

## Posttraumatic Stress Symptoms in Parents of Children With Cancer Within Six Months of Diagnosis

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**Objective:** To investigate levels and correlates of posttraumatic stress symptoms (PTSS) in mothers and fathers of children and youth with cancer. **Methods:** Mothers ( $n = 191$ ) and fathers ( $n = 95$ ), representing 195 families of children and youth with cancer, completed measures of PTSS (Impact of Event Scale-Revised), depression (Beck Depression Inventory-II), and anxiety (Beck Anxiety Inventory) between 2 and 22 weeks after their child's cancer diagnosis or recurrence of initial diagnosis. **Results:** Substantial subgroups of mothers (41%) and fathers (30%) reported levels of PTSS that exceeded cut-offs for elevated symptoms, and these subgroups of parents were characterized by heightened symptoms of depression and anxiety. Fathers of children and youth treated for relapse reported higher rates of elevated PTSS than fathers of children and youth treated for first-time diagnosis, but mothers' rates were similar. Mothers and fathers reported comparable mean levels of PTSS that were strongly positively correlated with symptoms of anxiety and depression. PTSS and other symptoms of distress were negatively related to education level for fathers. **Conclusion:** These findings provide additional evidence that mothers and fathers experience substantial PTSS near the time of their child or adolescent's cancer diagnosis during the first 6 months of treatment. Results suggest that PTSS may be part of a broader pattern of emotional distress and that a substantial portion of both mothers and fathers of children and youth with cancer may be in need of supportive mental health services within the first 6 months of their child's diagnosis.

**Keywords:** parents, PTSS, children, cancer

Each year, approximately 13,000 children and youth under the age of 20 years are diagnosed with cancer in the United States (United States Cancer Statistics, 2005). Having a child or adolescent diagnosed with cancer may put parents at increased risk for posttraumatic stress disorder (PTSD) and clinically elevated levels of posttraumatic stress symptoms (PTSS; Bruce, 2006; Cabizuca, Marques-Portella, Mendlowicz, Coutinho, & Figuiera, 2009; Dolgin et al., 2007; Kazak et al., 2004; Pai et al., 2007; Roddenberry & Renk, 2008). Elevated PTSS can include difficulty regulating negative affect and cognitions related to the trauma, attempts to avoid emotions and thoughts related to the trauma, feelings of

detachment from others, restricted range of affect, increased irritability and anger, and difficulty regulating physiological and emotional arousal in response to trauma-related cues (American Psychiatric Association, 2000; Tull, Jakupcak, Paulson, & Gratz, 2007). Further, the symptoms associated with PTSD can interfere with cognitive processes and executive functioning (LaGarde, Doyon, & Brunet, 2010; Leskin & White, 2007) and may impede parents' ability to make important treatment decisions and to provide emotional support to their children. Therefore, it is important to understand PTSS and other symptoms of distress in parents near the time of a child or adolescent's diagnosis when parents are making important treatment decisions and helping their children cope.

The current study aimed to provide further information on rates of elevated PTSS in mothers and fathers of children and youth being treated for cancer. Previous studies have found varied results with regard to mean levels of PTSS and the proportion of parents who exceed clinical cut-offs, with some studies concluding that having a child with cancer does not lead to increased PTSS in parents and others concluding that high levels of PTSS are common in both mothers and fathers of children and youth in treatment for pediatric malignancies (e.g., Jurbergs, Long, Ticonia, & Phipps, 2009; Kazak, Boeving, Alderfer, Hwang, & Reilly, 2005; Pöder, Ljungman, & von Essen, 2008). Variability in levels of

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PTSS both across studies and within samples has led to a call for additional multisite studies as a priority for future research (Jurbergs et al., 2009). The current study extends previous literature by estimating levels of elevated PTSS using two empirically based criteria. We included a sample of mothers and fathers of children and youth who were on active treatment at two cancer treatment centers and used the criteria described by Jurbergs et al. (2009) as well as an additional criterion put forth by Rash et al. (2008) to provide a conservative estimate of elevated PTSS.

The current study further builds on the previous literature by recruiting a sample that is relatively homogeneous in terms of time since diagnosis, large enough to reliably estimate rates of clinically significant PTSS in the population of parents of children and youth with cancer, large enough to examine subgroups, and includes both mothers and fathers. First, parents were assessed within 6 months of their child's diagnosis and at least 2 weeks postdiagnosis when children and youth were on active treatment. This period is consistent with Phase II in Kazak et al.'s (2006) model of pediatric medical traumatic stress and refers to the period after the initial traumatic event, or diagnosis, when trauma cues are prevalent. Studies of parents whose children who were on active treatment have included samples of a wide range of time since diagnosis (e.g., 2.5 to 44 months; Kazak et al., 2005), which introduces an additional source of variability to levels of parents' symptoms reported. Other studies have included relatively small sample sizes and reduced power to find clinically significant levels of PTSS in parents within 6 months of treatment (e.g., Jurbergs et al., 2009; Phipps, Long, Hudson, & Rai, 2005). Further, many studies of children on treatment have included mothers but not fathers (e.g., Dolgin et al., 2007; Iobst et al., 2009). Although the current study cannot distinguish parents' symptoms during the very acute phase of the trauma (i.e., within 2 weeks, Patino-Fernandez et al., 2008) or over time (e.g., Phipps et al., 2005), it provides important data to build on these previous studies by examining the characteristics and correlates of mothers' and father's distress (socioeconomic status [SES], marital status, and child's age and diagnosis) within 6 months of their child or adolescent's diagnosis.

