup>53</sup>	Jupiter cruise ship sinking at the Greek port of Piraeus (1988)	10 d	School	MHP	G and I	No

Notes: F, family intervention was provided if needed; G, group sessions; HMHS, health or mental health site; I, individual sessions; MHP, mental health professional; NA, not applicable; NS, not specified; PA, parent involved in assessment; PH, parent involved in child's intervention homework; PI, parent involved in intervention; TSP, teacher and/or other school personal; <sup>a</sup>The investigators were provided with a database of contact information of potential study participants 6 mo after the September 11 attack, but they did not specify the actual time of delivery of the intervention; <sup>b</sup>When the date for the start and end of the intervention were reported, timing was computed as the mean time interval between the time the investigators began to administer the intervention and when they completed intervention administration which may have varied for individual participants or for groups of participants; <sup>c</sup>This is the timing of the second phase of the study. The first phase started 5 mo before Hurricane Katrina and was interrupted by the disaster while the second phase started 6 mo after the hurricane and was implemented over a period of 33 mo; <sup>d</sup>Information about the family intervention in the study by Goenjian and colleagues<sup>25</sup> was obtained from the later study by the same group.<sup>26</sup>

total of 47 papers were reviewed. One article described a two-stage trial with two different interventions.<sup>7</sup> These two interventions were analyzed separately. Hence, the final sample included 48 studies. The search methodology that provided the foundation for this review is described in a companion paper.<sup>6</sup>

Table 1 displays information from the reviewed studies on the timing and setting of intervention delivery, the expertise of the providers, the therapeutic approach (e.g., individual, group), and the involvement of parents. Table 2 provides summary data on this material.

### Timing of Intervention Delivery

While disasters are seemingly single-incident traumas circumscribed by time and space, the ensuing secondary adversities extend their consequences over months and even years, with children's reactions and needs evolving over time. Studies

have examined preparedness interventions, those delivered in the early aftermath of disasters, and those delivered over the course of recovery from the intermediate post-disaster period to months and years post event. The discussion below emphasizes the importance of preparedness and resilience-enhancing interventions to help children who may be exposed to future disasters, the use and evaluation of debriefing interventions in the acute aftermath, the potential for interventions delivered long after a disaster to be efficacious, and the importance of natural recovery. Three studies were conducted during ongoing terrorist attacks.<sup>8,9,22</sup> For studies implemented after the event had occurred, the average time intervals from the disaster to the beginning of the intervention ranged from one day<sup>46</sup> to four years,<sup>44</sup> with a median of seven months. See Tables 1 and 2.

#### Pre event

Children living in areas prone to natural disasters and in environments which

expose them to a continuous threat of terrorism offer opportunities to provide and study preparedness interventions. For example, in a randomized control study, Ronan and Johnston<sup>37</sup> found that a hazards education program increased hazards-based knowledge in the children who received the intervention as well as both child- and parent-reported improved hazard adjustments at home. Interestingly, children's hazard-related fears and perception of their parents' fears improved with both the intervention and control conditions. This was perhaps due to a reading and discussion program that all children received suggesting that the mere willingness of teachers and parents to discuss hazards and disasters may be beneficial to youth.

Classroom interventions using psycho-education, skill training, and narrative techniques have been effective in alleviating various reactions to past and ongoing terrorism and in mitigating the anticipated

