Evidence-Based Interventions for Survivors of Childhood Cancer and Their Families

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Objective 
To summarize existing empirical reports of psychological interventions for children with cancer and their families and to outline directions for future work. 

Methods
Research accomplishments related to four areas were summarized: understanding and reducing procedural pain; realizing long-term consequences; appreciating distress at diagnosis and over time; and knowing the importance of social relationships. Recommendations for future research in this field were discussed in three domains: balancing competence and psychopathology; integrating research-based interventions into clinical care; future directions. 

Results and Conclusions
Interventions related to procedural pain and distress have strong empirical support. Although most survivors of childhood cancer and their families adjust quite well as they complete treatment, evidence-based interventions during and after treatment that address cancer-specific sequelae represent important growing areas of work. In the future, the development of interventions to address emerging survivorship issues will be vital, and theoretically grounded, evidence-based pragmatic interventions will be necessary.

Key words 
pediatric; oncology; cancer; psychological interventions.

With the general growth of evidence-based practice in health care, it is an opportune time to address the state of the art of psychological interventions for children with cancer and their families. Indeed, pediatric psychologists have a strong and growing presence in children’s cancer treatment programs and collaborate with other health care providers to deliver much-needed psychosocial support to patients, families, and staff. This care is an integral part of comprehensive cancer treatment and is reflected in treatment recommendations by national and international pediatric groups (American Academy of Pediatrics, 1997; Janovic, Van Dongen-Melman, Vasilatou-Hosmidis, Jenney, & European School of Oncology Advisory, 1999; Noll & Kazak, 1997, 2004).

Scientifically, childhood cancer is one of the most prominent topics in the Journal of Pediatric Psychology, representing a substantial portion of papers that address childhood chronic illness (Kazak, 2002a). However, similar to research on other pediatric chronic conditions, the majority of papers on pediatric oncology across refereed publications report not on intervention research but on the results of descriptive and correlational research (Kazak, 2002a).

As scientist–practitioners in pediatric cancer, we face a situation in which clinical care is expected and appreciated but must be provided with relatively few intervention studies to guide our advocacy and delivery of care. In an effort to help resolve this dilemma, the goals of this paper are twofold: first, to summarize the existing empirical reports of psychological interventions for children with cancer and their families (accomplishments); second, while acknowledging challenges in this field, to outline directions for future psychological intervention research in pediatric oncology.
Accomplishments in Pediatric Oncology Research Related to Psychological Intervention

A strong foundation for psychological intervention research in pediatric oncology has developed over the past two to three decades. Work contributing to this empirical foundation may be classified into four general areas of accomplishment: understanding and reducing procedural pain; realizing long-term consequences; appreciating distress at diagnosis and over time; and knowing the importance of social relationships. For each of these areas, I present major and consistent findings and their applicability toward intervention, as well as summaries of pertinent empirical intervention research.

Understanding Procedural Pain

Applications of behavioral models and treatments to help children undergoing invasive and painful procedures as part of their cancer care are exemplars of research that informs clinical practice in pediatric oncology. A range of cognitive and behavioral approaches have been utilized and investigated, including preparation, desensitization, imagery, relaxation, modelling, distraction, and positive reinforcement. Approaches that use a combination of cognitive–behavioral approaches are among the most commonly studied (Kazak & Kunin-Batson, 2001) and are regarded as well-established treatments (Powers, 1999).