The current study also aimed to identify characteristics of parents with elevated PTSS in order to help inform the allocation of psychosocial resources for families by examining mothers versus fathers, single parents versus married/partnered parents, parents of children and youth being treated for their first diagnosis versus a recurrence of their cancer, and by examining time since diagnosis, child's age, and parents' SES as possible correlates of PTSS. Among adults who have experienced potentially traumatic events, women may exhibit greater rates of PTSD than men (Tolin & Foa, 2006), but studies of parents of children with cancer have shown mixed results in the prevalence of elevated symptoms in mothers versus fathers (Vrijmoet-Wiersma et al., 2008). The current study adds to the literature that includes mothers and fathers (e.g., Barakat et al., 1997; Kazak et al., 2004) by including 60% of eligible fathers and comparing PTSS between mothers and fathers of children and youth who were on treatment. Evidence suggests that exposure to previous traumatic events increases the risk of developing PTSD in response to a subsequent traumatic event (e.g., Dohrenwend et al., 2006; Resnick, Yehuda, Pitman, & Foy, 1995), so parents of children being treated for a recurrence may be at increased risk for PTSS. Jurbergs et al. (2009) found that parents of children and youth who had relapsed reported almost double the

level of PTSS as parents of children and youth with no history of relapse, regardless of whether their children were on or off treatment, and relapse status was a significant predictor of parents meeting criteria for elevated PTSS. Brown, Swain, and Lambert (2003), however, found that the number of relapses a child had experienced was not related to PTSS in a sample of mothers of survivors of childhood cancer.

Finally, it is important to address the question of whether parents of children and youth on active treatment exhibit general psychological distress in the form of depressive and anxiety symptoms. Marshall, Schell, and Miles (2010) demonstrated (in adults exposed to community violence or natural disaster) that PTSS may be more appropriately conceptualized as part of general emotional distress, and that PTSS is often found along with elevated symptoms of dysphoria and anxiety. Many studies have reported elevated PTSS in parents of children with cancer (e.g., Kazak et al., 2005), but relatively few studies have examined depression and anxiety symptoms in parents of children with cancer. Norberg and Boman (2008) found that parents of children and youth with cancer showed increased depression and anxiety symptoms relative to healthy controls, but these analyses did not address whether a subgroup of parents who were experiencing high levels of PTSS also report high levels of symptoms of depression or anxiety. If elevated PTSS in response to a child's cancer diagnosis and treatment is part of a more general emotional distress that includes symptoms of anxiety and depression, these findings would have implications for how to approach supportive psychological care for these parents.

In the current study, we report levels of PTSS in parents of children and youth with cancer. Further, we hypothesized that (1) mothers would report higher rates of PTSS than fathers (Tolin & Foa, 2006); (2) parents of children and youth being treated for a recurrence would have higher rates of PTSS than parents of children treated for a first diagnosis (Jurbergs et al., 2009); (3) single parents would report higher rates of PTSS than married/partnered parents (Cairney, Boyle, Offord, & Racine, 2003); (4) mothers' and fathers' PTSS would be negatively related to time since diagnosis (e.g., Pöder et al., 2007) and SES (e.g., Jurbergs et al., 2009; Vrijmoet-Wiersma et al., 2008); and (5) parents who reported elevated PTSS would also report clinically significant levels of depressive and anxiety symptoms as evidence that PTSS may belong to a general distress construct (Marshall et al., 2010). Given mixed findings or lack of previous studies, exploratory analyses of child's age and child's diagnosis type in relation to parents' distress were conducted.

## Method

### Participants

Parents were recruited from cancer registries at two pediatric oncology centers in the Midwestern and Southern United States as part of a larger study of family adjustment to childhood cancer. Eligible parents had children who: (a) were ages 5–17 years old; (b) had a new diagnosis or relapse/recurrence of initial cancer diagnosis (i.e., child's treatment progressed to maintenance phase or further and initial diagnosis recurred) within the previous 6 months; (c) were actively receiving treatment through the oncology division; and (d) had no preexisting developmental disability.

A feature of the larger project in which the current study is embedded was the use of direct observations of parent-child communication when a child has cancer. The minimum age for children was set at 5 years as an estimate of when children would be able to participate in this type of discussion.

Two hundred thirty-seven families were eligible and were approached about the study, and 90% ( $n = 214$ ) of families had at least one parent consent to participate. Ninety-three percent ( $n = 199$ ) of families who consented to the study completed the questionnaires. This resulted in a sample of 287 parents of 199 children and youth with cancer. Four of these parents (two mothers and two fathers) completed the measures more than 200 days after their child's diagnosis and were excluded as outliers. Thus, the final sample included 283 parents of children and youth with cancer (190 mothers and 93 fathers of 195 children and youth with cancer; see Table 1). These parents included 92 mother-father pairs from the same families. Approximately 60% of eligible fathers in two-parent homes completed questionnaires, and 76% of participating mothers and 92% of participating fathers were married or partnered.

Parents were approached between 1 and 22 weeks after their child's diagnosis or relapse (mean [ $M$ ] = 5.5 weeks, standard deviation [ $SD$ ] = 3.4), and all children and youth were on active treatment. Parents completed the questionnaires between 1.7 and 23.5 weeks after their child's diagnosis ( $M = 7.5$ ,  $SD = 4.8$ ). Mean length of time between recruitment into the study and completion of questionnaires was 2.0 weeks,  $SD = 3.2$ . Notably, the length of time between enrollment and completion of questionnaires was not significantly related to mothers' or fathers' PTSS, depressive or anxiety symptoms, or SES ( $r$ 's = .01 to .14,  $ns$ ). Duncan scores of SES for families based on reports of currently held jobs and responsibilities within those jobs (TSEI2; Nakao & Treas, 1992) indicated that, on average, mothers held positions equivalent to administrative assistants and clerks ( $M =$

34.1,  $SD = 22.9$ ) and fathers held positions equivalent to supervisors and managers ( $M = 51.9$ ,  $SD = 21.0$ ). Children were on average 10.6 years old ( $SD = 3.9$ ), 56.5% ( $n = 108$ ) male, 86% ( $n = 164$ ) White/Caucasian, 9% ( $n = 17$ ) Black/African American, 5% ( $n = 9$ ) Hispanic/Latino, 1% ( $n = 2$ ) Asian American, and 4% ( $n = 7$ ) Other. Children had diagnoses of leukemia (38%), lymphoma (25%), brain tumor (11%), and other solid tumors (26%, e.g., osteosarcoma, Wilm's tumor). Twenty-eight children (14%) were recruited into the study following a recurrence of their original cancer and 167 children had an initial cancer diagnosis. Recruitment rates for families with children and youth with a new diagnosis (90%) versus a relapse (91%) were not different. Similarly, parents' years of education, age, annual family income, and SES did not differ significantly between families where a child had a new diagnosis versus a relapse.