**Table 2.** Summary Data from Reviewed Studies (Total = 48 studies)

		Natural or technological disaster n = 32 (%)	Terrorism <sup>a</sup> (chronic or single attack) n = 11 (%)	Other <sup>b,c</sup> n = 5 (%)	Total sample <sup>d</sup> n = 48 (%)
Timing	Ongoing traumatic event	0 (0.0)	3 (30.0)	0 (0.0)	3 (6.5)
	Less 1 mo	3 (9.4)	0 (0.0)	1 (25.0)	4 (8.7)
	1–3 mo	4 (12.5)	1 (10.0)	0 (0.0)	5 (10.9)
	4–6 mo	5 (15.6)	3 (30.0)	0 (0.0)	8 (17.4)
	7–12 mo	5 (15.6)	0 (0.0)	0 (0.0)	5 (10.9)
	13–36 mo	9 (28.1)	2 (20.0)	1 (25.0)	12 (26.1)
	More than 36 mo	3 (9.4)	0 (0.0)	0 (0.0)	3 (6.5)
Not specified	3 (9.4)	1 (10.0)	2 (50.0)	6 (13.0)	
Setting	School only	21 (65.6)	6 (54.6)	3 (60.0)	30 (62.5)
	Clinic or mental health site only	2 (6.3)	3 (27.3)	1 (20.0)	6 (12.5)
	School and clinic/mental health site	2 (6.3)	1 (9.1)	0 (0.0)	3 (6.3)
	School and other site	1 (3.1)	0 (0.0)	0 (0.0)	1 (2.1)
	Other site	4 (12.5)	0 (0.0)	0 (0.0)	4 (8.3)
	Not specified	2 (6.3)	1 (9.1)	1 (20.0)	4 (8.3)
Provider	MHP only	26 (81.3)	6 (54.6)	4 (80.0)	36 (75.0)
	Teacher/other non-MHP school personnel only	3 (9.4)	5 (45.4)	1 (20.0)	9 (18.8)
	MHP and teacher/other non-MHP school personnel	2 (6.3)	0 (0.0)	0 (0.0)	2 (4.2)
	MHP and other	1 (3.1)	0 (0.0)	0 (0.0)	1 (2.1)
Intervention approach	Individual only	5 (15.6)	3 (27.3)	2 (40.0)	10 (20.8)
	Group only	18 (56.3)	7 (63.6)	1 (20.0)	26 (54.2)
	Individual and group	8 (25.0)	0 (0.0)	2 (40.0)	10 (20.8)
	Not specified	1 (3.1)	1 (9.1)	0 (0.0)	2 (4.2)
Parent/Family involvement	PA only	5 (15.6)	3 (27.3)	0 (0.0)	8 (16.7)
	PH only	1 (3.1)	0 (0.0)	0 (0.0)	1 (2.1)
	PI only	3 (9.4)	4 (36.4)	0 (0.0)	7 (14.6)
	PA and PI	5 (15.6)	2 (18.2)	2 (40.0)	9 (18.8)
	PH and PI	0 (0.0)	0 (0.0)	1 (20.0)	1 (2.1)
	PA, PH, and PI	1 (3.1)	0 (0.0)	1 (20.0)	2 (4.2)
	Family intervention if needed	2 (6.3)	0 (0.0)	0 (0.0)	2 (4.2)
	Parent not involved in child assessment, intervention homework, or intervention	15 (46.9)	2 (18.2)	1 (20.0)	18 (37.5)

Notes: MHP, mental health professional; PA, parent involved in assessment; PH, parent involved in child's intervention homework; PI, parent involved in intervention; <sup>a</sup>The study by Wolmer and colleagues<sup>49</sup> was conducted as a preventive intervention three months before the traumatic event and was not included in the count of timing (thus, n = 10 for timing); <sup>b</sup>Studies with other types of traumatic events included those with heterogeneous stressors,<sup>24,34,41</sup> hostage taking<sup>46</sup> and disaster preparedness<sup>37</sup>; <sup>c</sup>The study by Ronan and Johnson<sup>37</sup> was not included in the count for timing as no disaster had occurred (thus, n = 4 for timing); <sup>d</sup>Two preparedness studies<sup>37,49</sup> were not included in the count for timing (thus, n = 46 for timing)

negative effects of future terrorist attacks on children's mental health functioning.<sup>8,22,49</sup> As preparedness assumes a larger role in the management of disasters, prevent interventions may be an approach to enhancing resilience in children, especially those residing in high-risk areas.

#### Early aftermath

The early hours, days, and weeks post disaster comprise a critical period during

which support and other interventions may be necessary. Only two interventions included in this review were implemented in the early post-event period<sup>46,52</sup> when services are difficult to mobilize and establish due to the urgency and chaos of the disaster environment and the effort needed to develop and implement interventions. Both were group debriefing interventions which, while widely used and studied in adults,

have not been well evaluated in children. As traditionally conceived, debriefing is delivered in the early aftermath of an event in a single group session in which survivors share their experiences and reactions, reconstruct the event, and discuss coping strategies. The lesson from adult debriefing studies is that in some cases, natural recovery, with no intervention, may be superior to any intervention or the wrong

intervention.<sup>54</sup> Thus, the few extant child debriefing studies are of interest.