The procedural pain literature provides information potentially generalizable to other types of intervention. First, interventions in this field have developed systematically from well-established learning principles. Second, procedural pain interventions have been tested in carefully controlled studies and have used multiple outcome measures, such as child, parent, and staff report; observational techniques; and physiological measurements (e.g., heart rate) or neuroendocrine measurements (e.g., cortisol; Chen, Joseph, & Zeltzer, 2000; Jay, Elliott, Fitzgibbons, Woody, & Siegel, 1995). Furthermore, child factors such as temperament have been shown to affect intervention efficacy (Chen, Craske, Katz, Schwartz, & Zeltzer, 2000). Third, research has shown that parents and staff can learn and implement these interventions (Barrera, 2000; Blount et al., 1992; Kazak, Penati, et al., 1998). Fourth, application of these interventions has remained flexible to accommodate change. The availability, refined delivery, and positive outcomes of pharmacological treatments to prevent and reduce pain and distress during procedures have made use of cognitive–behavioral treatments less common in practice. Such shifts in treatment require flexibility in applying psychological knowledge to pediatric problems. For example, the integration of cognitive–behavioral therapy with other intervention approaches—in this case, pharmacologic—has proven highly effective (Jay et al., 1991; Kazak, Penati, et al., 1998) and can help identify new opportunities for intervention.

Realizing Long-Term Consequences

With increasing rates of successful pediatric cancer treatment, there has been a parallel increase in our appreciation for the medical and psychological sequelae of cancers and their treatments. In their review of late effects of cancer therapy, Friedman and Meadows (2002) highlight not only the growing body of research on adverse consequences of treatment but also the difficulties of conducting research in this area. Specifically, they emphasize the importance of integrating research and clinical care to identify and treat medical and psychological aftereffects effectively. The threatened or actual development of late effects from pediatric cancer therapy provide important opportunities for psychosocial intervention, particularly for subgroups of patients at high risk for persistent difficulties.

Indeed, data from the first major cohort of childhood cancer survivors indicate that psychological adjustment was in general quite good. Across studies from the late 1970s through the 1990s, a minority of survivors (10%–20%) were reported to have ongoing distress; for most, adjustment was within normal limits as measured using standardized questionnaires (Kazak, 1994). The most consistent finding, in terms of factors associated with less positive adjustment, was disease and treatment that affected the central nervous system (Kazak, 1994). However, psychological late effects, neurocognitive and psychosocial, continue to be prevalent and concerning (Friedman & Meadows, 2002).

Current thinking suggests that traditional or general measures of psychopathology and well-being may not have captured the specific and persistent experiences of childhood cancer survivors and their families. Empirical studies of posttraumatic stress disorder (PTSD; American Psychiatric Association [APA], 1994) and posttraumatic stress symptoms (PTSS) in survivors and their families offer one alternative. The fourth edition of the Diagnostic and Statistical Manual of the American Psychiatric Association (DSM–IV; APA, 1994) added experiencing a life-threatening medical condition or observing it in a close affiliate (e.g., family member) as a qualifying event for PTSD.

With regard to PTSD in childhood cancer survivors, rates are low (5%–10%; Butler, Rizzi, & Handwerger,
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1996; Erickson & Steiner, 2001; Kazak, Barakat et al., 2001); however, they are considerably higher when assessing symptom clusters (e.g., reexperiencing, arousal; Brown, Madan-Swain, & Lambert, 2003; Erickson & Steiner, 2001; Kazak, Barakat et al., 2001). High rates of PTSD and PTSS are reported for survivors of childhood cancer when they are young adults (15–21%, Hobbie et al., 2000; Rourke, Hobbie, & Kazak, 2002). For parents of childhood cancer survivors, rates of PTSD or partial PTSD range from 5% to 25% (Brown et al., 2003; Kazak, Rourke et al., 2001; Kazak et al., 2004; Manne, DuHamel, Gallelli, Sorgen, & Redd, 1998; Manne et al., 2002) with subclinical PTSD being common as well. Mothers and fathers were found to have significantly higher levels of PTSS than were parents of never-ill children (Kazak et al., 1997). In a subsequent study, nearly all families (99%) had at least one parent meet criteria for Symptom Cluster B (reexperiencing), and 20% of the sample had at least one parent with current PTSD (Kazak, Alderfer et al., in press). Data also indicate PTSS in siblings of survivors (Alderfer, Labay, & Kazak, 2003).