## Measures

**Medical and demographic data.** Parents completed forms collecting demographic data on age, race, ethnicity, economic status, and employment. Participants gave permission for research staff to access the child's medical data, where the child's diagnosis and relapse status were extracted.

**Posttraumatic stress symptoms.** Parents completed the Impact of Event Scale-Revised (IES-R; Weiss & Marmar, 1997) in reference to their child's cancer diagnosis as the traumatic event. The IES-R was developed to closely parallel *DSM-IV* criteria for PTSD and yields total symptom scores and subscale scores for mothers' and fathers' intrusive thoughts, avoidance, and physiological hyperarousal related to their child's cancer. The 22 items are rated as to how distressing each symptom was over the past 7 days from 0 (*not at all*) to 4 (*extremely*). The IES-R has been used with parents of children with cancer (Barakat et al., 1997; Dolgin et al., 2007; Jurbergs et al., 2009; Kazak et al., 2001; Kazak et al.,

Table 1  
*Demographic Characteristics of Mothers and Fathers*

	Mothers ( $n = 190$ )		Fathers ( $n = 93$ )	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Age	37.9	8.4	39.5	7.6
Years of education	15.8	3.8	15.8	4.2
	<i>N</i>	%	<i>N</i>	%
Race				
White	167	87.4	89	94.7
African-American	17	8.9	3	3.2
Asian-American	2	1.0	1	1.1
American-Indian/Native Alaskan	2	1.0	0	0
Other	3	1.6	1	1.1
Annual family income				
<\$25,000	47	24.9	15	16.1
\$25,001-\$50,000	58	30.7	24	25.8
\$50,001-\$75,000	26	13.8	21	22.6
\$75,001-\$100,000	25	13.2	17	18.3
>\$100,000	33	17.5	16	17.2
Marital status				
Married/living with someone	144	75.7	85	91.5
Single, divorced, separated, or widowed	46	24.3	8	8.6

2005; Phipps et al., 2005), and demonstrates good reliability and validity (Weiss & Marmar, 1997). Internal consistency reliabilities for total IES-R scores with the current sample were  $\alpha = .93$  for mothers and  $\alpha = .95$  for fathers;  $\alpha = .88$  for mothers and  $\alpha = .90$  for fathers for intrusive symptoms;  $\alpha = .81$  for mothers and  $\alpha = .84$  for fathers for avoidance symptoms; and  $\alpha = .83$  for mothers and  $\alpha = .87$  for fathers for hyperarousal symptoms.

We applied two criteria to participants' responses on the IES-R in order to estimate elevated levels of PTSS. A parent whose responses met both sets of criteria was labeled as reporting "elevated PTSS." First, we applied a cutoff for the total PTSS score on the IES-R at a value of 34 or greater. A previous study of the diagnostic predictive power of the IES-R has shown that total PTSS scores greater than or equal to 34 predict diagnoses of PTSD with a conservative balance of a positive predictive value of .81 and negative predictive value of .66 (Rash et al., 2008). Second, we used a procedure described by Jurbergs et al. (2009). For each participant, we took questionnaire items that had been endorsed at least at a moderately high level of severity (i.e., a 3 out of 4) and mapped those responses onto specific *DSM-IV* diagnostic criteria for PTSD. Items rated a 3 or higher were judged as "endorsed" by the participant. Participants who endorsed one or more symptoms from Cluster B (i.e., intrusive thoughts), three or more from Cluster C (i.e., avoidance), and two or more from Cluster D (i.e., hyperarousal), mirroring *DSM-IV* criteria, were defined as meeting diagnostic criteria. Thus, parents were considered to have elevated levels of PTSS if their total score was greater than or equal to 34 and they endorsed enough symptoms at a 3 or greater to meet *DSM-IV* criteria.

**Depression and anxiety symptoms.** Mothers and fathers completed the Beck Depression Inventory-II as a measure of current depressive symptoms (BDI-II; Beck, Steer, & Brown, 1996) and the Beck Anxiety Inventory as a measure of current generalized anxiety symptoms (BAI; Beck & Steer, 1990). Both are well-standardized measures of symptoms of depression and anxiety in nonpsychiatric samples and demonstrate good psychometric properties (Steer, Ranieri, Beck, & Clark, 1993). Both measures have 21 items on which participants rate the symptoms on a 4-point scale from 0 (*no change/not at all*) to 3 (*substantial change/severely*). Total depression scores are labeled: 0–13: minimal; 14–19: mild; 20–28: moderate; and 29–63: severe (BDI-II manual, Beck et al., 1996). Total anxiety scores are labeled: 0–7: minimal; 8–15: mild; 16–25: moderate 26–63: severe (BAI manual, Beck & Steer, 1990). Internal consistency reliabilities in the current sample were: BDI-II:  $\alpha = .93$  mothers,  $\alpha = .93$  fathers; BAI:  $\alpha = .91$  mothers,  $\alpha = .91$  fathers.