In an early disaster study, Yule<sup>52</sup> offered a single group debriefing session to school girls who survived a shipping disaster. Relative to those who were not treated, girls who received debriefing and subsequent cognitive behavioral group sessions scored significantly lower on measures of posttraumatic stress but not on measures of anxiety or depression. Girls in the school where treatment was delivered showed significantly fewer fears overall.<sup>52</sup> Another study examined a modified group debriefing intervention implemented within the first 24 h, and again six weeks, after a school hostage-taking incident.<sup>46</sup> The intervention was designed to manage the children's acute responses and to provide education to children, parents, and school personnel. Follow up at 18 mo revealed that the debriefing sessions did not prevent the development of psychological disorders, including posttraumatic stress disorder (PTSD).<sup>46</sup> Thus, there is little empirical evidence to support psychological debriefing with children.

#### Recovery period

Evidence suggests that children are responsive to interventions delivered months and even years after a disaster. Delivered 18 mo post disaster, a trauma- and grief-focused psychotherapy intervention for children exposed to an earthquake resulted in benefit evident five years after the disaster.<sup>26</sup> In addition to greater improvement in PTSD symptoms, those who received the intervention showed improvement in depressive symptoms while those who did not experienced worsening of depressive symptoms.<sup>26</sup> Chemtob and colleagues<sup>16</sup> found significant improvement in PTSD symptoms with both individual and group applications of an eclectic psychosocial intervention two years after Hurricane Iniki with no significant difference in the two approaches. One year later, EMDR delivered to children who continued to suffer significant trauma symptoms produced benefit in PTSD symptoms, anxiety, and depression.<sup>15</sup> A cognitive behavioral intervention, delivered four years after Hurricane Katrina, resulted in improvement in both PTSD symptoms and diagnosis.<sup>44</sup>

#### Natural recovery

Multiple studies utilizing control groups found improvement in both intervention and control conditions for at least some outcomes.<sup>13,14,28,36</sup> For example, Hardin and colleagues<sup>28</sup> studied a school-based public health intervention delivered to adolescents with normal distress responses three times a year for three years after Hurricane Hugo. There was a significant intervention effect for the first 24 mo. Pointing to the influence of natural recovery, however, after increased distress in both the intervention and control groups in the first year, there was a steady decrease over the next two years for all groups. In a September 11 study, children assigned to either a trauma-specific cognitive behavioral intervention or a brief cognitive behavioral skills intervention improved; the CATS Consortium acknowledged, however, that the children might have improved over time without intervention.<sup>14</sup> Ronan and Johnston<sup>36</sup> also recognized the possibility of natural recovery in their study comparing exposure and cognitive behavioral interventions. Citing high and stable response rates, Catani and colleagues<sup>13</sup> discounted the possibility that improvement in their two intervention conditions—one using meditation and relaxation and one using narrative exposure—was due to natural recovery. In some studies, treatment was found to be more beneficial than natural recovery alone.<sup>26,31</sup> Moreover, other trials have reported a worsening of symptoms<sup>25</sup> or failure of trauma symptoms to resolve<sup>46</sup> in children who did not receive treatment.

#### Intervention Settings and Delivery

Disaster interventions are delivered in various sites, including schools, health and mental health facilities, and other community settings. Factors important in determining the setting include the location and magnitude of the disaster, characteristics of the disaster community, availability of venues such as schools and clinics to offer services, accessibility for families, expertise of the professionals (e.g., psychologists, teachers) delivering the intervention, and feasibility. For example, public health and wellness interventions may be administered

by teachers or other school personnel in educational settings. In some situations, it may be difficult for individuals to leave a disaster location, making it necessary to conduct interventions in other settings such as shelters and refugee camps. Moreover, even when families are able to commute to alternative locations, they may be less willing to travel to clinics than to access services in schools which children regularly attend.<sup>29</sup> In addition, the setting may depend in part on the type and goals of intervention being administered. Public health and wellness interventions, which are commonly presented in a group format, may be best suited for school settings, which provide access to a large number of children who are accustomed to shared experiences. Interventions requiring the expertise of clinicians may be delivered in clinical settings or schools if professionals are available to administer them. This section identifies the advantages and limitations of using school, clinical, and other community settings for disaster intervention delivery.