An intervention to reduce PTSS has been evaluated in a wait-list control randomized clinical trial of 150 families. The Surviving Cancer Competently Intervention Program (SCCIP; Kazak et al., 1999) integrates cognitive behavioral and family therapy in a four-session, 1-day program involving groups of adolescent cancer survivors and their mothers, fathers, and siblings. Using this treatment model, survivors and family members identify ongoing distressing beliefs about cancer and its treatment and utilize an interpersonal systems framework to identify the current and likely future impact of cancer on the family. The results of the randomized clinical trial indicate that families randomized to the SCCIP arm showed significant reductions in PTSS, particularly for survivors and fathers (Kazak, Alderfer et al., 2004). A two-session intervention based on the SCCIP model has also been developed and piloted among 21 young adult survivors (Rourke et al., 2002). Most recently, this treatment model has been revised and piloted for caregivers of children at the time of diagnosis (Kazak, Simms et al., in press).

Health-related problems that can develop secondary to cancer and its treatment provide opportunities for psychological intervention in cancer survivorship. For example, common late effects affecting the cardiopulmonary, endocrine, or musculoskeletal systems can each have psychological components and thus provide targets for treatment strategies. As an example, smoking prevention is important for everyone, but childhood cancer survivors with cardiopulmonary late effects and those who are at risk for secondary malignancies provide a particularly opportune group to target. In a randomized clinical trial of a brief (<1 hr) educational intervention delivered by telephone, Tyc and colleagues (2003) provided evidence that at 1 year postintervention (but not at 6 months), adolescent survivors who received the intervention showed increased knowledge of smoking risks, reported more perceived vulnerability, and indicated less intent to smoke cigarettes than did control participants.

Appreciating Distress at Diagnosis and Over Time

The largest area of work in pediatric oncology has examined the psychological reactions of patients and parents during the course of active cancer treatment. This work provides ample evidence of challenges faced by children and families but has returned inconclusive data with regard to potential intervention targets. For example, survivors of childhood cancer do not evidence elevated levels of depression (Recklitis, O’Leary, & Diller, 2003; Zebrack et al., 2002). The types of depressive symptoms seen in pediatric cancer patients during treatment are often indicators of an understandable and normal response to the distressing circumstances of diagnosis and treatment; they can be understood and treated contextually (Kazak, Simms, & Rourke, 2002; Mulhern, Fairclough, Smith, & Douglas, 1992). Parents similarly show elevations in scores on measures of psychological distress (Hoekstra-Weebers, Jaspers, Kamps, & Klip, 2001) but, again, not clearly of the magnitude generally associated with help seeking or psychotherapy.

The few prospective studies of adjustment over time report similar findings—that distress attenuates over time (irrespective of intervention) and that early adaptive adjustment is associated with comparable adjustment over time (Best, Streisand, Catania, & Kazak, 2002; Hoekstra-Weebers et al., 2001; Kazak & Barakat, 1997; Kazak, Penati, Brophy, & Himelstein, 1998; Kupst et al., 1995; Kupst & Schulman, 1988). That distress is high at diagnosis and naturally attenuates for most families poses particular challenges for interventions during treatment. For example, in a randomized study of an eight-session psychoeducational intervention, both treatment and control groups improved over time (Hoekstra-Weebers, Heuvel, Jaspers, Kamps, & Klip, 1998). This highlights the potential importance for identifying specific targets of the intervention while being mindful of the fact that adaptation and coping over time will predict a natural decline in distress, regardless of intervention.
The most promising interventions during cancer treatment appear to be those that are carefully timed and tailored to specific outcomes rather than those that rely on general outcomes. For example, problem-solving therapy has been shown to be more effective than “treatment as usual” in reducing negative affectivity and in increasing problem-solving skills for mothers of children currently in treatment (Sahler et al., 2002). These data have been replicated (Sahler et al., 2004) to show that a systematic, relatively easy-to-deliver intervention to address ways of solving problems may help mothers cope with the many stressful demands of cancer therapy and may provide benefits to their emotional well-being. The data show the strongest support for short-term treatment effects, and the authors raise the possibility that problem solving may have an impact on other psychological outcomes over time (Sahler et al., 2002).