## Procedure

Parents were identified from cancer registries at the two sites and approached in the outpatient hematology/oncology clinics or in inpatient rooms by a member of the research team. The staff member introduced the study, explained that the goals of the study were to help medical personnel and future families of children and youth with cancer better understand how families coped with the stress of a cancer diagnosis and treatment, and assessed parents' interest in participating. Variation in the time at which parents were first approached by the research team occurred based on the timing of communication of the diagnosis from the medical team,

parents' availability to hear about the study, and parents' needing time to consider the study before consenting. After providing informed consent during a visit to the hospital, parents were given questionnaire packets that they completed in the hospital, outpatient clinic, or took home and returned at a subsequent visit. In the case that only one parent was present and another parent or caregiver was involved, consent forms and questionnaires were sent home for the other caregiver to consider. Families were compensated \$50 when at least one parent completed the measures. The Institutional Review Boards at both sites approved the study protocol.

## Statistical Analyses

Means, standard deviations, and minimum and maximum scores for mothers' and fathers' PTSS, depressive, and anxiety symptoms are reported. To identify rates of elevated PTSS, the two criteria described previously were applied to mothers' and fathers' total scores on the IES-R. In order to describe the characteristics of parents above the cutoff, independent sample *t* tests were calculated to compare mothers and fathers with PTSS above suggested diagnostic cutoffs (Rash et al., 2008) to those below the cutoff on key psychological, demographic, and medical variables. To test Hypothesis 1, paired-sample *t* tests were calculated to compare mean levels of mothers and fathers of the same child on psychological symptoms. Bonferroni corrections for family-wise error in analyses of mothers, and then fathers, were made and the adjusted significance value was  $p < .004$ . Hypotheses 2 and 3 were tested using independent sample *t* tests to compare PTSS, anxiety, and depression symptoms between mothers and fathers of children who were treated for a recurrence versus those with their first diagnosis, and between mothers and fathers who were partnered versus those who were single. Hypotheses 4 and 5 were tested using Pearson correlations among parents' psychological distress variables, demographic variables, and child's medical variables. Two sets of correlations were defined for mothers and fathers, respectively, where significance level was adjusted to  $p < .002$ . One-way analyses of variance compared mothers' and fathers' psychological symptoms among categories of the child's cancer diagnosis. Power calculations indicated that there was ample power to detect medium-to-large correlations ( $r > .31$ ) and large effect sizes for *t* tests ( $d > .80$ ).

## Results

### Mothers' and Fathers' Elevated PTSS

Almost two thirds of mothers (i.e., 66%) and fathers (60%) met the modified diagnostic criteria proposed by Jurbergs et al. (2009) and Schwartz and Drotar (2006) based upon their patterns of responses (see Table 2), whereas 41% of mothers and 30% of fathers had total symptom scores on the IES-R greater than or equal to the cut-off of 34 proposed by Rash et al. (2008). Notably, all of the mothers and fathers who had total symptom scores on the IES-R greater than or equal to 34 also met modified cluster diagnostic criteria. Thus, among the whole sample, 41% of mothers and 30% of fathers met both sets of criteria for elevated PTSS.

Comparisons showed that mothers who met both criteria for elevated PTSS had significantly higher self-reported symptoms of

Table 2  
Rates of Elevated PTSS in Mothers and Fathers of Children With Cancer

	Mothers		Fathers	
	(n = 190)		(n = 93)	
	N	%	N	%
Total PTSS score (IES-R) > 34	78 of 190	41	28 of 93	30
DSM-IV criteria estimate				
Cluster B: intrusive thoughts	155 of 190	82	74 of 93	80
Cluster C: avoidance	156 of 190	83	67 of 93	72
Cluster D: hyperarousal	150 of 190	80	69 of 93	74
PTSD	124 of 190	66	56 of 93	60
Both cutoffs	78 of 190	41	28 of 93	30

*Note.* A study of the diagnostic predictive power of the IES-R has shown that total PTSS scores greater than or equal to 34 predict diagnoses of PTSD with positive predictive value of .81 and negative predictive value of .66 (Rash et al., 2008). *DSM-IV* criteria estimate is a procedure described by Jurbergs et al. (2009). For each participant, questionnaire items that had been endorsed at least at a moderately high level of severity (i.e., a 3 out of 4) were mapped onto specific *DSM-IV* diagnostic criteria for PTSD. Items rated a 3 or higher were judged as “endorsed” by the participant. Participants who endorsed one or more symptoms from Cluster B (i.e., intrusive thoughts), three or more from Cluster C (i.e., avoidance), and two or more from Cluster D (i.e., hyperarousal), mirroring *DSM-IV* criteria, were defined as meeting diagnostic criteria.

depression ( $d = 1.4$ ) and anxiety ( $d = 1.6$ ; see Table 3) than mothers who did not have elevated PTSS. Mean scores for both depressive symptoms on the BDI-II ( $M = 21.4$ ) and anxiety symptoms on the BAI ( $M = 18.2$ ) fell in the moderate range for

mothers with elevated PTSS. Further, comparisons showed that mothers who reported elevated PTSS did not differ significantly from mothers without elevated PTSS as to the time since their child’s diagnosis ( $d = .33$ ) or annual family income ( $d = .30$ ).