#### School settings

The majority of studies ( $n = 34$ , 70.8%) in this review examined interventions delivered in school sites. See Table 1. Some school-based interventions were administered to children regardless of their specific exposures or reactions.<sup>22,28</sup> Other school-based interventions were more clinical in nature and were administered to children suffering from distressing psychiatric symptoms.<sup>15,26,34</sup> Teachers and other school personnel are in an excellent position to help children after disasters as they are familiar with developmental processes and situational crises; they have established relationships with children; and they are likely to notice emotional and behavioral changes, performance difficulties, and functional impairment. Therefore, schools provide a natural venue for conducting public health activities such as delivering psychoeducation and social support, assessing and monitoring affected children, and identifying and triaging children with problems that warrant more intensive professional attention. School settings may lack some of the resources found in clinical settings, however, such as sufficient private space to meet with children and



families, the availability of licensed mental health professionals, and the capacity and mechanisms to conduct comprehensive assessments.

#### **Clinical settings**

Disaster interventions in the reviewed studies also were implemented in clinical settings where children were less likely to have an established, trusting relationship as may exist with teachers in school settings. Only nine (18.8%) of the studies conducted the intervention in a clinical facility. See **Table 1**. Clinical settings may be less accessible than school sites to children and their families. Clinical facilities are more likely, however, to possess the resources, including experienced mental health clinicians knowledgeable about pathology and traditional treatment, needed to conduct comprehensive assessments and to employ a range of interventions. They also offer more privacy for children and families who may not want others to know they are seeking services.

#### **Other community settings**

Administering an intervention in a location other than a school or mental health clinic may be necessary in areas where a disaster has destroyed these sites. Examples of alternative community settings include shelters, refugee camps, or makeshift structures such as tents. For example, Catani and colleagues<sup>13</sup> used trained teachers and mental health therapists to administer meditation-relaxation and narrative exposure interventions to children in refugee camps who had suffered both civil war and the 2004 Indian Ocean tsunami. The willingness of these professionals to conduct interventions in resource-barren community settings provided services the children likely would not have received otherwise.

#### **Comparing school, clinical, and community settings**

To directly test the relative advantages of clinic- and school-based interventions, Jaycox and colleagues<sup>29</sup> compared two interventions in children 15 mo after Hurricane Katrina. One intervention was delivered in a group approach (with 1 to 3 individual sessions) at school while the other was delivered to children and parents in a mental health clinic. Both treatments resulted in significant PTSD symptom reduction though many

children continued to experience elevated symptoms post treatment. Many families did not utilize the treatment services in the clinic setting, but most did participate in the intervention delivered at school. This was perhaps due to the clinic location, which was further away than was the school where the children attended classes.<sup>29</sup>

#### **Providers**

Typically, the studies did not focus on the qualifications of providers who delivered the interventions, but many mentioned the backgrounds of providers. In general, school-based interventions for symptomatic children were delivered by clinicians such as licensed clinical social workers, doctoral-level clinicians, clinical psychology trainees, or trained school counselors. For wellness-focused school-based programs, teachers and even trained paraprofessionals administered interventions. Using teachers has the advantage of increasing the number of children served at a time, which is important given that providers are often scarce after a disaster. Teachers can administer assessments, reinforce skills learned in therapy, and provide feedback about children's improvements.<sup>51</sup> For instance, after a major earthquake in Turkey, Wolmer and colleagues<sup>50,51</sup> used teachers to administer their intervention because the need for therapeutic services had surpassed the availability of trained clinicians.<sup>51</sup> A team of local mental health professionals prepared the teachers and provided ongoing supervision which included helping teachers to redefine their roles.<sup>50,51</sup> Providers without a clinical background may be limited in their ability to evaluate and manage clinical problems, however. Following the 2004 Indian Ocean tsunami, Catani and colleagues<sup>13</sup> used a local team of clinical experts to provide intense training on mental health diagnosis, basic counseling skills, and trauma-informed treatment strategies to teachers prior to deploying them. After the tsunami, the teachers attended a refresher course and received ongoing supervision. Clinically, training and supervision are essential to the delivery of disaster services. In terms of research, training and consultation or supervision are needed to assure fidelity and adherence in intervention delivery.

Training in disaster mental health and/or in specific interventions is needed for interventions delivered in clinical settings as well. For example, after the September 11 attack, the CATS Consortium used clinicians employed in nine provider organizations in New York City to deliver their interventions in schools and clinics.<sup>14</sup> All participating clinicians were trained by the intervention developers on the cognitive behavioral therapy models being implemented. Clinicians received case consultation from the intervention developers and clinical training directors at the local sites where the interventions were being implemented, and they received training on structured engagement strategies.<sup>14</sup>

### **Therapeutic Approaches**

The interventions reviewed for this report varied with respect to the format of sessions delivered to individual children and/or to children in groups. Some interventions involved work with parents.