In a pilot study with 22 mothers of children undergoing a bone marrow transplantation, Streisand, Rodrigue, Houck, Graham-Pole, and Berlant (2000) demonstrated the feasibility of providing parents with stress reduction techniques in a one-session intervention. The data comparing the intervention to standard preparation suggest that the timing of intervention may be critical—in this case, before the admission for transplantation, when stress levels are elevated.

Finally, building on a model that conceptualizes the diagnosis of cancer as a potentially traumatic event, a manualized intervention has been developed for parents and other immediate caregivers of newly diagnosed pediatric oncology patients (Kazak, 2002b). Using the SCCIP treatment model (Kazak et al., 1999), this three-session intervention helps caregivers link their cancer-related beliefs to their actions and emotions by identifying strategies to maximize adaptation in an interpersonal, family context. The goal of the intervention is to prevent PTSS and enhance family adjustment over the course of treatment (Kazak, Simms et al., in press).

**Knowing the Importance of Social Relationships**

Cancer affects families and other systems in addition to its obvious impact on patients (Kazak, Rourke, & Crump, 2003). This is particularly pertinent in pediatric oncology and explicit in the studies noted that include the family as well as the patient. Although this literature is less focused on treatment, research related to social relationships is critically important and relevant to intervention.

The work of Noll and colleagues uses methodologically rigorous approaches to describe the peer relationships of children with cancer. In general, most children with cancer have been found to be quite resilient and have maintained good peer relationships over the course of treatment. Some consistent indications, however, suggest that children with cancer may be perceived as being socially withdrawn (Noll, Bukowski, Davies, Koontz, & Kulakrni, 1993; Noll, Bukowsky, Rogosch, LeRoy, & Kulkarni, 1990; Noll et al., 1999). Similar to other groups of children with chronic illness, children and adolescents at highest risk for peer difficulties are those whose treatment affects the central nervous system or who have obvious changes in physical appearance (Reiter-Purtill & Noll, 2003). An intervention with direct relevance to peer relationships is social skills training. A social skills intervention has been compared with a school reintegration approach, with data on the social skills package providing some evidence for its impact over a 9-month period, particularly for children at risk for behavioral concerns (Burns, Katz, Colegrove, & Dolgin, 1993). Social skills training has also been used with children with brain tumors in a pilot format (Barakat et al., 2003).

Similar to the research guiding family intervention, the overall competence of children with cancer in their peer relationships necessitates carefully crafted interventions that target the most relevant subgroup of patients and provide a careful assessment of relevant outcome. By describing the social environment of the school and the patients’ interactions with other children, this work can inform the development and evaluation of school reintegration programs and other intervention approaches to help children with cancer reenter their schools and home communities (Prevatt, Heffer, & Lowe, 2000). Unfortunately, there are no published studies of interventions with peers or other school-based interventions that focus on children with cancer.

More generally, the amount and quality of support available to patients with cancer and their families form an important area of work. Social support is seen as protective against the development of distress and psychopathology and in adjustment to cancer (Helgeson & Cohen, 1996). Empirical studies of pediatric cancer show that parental social support is associated with adaptive functioning outcomes and that lack of social support for parents is related to greater risk for ongoing difficulties (Kazak, Stuber et al., 1998; Sloper, 2000; Speechley & Noh, 1992).

**Summary of Accomplishments**

Empirically supported interventions related to procedural pain in cancer treatment are available; they are generalizable to other situations in which children experience...
pain and distress; and they can be flexibly combined with other effective intervention approaches. These interventions represent an important component of care for children with cancer. Studies of survivors of childhood cancer have supported the overall psychological health of this population while highlighting specific, cancer-related sequelae that can be remedied using empirically supported interventions. The large body of research on psychological aspects of cancer and its treatment have shown the importance for the early identification of families who may benefit from psychological intervention. Data support the use of problem-solving therapy with mothers and favor the development of interventions focused on specific issues and delivered at certain points in treatment. Although most children with cancer adjust relatively well as they return to school and reenter peer interactions, risk factors associated with neurocognitive difficulties and changes in appearance point to the importance of integrating these findings into interventions that promote adaptive functioning at school.