Table 3  
T-Test Comparisons of Psychological, Demographic, and Medical Characteristics of Mothers and Fathers With and Without Elevated PTSS

	Without elevated PTSS		With elevated PTSS		<i>t</i>	<i>d</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Mothers	(n = 110)		(n = 78)				
IES-R intrusion	7.5	4.6	18.0	3.7	-17.4**	-2.5	<.001
IES-R avoidance	5.2	3.5	13.0	5.4	-11.3**	-1.8	<.001
IES-R hyperarousal	4.6	3.1	15.1	4.4	-18.3**	-2.8	<.001
IES-R Total PTSS	17.3	8.7	46.1	8.3	-22.9**	-3.4	<.001
BDIII depressive symptoms	9.7	7.1	21.4	9.9	-8.7**	-1.4	<.001
BAI anxiety symptoms	6.2	5.9	18.2	9.0	-10.3**	-1.6	<.001
Number of days between child’s diagnosis and assessment	56.7	35.7	45.8	30.1	2.20	.33	.03
Child’s age	11.1	3.6	10.0	4.1	1.94	.29	.05
Years of education	16.2	3.8	15.3	3.7	1.67	.24	.10
Annual family income	2.8	1.4	2.4	1.3	2.16	.30	.03
SES	38.9	22.4	36.3	22.2	0.79	.12	.43
Fathers	(n = 65)		(n = 28)				
IES-R intrusion	7.2	4.6	17.7	3.0	-13.1**	-2.8	<.001
IES-R avoidance	4.9	3.5	14.7	3.8	-12.1**	-2.7	<.001
IES-R hyperarousal	4.5	3.2	15.1	5.0	-10.4**	-2.6	<.001
IES-R total PTSS	16.6	9.2	47.5	9.3	-14.8**	-3.3	<.001
BDI-II depressive symptoms	8.7	7.2	19.0	10.4	-5.51**	-1.2	<.001
BAI anxiety symptoms	5.2	5.8	14.5	9.9	-4.65**	-1.2	<.001
Number of days between child’s diagnosis and assessment	46.2	28.5	43.7	32.3	0.38	.08	.70
Child’s age	10.4	4.1	10.6	3.2	-0.30	-.05	.77
Years of education	16.5	4.3	14.1	3.7	2.47	.60	.01
Annual family income	3.0	1.3	2.9	1.4	0.53	.07	.60
SES	54.5	21.6	44.9	16.8	2.03	.50	.03

*Note.* Bonferroni adjusted; Elevated PTSS = total IES-R > 34 and symptoms endorsed at a 3 or greater to meet *DSM-IV* criteria; Annual family income: Scores of 2 corresponded to family income between \$25,000–50,000; scores of 3 corresponded to family income between \$50,000–75,000.

\*\*  $p < .004$ .

Mothers with and without elevated PTSS did not differ significantly on years of education, total SES, and child's age.

Results of *t* tests showed that fathers who met both criteria for elevated PTSS had significantly higher self-reported symptoms of depression ( $d = 1.2$ ) and anxiety ( $d = 1.2$ ; see Table 3) than fathers without elevated PTSS. For fathers with elevated PTSS, the score for depressive symptoms on the BDI-II ( $M = 19.0$ ) was in the moderate range, whereas anxiety symptoms on the BAI ( $M = 14.5$ ) were in the mild range. There were medium but nonsignificant effects from *t* tests for fathers with elevated PTSS to have fewer years of education ( $d = .60$ ) and lower family SES ( $d = .50$ ) than fathers without elevated PTSS. Fathers with and without elevated PTSS did not differ significantly in family income, child's age, and time lapsed between their child's diagnosis and completion of the measures.

### Mean Levels of Mothers' and Fathers' Psychological Symptoms

The mean total scores on the IES-R were 29.3 for mothers and 25.9 for fathers. Mean score for mothers' depressive symptoms on the BDI-II ( $M = 14.6$ ) was in the "mildly depressed" category, whereas the mean for fathers' depressive symptoms ( $M = 11.8$ ) was in the "minimally depressed" category (Beck et al., 1996). Seventeen mothers (9.2%) and 4 fathers (4.3%) reported depressive symptoms in the "severe depression" range (total scores greater than or equal to 29). Mothers' and fathers' anxiety symptoms on the BAI ( $M = 11.1$  and  $M = 8.0$ , respectively) are in the "mild anxiety" range (Beck & Steer, 1990). Fifteen mothers (7.9%) and 4 fathers (4.3%) reported anxiety symptoms in the "severe anxiety" range (total scores greater than or equal to 26); see Table 4.

Additional *t*-test comparisons were made of pairs of mothers and fathers within the same families. Mothers and fathers of the same child ( $n = 90$  children and youth) did not differ significantly on PTSS on the IES-R, paired  $t(1, 89) = 1.35, p = .18, d = .18$ . Mothers and fathers from the same family also did not differ significantly on depressive symptoms on the BDI, paired  $t(1, 85) = 1.59, p = .12, d = .21$ , or anxiety symptoms on the BAI, paired  $t(1, 88) = 1.91, p = .06, d = .29$ .

### Mothers' and Fathers' Psychological Symptoms and Medical Variables

Among mothers whose children were being treated for a relapse ( $n = 27$ ), 44% ( $n = 12$ ) met criteria for elevated PTSS, and 40%

( $n = 66$  of 163) of mothers whose children were treated for a first diagnosis met criteria for elevated PTSS. This difference was nonsignificant,  $\chi^2, (1, N = 190) = .33, p = .57$ . Among fathers whose children were being treated for a relapse, 42% ( $n = 5$  of 12) met criteria for elevated PTSS versus 27% ( $n = 22$  of 81) of fathers whose children were being treated for a first diagnosis. This difference was significant,  $\chi^2, (1, N = 93) = 4.98, p < .05$ . There were no significant differences in mothers' or fathers' mean levels of symptoms of anxiety and depression between parents of children and youth who were being treated for a recurrence versus their first diagnosis of cancer. There was a medium, nonsignificant effect for mothers of children and youth who were being treated for a recurrence to report more depressive symptoms than mothers of newly diagnosed patients (see Table 5). Mothers' intrusive thoughts were negatively related (nonsignificant after Bonferroni correction) to the amount of time since their child's diagnosis (see Table 3). For fathers there was no significant relation between their psychological symptoms and the amount of time lapsed since their child's diagnosis.