#### **Individual approaches**

In the present review, individual intervention was offered as the sole approach in 10 studies (20.8%) with the number of sessions varying widely. See **Table 1**. Providers used cognitive behavioral treatment<sup>11</sup> and client-centered therapy<sup>28</sup> in their individual work with bereaved children of firefighters after the September 11 attack. Following Hurricane Katrina, Taylor and Weems<sup>44</sup> offered a 10-session manualized cognitive behavioral intervention with psychoeducation, cognitive restructuring, exposure, problem solving, and relapse prevention to six individual children who met diagnostic criteria for PTSD. While anxiety symptoms did not decrease significantly, none of the children met criteria for PTSD post intervention.<sup>44</sup> In some instances, the decision to administer individual intervention may be influenced by the techniques used. Certain intervention techniques, such as massage therapy,<sup>20</sup> necessitate individual delivery. Additionally, EMDR was typically delivered in individual sessions.<sup>18,19</sup>

Other interventions involved a combination of group and individual sessions. For example, a number of group interventions used pull-out sessions in which the child was seen individually.<sup>25,29,39,40</sup> In their

10 session group treatment, Salloum and Overstreet<sup>39,40</sup> used an individual session to discuss the child's worst, most horrifying, or saddest moments related to trauma or loss and to address trauma reminders, guilt, or other issues or needs unique to the individual child. This allowed focused attention for the child and protected other children from vicarious exposure to graphic and detailed content.

The choice to treat an individual child, as opposed to using group or classroom-based interventions, is likely to rely on ongoing evaluation and available resources. A major unanswered question is whether, and for what ages, vicarious exposure to other children's reactions is helpful or harmful. Providing individual treatment may be impractical and costly in the aftermath of a disaster, especially if large numbers of children have been affected. On the other hand, some children, such as those who have experienced disaster-related bereavement, may need intensive individualized intervention.

Few studies have compared individually-delivered interventions.<sup>18,24</sup> For example, Gilboa-Schechtman and colleagues<sup>24</sup> found prolonged exposure superior to time-limited dynamic therapy at the conclusion of the treatment and at six-month follow up but not at 17 mo follow up. While de Roos and colleagues<sup>18</sup> found benefit with both individual cognitive behavioral therapy and EMDR for children seen in a disaster mental health after-care setting following an explosion of a fireworks factory, fewer sessions were needed for the EMDR intervention.

#### **Group interventions**

As evident in Table 1, the majority of the interventions (n = 36, 75.0%) administered group sessions. While group interventions must be carefully designed and implemented so that children are not overwhelmed by the experiences and reactions of other participating children, groups have advantages in terms of efficiency and reduced costs and the potential to lessen stigma associated with mental health services. The social component of group interventions also may be beneficial.<sup>7</sup> For example, Brown and colleagues<sup>7</sup> found improvement in depression with a classroom intervention. Interestingly, an individualized intervention for children

who remained symptomatic following the classroom group intervention was not successful in decreasing depression symptoms which actually worsened. The authors implicated the lack of social support available in the classroom intervention in the negative results.

Two studies randomly assigned children to either group or individual intervention.<sup>16,39</sup> Chemtob and colleagues<sup>16</sup> found no difference in effectiveness when they delivered an intervention to children individually or in groups following Hurricane Iniki. Children who participated in the group approach, however, were more likely to complete the intervention. In another study, children experiencing moderate to severe symptomatology related to their Hurricane Katrina experiences were randomly assigned to group or individual intervention.<sup>39</sup> Rates of PTSD, depression, traumatic grief, and distress decreased for children in both intervention conditions with no differences between the two approaches. Additional research with enhanced experimental control is needed to determine the relative effectiveness of individual and group interventions for children exposed to disasters.