**Directions for Future Intervention Research in Pediatric Oncology**

To build on the strengths of existing research related to interventions in pediatric oncology, we as researchers and practitioners need to identify the next steps and priorities for investigation. In this section, I propose three broad directions to further define and refine evidence-based psychosocial practice in pediatric oncology: balancing competence and psychopathology; integrating research-based interventions into practice; and future directions.

**Balancing Competence and Psychopathology**

To develop effective interventions, we need to attend to the current standards in our field for empirically supported treatments (e.g., Chambless & Hollon, 1998) and to the modifications that have been used for pediatric psychology interventions (Spirito, 1999). However, it is imperative that we recognize not only the conceptual and pragmatic needs of pediatric cancer patients and their families but also the ways in which this population is fundamentally different from the populations for whom other empirically supported interventions have been developed.

This is a broad concern that transcends attention to particular intervention outcomes or models of intervention. That is, treatment models developed to reduce symptoms of psychopathology are not necessarily well suited to this population. If interventions for children with cancer (or their parents or their peers) focus exclusively on change (improvement) from clinical to non-clinical scores, they will only be appropriate for a small subset of patients. These research designs may render data that show weak findings with attendant difficulties in interpretation and clinical application.

As noted, the data supporting the competence of children with cancer and their families are strong. To develop intervention frameworks useful for this population, we need to move outside of deficit-oriented treatment models. This is not to suggest a lack of attention to the very real distress experienced by children and families but rather to encourage specific interventions that build on strengths while mitigating symptoms for the broadest possible group of patients. Such interventions are likely to build on competency-based models and theories rather than on psychopathology. Most important, the approaches are inherently preventative. A challenge to research in this field is the development of creative and thoughtful research approaches and tools to document clinically relevant change in subclinical distress associated with cancer and its treatment.

**Integrating Research-Based Interventions Into Practice**

Despite multiple, reasonably comparable treatment recommendations for psychosocial care in pediatric cancer, there is little, if any, evidence for consistency in practice, even across major treatment centers. In an environment of limited resources and financial concerns, informal evidence suggests that the amount and variety of psychosocial support provided to families has declined over the past 10 years at many centers, if not most. This trend is disappointing given the knowledge that has accumulated regarding the benefits that children with cancer and their families derive from psychosocial interventions. It is essential that approaches deemed helpful in research studies be evaluated for broad applicability in clinic settings and, if effective, translated into practice.

As it is in other areas of intervention research, translating treatments from research “laboratories” into practice settings is difficult work. In many cases, the distinction between laboratory-based efficacy research and clinic-based effectiveness studies is less clear in pediatric psychology than it is in psychotherapy research. From the beginning, most interventions for pediatric cancer are developed and tested in pediatric oncology settings. The challenge comes in ensuring that helpful treatments are used in daily practice, which necessitates evaluating and ensuring the cost-effectiveness and feasibility of
psychosocial interventions within the health care system.

One way of meeting this objective is to look broadly at the needs of patients and families and to match level of intervention with level of need. The overall competence of most families facing childhood cancer indicates that many may not need traditional or intensive intervention and, furthermore, may not want it. However, a small subset of families would clearly benefit from specific interventions. The challenge is to identify level of need and to provide interventions that are tailored to those needs, delivering the most intensive treatments to those who are most distressed, without negating the needs of all families for effective, compassionate, and responsive psychosocial care. We have proposed a tiered model of psychosocial need and care based on public health frameworks, using the concepts of universal, selected, and targeted interventions (Power, DuPaul, Shapiro, & Kazak, 2003). Most families would receive universal care, that is, a minimal level of psychosocial support; those with more severe difficulties would require targeted care. If those families at highest risk for psychosocial distress during treatment can be identified reliably at diagnosis and if interventions can be developed to match these levels of risk, psychosocial care would be cost-efficient. Our initial work in this area includes the development of a brief screening tool for assessing psychosocial risk and for predicting the health care utilization costs associated with treating patients and families at different levels of risk (Kazak, Prusek, et al., 2001; Kazak, Cant, et al., 2003).