There was a significant difference in mothers' depressive symptoms across diagnostic categories (i.e., leukemia, lymphoma, brain tumor, other solid tumor),  $F(3, 181) = 4.69, p < .01$ . Tukey post hoc tests revealed that mothers of children diagnosed with brain tumors reported significantly higher depressive symptoms ( $M = 20.06$ ) than mothers of leukemia ( $M = 12.82$ ) and lymphoma ( $M = 12.31$ ) patients, Tukey post hoc tests  $p$ 's  $< .05$ ;  $d$ 's = .77, .84, respectively. There were no significant differences in mothers' or fathers' total PTSS or anxiety or fathers' depressive symptoms among the diagnostic categories.

### Associations of Mothers' and Fathers' Psychological Symptoms With Demographic Factors

After Bonferroni corrections, fathers' level of education was significantly negatively related to avoidance, hyperarousal, depressive, and anxiety symptoms (see Table 6). Several variables were associated with mothers' distress (e.g., education, income, and child's age were negatively related to depressive symptoms), but these relations were no longer significant after Bonferroni correction. Mothers' and fathers' reports of distress were also significantly intercorrelated. Mothers who were partnered versus those who were single/divorced were not significantly different on reported PTSS, depressive, or anxiety symptoms;  $t$ 's ( $1, 185$ ) = 1.16,  $-.77, -.28$ , respectively. Only 8 of 92 fathers who participated in the study (9%) were single or divorced; therefore, analyses of fathers' marital status could not be interpreted due to low statistical power.

### Discussion

The current study has several strengths that extend the previous literature on rates and correlates of PTSS in parents of children and youth with cancer. First, the current study assessed parents who were within 6 months of their child's diagnosis during a period consistent with Phase II in Kazak et al.'s (2006) model of pediatric medical traumatic stress. The current sample also included a large number of fathers and a subgroup of children and youth being treated for a recurrence of their cancer, allowing analyses between

Table 4  
Mothers' and Fathers' Psychological Symptoms

	Mothers ( $n = 190$ )		Fathers ( $n = 93$ )	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
IES-R total	29.3	16.6	25.9	17.0
Intrusion	11.9	6.7	10.4	6.4
Avoidance	8.6	5.6	7.8	5.7
Hyperarousal	9.0	6.3	7.7	6.2
BDI-II	14.6	10.3	11.8	9.5
BAI	11.1	9.3	8.0	8.4

Table 5  
PTSS in Mothers and Fathers of Children With New Versus Relapsed Cancer Diagnoses

	No relapse		Relapse		<i>t</i>	<i>p</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Mothers	<i>(n = 163)</i>		<i>(n = 27)</i>				
Intrusion	11.9	6.7	11.8	6.6	.06	.95	-.01
Avoidance	8.5	6.1	8.9	5.0	-.39	.70	.08
Hyperarousal	8.8	6.3	10.2	6.6	-.93	.36	.20
Total PTSS	29.0	16.6	30.9	16.8	-.52	.61	.11
Depression	14.1	10.3	18.4	9.6	-2.07	.05	.43
Anxiety	11.0	9.6	11.7	8.0	-.40	.69	.08
Fathers	<i>(n = 81)</i>		<i>(n = 12)</i>				
Intrusion	10.1	6.4	12.3	6.8	-1.00	.34	.33
Avoidance	7.8	5.7	8.4	6.2	-.28	.78	.09
Hyperarousal	7.4	6.2	10.2	6.1	-1.45	.17	.46
Total PTSS	25.3	16.8	30.8	18.1	-.97	.35	.32
Depression	11.2	9.0	15.7	12.4	-1.16	.27	.41
Anxiety	7.9	8.6	8.9	7.3	-.42	.68	.13

Note. Bonferroni-adjusted significance value  $p < .008$ . All comparisons *ns*.

these groups, but still among parents whose children were all on active treatment.

The findings reported here provide additional evidence on estimates of elevated PTSS in parents of children and youth with cancer derived from applying clinical cutoffs to questionnaire measures. We found that substantial subgroups of mothers and fathers reported levels of PTSS that exceeded cut-offs for elevated symptoms. These findings support our hypothesis that we would find rates of elevated PTSS consistent with previous studies that reported relatively high rates of symptoms of parents of children and youth on treatment (e.g., Kazak et al., 2005). Further, these rates were found even though we used relatively conservative criteria including evidence of symptoms in each of the B-D clusters (Schwartz & Drotar, 2006) and the requirement that parents report a total symptom score greater than or equal to 34 (Rash et al., 2008). Further, when we estimated rates of PTSS in a split sample according to whether the child was being treated for a first

diagnosis versus a relapse, the rates of elevated PTSS in mothers were comparable across groups. Among fathers, however, rates of elevated PTSS were significantly higher when children and youth were being treated for a relapse than when children were treated for a first diagnosis. Jurbergs et al. (2009) found that 28% of parents of children and youth being treated for relapse met criteria for elevated PTSS in their study. These findings suggest that a substantial portion of families with a child or adolescent being treated for cancer, including both mothers and fathers, may be in need of supportive mental health services within the first 6 months after the child's diagnosis.

Rates of PTSS can be used to provide information to inform the allocation of psychosocial resources to mothers and fathers of children and youth being treated for cancer. The evidence presented here included information on parents' PTSS when their children were being treated for a first diagnosis versus a relapse, the presence of general psychological distress in these parents, the

Table 6  
Relations Among Mothers' and Fathers' Psychological Symptoms and Environmental Variables

	Time since child's diagnosis	Education	Income	Child's age	Total PTSS	Anxiety
Mothers						
Intrusive thoughts	-.19*	-.07	-.04	-.15		
Avoidance	-.14	-.07	-.09	-.21*		
Hyperarousal	-.11	-.19*	-.22*	-.14		
Total PTSS	-.18	-.12	-.12	-.18	—	
Anxiety	-.06	-.18	-.20*	-.13	.66**	—
Depression	-.02	-.20*	-.21*	-.20*	.59**	.66**
Fathers						
Intrusive thoughts	-.20	-.20	.01	.01		
Avoidance	-.10	-.33**	-.12	-.02		
Hyperarousal	-.15	-.34**	-.19	-.07		
Total PTSS	-.16	-.31**	-.12	-.01	—	
Anxiety	-.13	-.36**	-.20	-.12	.60**	—
Depression	-.10	-.30**	-.23	-.08	.63**	.72**