#### **Parent involvement**

Parents provide primary caretaking and support for children in the post-disaster environment. Specifically, parents can function as agents of change for children and as extenders of the therapeutic efforts of professionals helping them. Moreover, intervening with parents may help reduce their own adverse trauma responses which can affect their children. A number of interventions incorporated parent involvement. Some included one or two psychoeducation sessions for parents,<sup>8,19,22,23,39,40,51</sup> which typically included an overview of the intervention, information about normal and maladaptive reactions to disasters, and resources for further assistance when indicated. Berger and colleagues<sup>8</sup> found that younger children exhibited more terrorism-related distress than older children, and they benefited more from the preparedness intervention perhaps because of the intervention's significant parental involvement and the greater reliance of younger children on their parents for emotional regulation. Sahin and colleagues<sup>38</sup> assessed the effects of a

psychoeducation seminar delivered to parents as well as children. Children gained no more new knowledge than those in a comparison group who did not attend the seminars. For parents, earthquake-related knowledge was superior in those who attended the seminars, and the perceived benefit correlated with the number of issues discussed in the seminars.

Some studies involved parents directly in interventions beyond delivering psychoeducation.<sup>10,18,19,23,27,29,46</sup> For example, Giannopoulou and colleagues<sup>23</sup> provided an introductory session to parents to normalize their children's reactions, enhance the children's recovery environment, impart self-help strategies, explain the intervention, and offer suggestions on ways to help their children. Parents also attended the last 30 min of each session to meet with a therapist to discuss the techniques children were taught in the group session and to review the children's homework. Two September 11 studies of children whose firefighter fathers had been killed in the disaster response received interventions with individual sessions for the children and their mothers.<sup>11,27</sup> Parent treatment was designed to support the mothers' parenting abilities as well as deal with their own role transitions and reactions.<sup>11,27</sup>

Some interventions used joint parent-child sessions. For example, in one intervention, parents participated in parallel individual sessions to cover issues addressed in sessions with the children, and parents also attended joint sessions with their children at the end of each module.<sup>41</sup> Scheeringa and colleagues<sup>41</sup> used creative approaches to engage children's primary maternal caretakers, who were seen with the children during select sessions. Caretakers also observed children's sessions on television to learn the material simultaneously and to become better attuned to their children, and they met alone with the therapists to help the therapists interpret the children's words and body language, to discuss homework, and to receive supportive therapy and advice. The potential long-term benefits of parental involvement include an increase in parents' ability to support their children and enhanced parenting abilities.<sup>55</sup> Few studies measured parent outcomes.<sup>11,27,37,38</sup> Results



underscore the importance of studying various forms of parent involvement in future investigations.

## Conclusions and Future Directions

The studies in this review examined interventions delivered in multiple settings, using a variety of intervention modalities, and across a wide time line. In general, studies have not addressed the importance of timing in determining which interventions are appropriate at any particular disaster phase, and they have not compared the efficacy of interventions delivered at different disaster phases. In fact, the timing of intervention delivery in many studies may well have depended more on factors such as the availability of settings, providers to deliver the intervention, and/or funding rather than on examining what interventions might be appropriate for distinct disaster phases.

The specifics of the disaster, the recovery environment, and the interventions are important determinants of the setting for intervention administration. The setting also may be determined in part by the individuals delivering the interventions. Because it is not always possible to recruit an adequate number of licensed mental health professionals after a disaster, it may be necessary to recruit and train other child-serving professionals such as teachers or other school staff to administer interventions. The setting may be influenced by pragmatic considerations such as the location and severity of the disaster, available manpower, and accessibility of services to children and families. If an intervention to be implemented in a clinical setting is far away from the children's homes, accessing those services may be difficult and the distance prohibitive. Preparing interventionists before a disaster and delivering just-in-time training can enhance the feasibility, and perhaps the effectiveness, of services.

Studies described individual and group interventions, some with parent involvement. Additional research is needed to determine the relative benefits of these approaches, although most of the studies reviewed tended to produce positive

results regardless. Further, while parent involvement would seem beneficial for both children and their parents, no controlled studies have demonstrated the value of including parents. Moreover, additional research is needed to elucidate the effect of treating children and their parents jointly and separately.

In summary, disaster interventions have been developed to meet the wide range of psychological reactions. These interventions can be delivered in various settings by providers of multiple disciplines. The necessity for ongoing flexibility with regard to intervention settings and delivery is an important consideration as disaster mental health interventions are created, tested, and improved. The next generation of interventions and studies should be based on a more formal and empirical analysis of a number of key issues related to the timing and setting of interventions and the intervention approach.

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No potential conflicts of interest were disclosed.

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