Sometimes, however, effective targeted care for patients may not be enough to ensure the adoption of psychological interventions in health care settings. A second way to promote the implementation of programs that benefit patients is to research broad, systemic effects that may facilitate larger scale change. For example, the implementation of procedural pain interventions in a clinical setting rests on acceptance of the intervention model and the identification of perceived barriers to implementation (e.g., amount of time entailed), factors that can vary across settings and time (Kazak et al., 1996; Kazak, Blackall, Himelstein, Brophy, & Daller, 1995). Another example is problem-solving therapy for mothers; this treatment has a positive impact on the emotional distress that mothers experience. This effect could influence their ability to solve problems or make treatment decisions (Sahler et al., 2002), possibly improving communication with nursing staff or decreasing the number of consultations with their physicians. Similarly, brief procedural pain interventions might be applied systematically in clinics to a broad array of distressing procedures, with the outcomes being not only child–family endpoints (e.g., pain, distress) but also staff and systems measures (e.g., time to complete procedure, necessary dosage of sedation or analgesia, work satisfaction). Research addressing the broad effects of implementing psychological interventions in pediatric oncology settings may help identify additional benefits (e.g., cost containment, retention of nursing staff, overall patient satisfaction) that may aid in ensuring their adoption. At the same time, this form of research could uncover systemic barriers to implementation and suggest alternative strategies to facilitate acceptance of the intervention.

**Future Directions**

While the psychological literature in pediatric oncology is growing at a steady rate with evidence of increasing attention to intervention, there are many opportunities and a few areas of apparent neglect. The most broad opportunities include the identification of specific subsets of patients for targeted interventions—for example, psychological interventions applied to specific treatment effects or based on risk factors. Many possibilities exist within this regard, particularly as treatment-related effects continue to be identified (Friedman & Meadows, 2002). For example, there are opportunities to further refine interventions for neurocognitive problems and to combine them with treatments that target related emotional components of functioning; likewise, there is growing interest in interventions that could facilitate adjustment to long-term consequences, such as infertility and endocrine or cardiac conditions.

Perhaps the most obvious area of neglect concerns the subset of patients who are likely to die (or have died) and their families. In the midst of growing data on cancer survivorship, it is important to remember that not all patients survive. It is surprising how little data are available to support the observation that the occurrence of a relapse (first or subsequent) is an extremely stressful time for patients and families (Hinds et al., 1996). However, when a child dies, there are still survivors—parents, siblings, and extended family members. For these patients, palliative care programs tend to focus on medical care (e.g., symptom management), with clinical attention to psychosocial and spiritual needs referred to social workers and chaplains. In general, the empirical literature on interventions related to end of life and bereavement is extremely limited (Kazak & Noll, 2004). Yet, the relatively large number of children with cancer who die provides the opportunity to
develop and evaluate interventions to help children and families face one of the most difficult circumstances imaginable and to help identify reasonable outcomes for their well-being when a child dies.

Most psychological research in pediatric oncology includes either patients alone or patients and mothers, with persistent lack of attention to fathers, siblings, and others in the child’s social ecology. Furthermore, most psychological research in this field is based overwhelmingly on Caucasian samples, providing little information on the relevance of findings for ethnic minority families. For example, in the Childhood Cancer Survivor Study of over 20,000 survivors of childhood cancer (which is generating psychosocial data as well as medical outcome data), 2% of the sample is Black and 5% is Hispanic (Robison et al., 2002). Looking across disease groups, reports and consideration of ethnicity were grossly underrepresented in papers reviewed in the Journal of Pediatric Psychology series on empirically supported treatments (Clay, Mordhorst, & Lehn, 2002). Although understandable in terms of the availability of study participants, these circumstances as a whole are of great concern in our increasingly multicultural society with multiple and complex family configurations.