\*  $p < .01$ . \*\* Significant after Bonferroni family-wise adjustment to  $p < .002$ .

level of symptoms reported by fathers, and correlates of parents' distress. Within the limits of our sample of children and youth who were on active treatment (including parents who participated very shortly after their child's diagnosis and may not have had time to develop coping resources), we were able to make comparisons of relapse versus first diagnosis with regard to parents' psychological distress. Our findings suggest that a substantial portion of mothers and fathers whose children are on treatment reported elevated PTSS regardless of relapse status, but that having a child treated for recurrence may increase risk for elevated PTSS among fathers specifically. Notably, even the relatively lower rates of elevated PTSS among fathers of children and youth with first-time diagnoses suggest that many of these fathers warrant psychosocial attention as well. Evidence suggests that exposure to previous traumatic events increases the risk of developing PTSD in response to a subsequent traumatic event (e.g., Dohrenwend et al., 2006; Resnick, Yehuda, Pitman & Foy, 1995), and this may hold true for fathers whose children are on active treatment for cancer.

Marshall et al. (2010) demonstrated that PTSS may be a part of more general emotional distress, including dysphoria and anxiety. We found that PTSS were strongly correlated with symptoms of anxiety and depression for mothers and for fathers. When the overall sample was considered, mean levels of depression and anxiety symptoms were consistent with labels of "minimal" and "mild" (Beck et al., 1996). Among parents with elevated PTSS, however, mothers' depressive and anxiety symptoms were in the moderate range and fathers' depressive symptoms were also in the moderate range (Beck et al., 1996). Although these levels of depressive and anxiety symptoms do not represent diagnostic levels, they do suggest that parents who reported more PTSS are also elevated in other types of emotional distress. Our results are consistent with other findings that PTSS are highly correlated with dysphoria, general distress, and depression and anxiety symptoms (e.g., Grant, Beck, Marques, Palyo, & Clapp, 2008; Marshall et al., 2010). These findings suggest that supportive psychological interventions for families where a child or adolescent is being treated for cancer within 6 months after the child's diagnosis should consider addressing mothers' and fathers' symptoms of PTSS, depression, and anxiety, especially among highly distressed parents.

Mothers and fathers recruited from the same families reported comparable levels of PTSS, depressive, and anxiety symptoms. These results suggest that clinicians should be attentive to the needs of both parents when providing supportive care to families. The most robust correlate of PTSS and other symptoms of emotional distress for fathers was their level of education, such that fathers with less formal education reported higher levels of symptoms. Fathers with fewer years of formal education may have fewer support resources to assist them in taking care of other children at home or taking on more responsibilities in the home, may experience increased stress because their job is less likely to be flexible and provide time off to manage the increased demands associated with a child's cancer diagnosis and treatment, or may be less prepared to absorb the complexity of information presented to them regarding their child's diagnosis and treatment. None of the demographic or medical variables, including child age, time since diagnosis, and indicators of SES were correlated with mothers' total PTSS. The current sample of mothers was sufficiently large to detect even small effect sizes for these correlations and absence

of significant correlations suggests that these factors do not provide useful information for clinicians as markers of increased risk for PTSS in mothers.

The current study is limited in its use of self-report questionnaire measures, without the addition of diagnostic interviews. Future studies should use diagnostic interviews to enhance these findings. The current study made special efforts to recruit fathers, but was still only able to enroll about 60% of fathers in two-parent households. Additionally, study protocol was designed to maximize parents' participation and the study personnel's ability to receive questionnaires back from parents, but these procedures created variability in where parents completed the measures and how long they took to complete them, which may have also contributed to additional variance in parents' reporting of symptoms. Parents who completed the measures within 1 month of their child's diagnosis may not have had sufficient time to develop coping strategies and understand the chance for successful treatment. Future studies may benefit from stricter protocols for data collection in order to avoid potential inflation of reports of PTSS and enhance conclusions about the relation of time since diagnosis to parents' symptoms. An additional limitation of the study is that parents of younger children (i.e., those less than 5 years old) were not included in the current sample, so only conclusions about parents of school-age children and adolescents can be drawn from the current data. Future studies may benefit from including parents of younger children as well.

Furthermore, the current study could only consider findings in the context of previous studies since we did not use a comparison group for parents' psychological symptoms. Our findings suggest that there are factors other than the demographic and medical factors examined here that may put mothers and fathers at risk of developing PTSS in response to their child's diagnosis of cancer. Specifically, future studies can add to previous studies of other potential risk or protective factors including coping (e.g., Kupst & Schulman, 1988; Kupst, 1993) by examining specific coping strategies in these parents of children and youth on active treatment. Future studies can also build on previous longitudinal work (e.g., Kazak et al., 2001; Kupst et al., 1995) by examining distress and coping in a large number of mothers and fathers of children and youth treated for a variety of cancer diagnoses and by including parents of children and youth who were treated for relapse.

These limitations notwithstanding, the nature of the study design and sample allowed for unique analyses that may help inform the use of psychosocial resources for families in pediatric oncology settings. Our findings suggest that a range of services for families where a child or youth is being treated for cancer may be appropriate, including psychosocial interventions that address PTSS, anxiety, and depressive symptoms in mothers and fathers. Given that mothers are often the primary caregiver and the parent who accompanies a child or adolescent to his or her medical appointments (Dunn et al., 2011), and the relative difficulty in recruiting fathers relative to mothers, psychosocial teams may want to consider alternative methods of reaching fathers of children and youth with cancer, who may also be clinically distressed. Family centered models of care may be the most effective in reaching both mothers and fathers with high levels of PTSS and other psychological symptoms (e.g., Alderfer, Navsaria, & Kazak, 2009; Kazak et al., 2010). Our analyses revealed relatively little information about subgroups that may warrant clinical attention, except to



suggest that fathers with fewer years of formal education and fathers of children being treated for relapse may be at increased risk. Overall, using the IES-R as a screening instrument to identify parents most at risk of elevated PTSS by using a total PTSS score of 34 or greater may prove more useful for practitioners than identifying demographic or medical factors. Psychosocial care for families where parents are identified may need to include interventions that address PTSS, depressive, and anxiety symptoms.

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### Correction to Dunn et al. (2012)

For the article “Posttraumatic Stress Symptoms in Parents of Children with Cancer Within Six Months of Diagnosis” by Madeleine J. Dunn, Erin M. Rodriguez, Anna S. Barnwell, Julie C. Grossenbacher, Kathryn Vannatta, Cythia A. Gerhardt, and Bruce E. Compas (*Health Psychology*, 2012, Volume 31, No. 2, pp. 176–185. doi: 10.1037/a0025545) the authors have reported an error in their data that impacts the results and discussion sections of this published paper. The authors detected that they miscalculated the cut-off score on the Impact of Events Scale-Revised (IES-R). They reported that 66% of mothers and 60% of fathers met the modified diagnostic criteria for Posttraumatic Stress Disorder. Using the correct scoring, 11% of mothers and 9% of fathers met criteria.

A corrected Table 2 appears below.

Table 2  
(corrected) *Rates of Elevated PTSS in Mothers and Fathers of Children with Cancer*

	Mothers ( <i>n</i> = 190)		Fathers ( <i>n</i> = 93)	
	<i>N</i>	%	<i>N</i>	%
Total PTSS score (IES-R) ≥ 34	78 of 190	41	28 of 93	30
DSM-IV Criteria estimate				
Cluster B: Intrusive thoughts	126 of 190	66	49 of 93	53
Cluster C: Avoidance	26 of 190	22	9 of 93	10
Cluster D: Hyperarousal	75 of 190	39	27 of 93	29
PTSD	20 of 190	11	8 of 93	9
Both cutoffs	19 of 190	10	8 of 93	9

*Note.* A study of the diagnostic predictive power of the IES-R has shown that total PTSS scores greater than or equal to 34 predict diagnoses of PTSD with positive predictive value of .81 and negative predictive value of .66 (Rash et al., 2008). DSM-IV Criteria estimate is a procedure described by Jurbergs et al. (2009). For each participant, questionnaire items that had been endorsed at least at a moderately high level of severity (i.e., a 3 out of 4) were mapped onto specific DSM-IV diagnostic criteria for PTSD. Items rated a 3 or higher were judged as “endorsed” by the participant. Participants who endorsed one or more symptoms from Cluster B (i.e., intrusive thoughts), three or more from Cluster C (i.e., avoidance), and two or more from Cluster D (i.e., hyperarousal), mirroring DSM-IV criteria, were defined as meeting diagnostic criteria.

In the note for Table 3, the following phrase is no longer valid: “and symptoms endorsed at a 3 or greater to meet DSM-IV criteria.” The first paragraph of the Results section should read as follows:

“A portion of mothers (i.e., 11%) and fathers (9%) met the modified diagnostic criteria proposed by Jurbergs et al. (2009) and Schwartz and Drotar (2006) based upon their patterns of responses (see Table 2), whereas 41% of mothers and 30% of fathers had total symptom scores on the IES-R greater than or equal to the cut-off of 34 proposed by Rash et al. (2008). Almost all of the mothers and fathers who had total symptom scores on the IES-R greater than or equal to 34 also met modified cluster diagnostic criteria. Thus, among the whole sample, 10% of mothers and 9% of fathers met *both* sets of criteria for elevated PTSS.”

The first sentences of the second and third paragraphs of the Results section should read as:

“Comparisons showed that mothers who met the Rash et al. (2008) criteria for elevated PTSS had significantly higher self-reported symptoms of depression ( $d = 1.4$ ) and anxiety ( $d = 1.6$ ; see Table 3) than mothers who did not have elevated PTSS.”

“Results of *t*-tests showed that fathers who met the Rash et al. (2008) criteria for elevated PTSS had significantly higher self-reported symptoms of depression ( $d = 1.2$ ) and anxiety ( $d = 1.2$ ; see Table 3) than fathers without elevated PTSS.”

The second paragraph of the Discussion section should read as follows:

“The findings reported provide additional evidence on estimates of elevated PTSS in parents of children and youth with cancer derived from applying clinical cutoffs to questionnaire measures. Subgroups of mothers and fathers reported levels of PTSS that exceeded cut-offs for elevated symptoms. The findings varied depending on which of two criteria were used to identify elevated PTSS but are consistent with previous studies that reported rates of symptoms of parents of children and youth on treatment (e.g., Jurbergs et al., 2009; Kazak et al., 2005). Using the relatively conservative criteria of symptoms in each of the B-D clusters (Jurbergs et al., 2009) 11% of mothers and 9% of fathers had elevated PTSS. When the criterion was used that parents report a total symptom score greater than or equal to 34 (Rash et al., 2008) 41% of mothers and 30% of fathers had elevated levels of PTSS. Further, when estimated rates of PTSS in a split sample according to whether the child was being treated for a first diagnosis vs. a relapse, the rates of elevated PTSS in mothers were comparable across groups. Among fathers, however, rates of elevated PTSS were significantly higher when children and youth were being treated for a relapse than when children were treated for a first diagnosis. These findings suggest that a portion of families with a child or adolescent being treated for cancer, including both mothers and fathers, may be in need of supportive mental health services within the first 6 months after the child’s diagnosis.”