At a minimum, the inclusion of fathers in samples is highly feasible, although necessitates commitment to recruitment and attention to scheduling flexibility (Seagull, 2000). In studies that pertain to parenting and family functioning in particular, it is concerning and unjustifiable that fathers continue to be systematically excluded. Recent data suggest that fathers’ levels of cancer-related distress may match those of mothers and that fathers, too, benefit from psychological intervention (Kazak et al., in press; Kazak et al., 2004).

The recruitment of ethnic minority participants is complex and admittedly difficult to achieve. However, researchers can take certain steps to address these concerns. First, they need to document and discuss the low rates of ethnic minority participation in this field, aside from mentioning the rates as a study limitation in published reports. To begin to address this concern, researchers could clearly define components of the problem—for example, barriers to participation in studies; institutional characteristics, such as composition of patients attending survivorship programs; perceived importance and acceptability of interventions by individuals of ethnic minority background; associations between socioeconomic status and race. Once explicitly described and circulated, strategies for attaining diverse samples can be identified and tested. Second, researchers need to give consideration to the development and evaluation of existing interventions in terms of their cultural sensitivity and applicability to ethnic minority participants. For example, some of the existing interventions could quite readily be translated into other languages or evaluated with regard to their acceptability among ethnic minority participants. Third, with the goal of providing tailored psychological support to all families of children with cancer, it is important that researchers consider alternate models of intervention delivery. Given the needs of ethnic minority and lower income families, it is especially vital to consider the use of innovative formats and the delivery of care in the community and in schools (Tucker, 2002).

Other questions related to intervention structure and process require further attention. It seems inevitable that effective interventions will need to be brief. Some of the interventions reviewed in this paper were quite short, being 1 hr or 1 day. Others represent a range of sessions (from three to eight), which is more consistent with other psychological treatments. Overall, it is recommended that interventions build on theory and clinical knowledge and, through processes of refinement and focus, strive to maintain their potency while being delivered in as brief a format as is feasible and effective.

Though important, brevity must be balanced with theoretically and empirically grounded interventions that are doable and that can ultimately be disseminated. Interventions that transcend traditional disciplinary boundaries are of particular interest, such as those that combine treatment modalities (e.g., pharmacologic and psychologic, cognitive–behavioral and family systems) and those that can be delivered by health care professionals outside of mental health (e.g., physicians, nurses, teachers). Also essential is further research on interventions that can be delivered or augmented using technology. For example, in pediatric cancer, data suggest that participation in electronically based networks may help to reduce distress and maintain connectedness for patients (Battles & Wiener, 2002). Furthermore, attention to the systemwide impact of psychological intervention implementation needs to be explored, with benefits to the broader system maximized (e.g., cost containment).

Multisite studies are often advocated as essential in accruing samples of adequate size to extract treatment effects. Indeed, successful examples of multisite trials present evidence of their effectiveness (e.g., Sahler et al., 2002). However, not all types of research are necessarily amenable to multisite trials, and there is little, if any, discussion on the potential liabilities of these studies. Newly developed interventions may be particularly
difficult to deliver and test in multi-institutional studies unless sufficient resources are available for training and monitoring interventionists and are above and beyond the usual costs of coordinating a study at several sites. A balanced portfolio of intervention studies in pediatric oncology might include large, multisite studies of protocolized treatments and smaller, more intensive investigations of innovative interventions targeting specific groups of patients. In all cases, attention to the generalization of treatments and dissemination is vital.

Summary

This is an opportune time to develop psychological interventions drawing on the relatively large literature on psychological factors and the strong tradition of clinical care provided to children with cancer by health care teams. Over the next decade psychological interventions matched to emerging broader issues in cancer survivorship will be necessary and important to ensure and enhance the well-being of this growing population. Effective interventions will need to balance theoretically and clinically grounded approaches with empirical evidence. They will need to be deliverable in a brief format and done so creatively to mesh with pediatric practice and health care economics. The breadth of psychological functioning seen in children with cancer and their families, combined with the common extreme stressors associated with treatment, provide opportunities for preventative interventions and necessitate the application of a range of treatment approaches and scientific methods.

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**Note**

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