

## Providing Children and Adolescents Opportunities for Social Interaction as a Standard of Care in Pediatric Oncology

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Experiences with peers constitute an important aspect of socialization, and children and adolescents with cancer may experience reduced social interaction due to treatment. A literature review was conducted to investigate the evidence to support a standard of care evaluating these experiences. Sixty-four articles were reviewed using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) criteria. Moderate quality of evidence

suggest that social interaction can be beneficial to increase knowledge, decrease isolation, and improve adjustment and constitute an important, unmet need. The evidence supports a strong recommendation for youth with cancer to be provided opportunities for social interaction following a careful assessment of their unique characteristics and preferences. *Pediatr Blood Cancer* 2015;62:S724–S749. © 2015 Wiley Periodicals, Inc.

**Key words:** pediatric oncology; psychosocial; support care

### INTRODUCTION

Starting with the preschool years, experiences with peers can make up a large part of a child's daily life. These experiences can be sources of companionship, stimulation, information, help, rewards, security, joy, and, at times, frustration and harm. For at least seven decades, researchers have been testing hypotheses about the effects of peer interaction.[1] Evidence from population-based longitudinal studies has shown that experiences with peers constitute an important socialization domain for children and adolescents.[2] Specifically, it is known that experiences with peers affect how children and adolescents think about themselves, how they feel, and how they behave. Research evaluating the impact of childhood cancer on social functioning is mixed with some studies showing healthy functioning and other studies identifying children are at risk.[3–7] For example, school-aged children with cancer were found to be similar to peers on measures of emotional functioning [3] and better on multiple measures of social functioning.[3,4] In contrast, survivors who had central nervous system (CNS)-directed treatment and children with a history of a bone marrow transplant have been found to have poorer social functioning overall.[6,7] Also, survivors of childhood brain tumors experience reduced social adjustment.[5,8] Lown et al. (in this special issue) found that a small subset of survivors were more likely to report poor social support and have lower marriage rates compared to peers.[9]

Children and adolescents undergoing cancer treatment and into survivorship experience school absence [10] and subsequent reductions in social activities as well as report social isolation.[11,12] Children who are immunocompromised and socially isolated for long periods of time due to infection risks (e.g., following bone marrow transplant) may be especially vulnerable. Reduced social interactions can be particularly salient for adolescents, for whom development centers on establishing autonomy and self and social identities, as well as the heightened importance of peer relationships.[13]

### Psychosocial Standard of Care

- Children and adolescents with cancer should be provided opportunities for social interaction during cancer therapy and into survivorship following careful consideration of the patient's unique characteristics, including developmental level, preferences for social interaction, and health status.
- The patient, parent(s), and a psychosocial team member (e.g., designee from child life, psychology, social work, or nursing) should participate in this evaluation at time of diagnosis, throughout treatment, and when the patient enters survivorship; it may be helpful to include school personnel or additional providers.

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Conflicts of Interest: Nothing to declare.

Author's contributions: All authors participated in the conception and design of this standard, the collection and assembly of data, data analysis, interpretation and presentation of data, drafting of the manuscript, and critical revisions of content. All authors approved the final version of this manuscript.

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Received 30 June 2015; Accepted 31 August 2015

## METHODS

This review was performed as part of the collaborative Standards for Psychosocial Care of Children with Cancer and Their Families effort utilizing the Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology, a system to assess quality of evidence and strength of recommendations. For a full description of the methods used to develop the standard, please refer to Wiener et al. (in this special issue).[14] The literature search utilized three databases: PubMed, OVID, and PsycINFO (March 1, 1995 to March 1, 2015). Due to the limited body of work on the impact of social interaction on adaptation in children with cancer, the search terms were broadened to be inclusive of work that captures the social support needs of children and adolescents with cancer, their social and peer relationships, and interventions that promote social adaptation, including camps and groups. The search utilized the following indexed MeSH terms: “social support” OR “social distance” OR “interpersonal relations” OR “peer group” OR “self-help group” OR “psychotherapy group” OR “hospitalization” OR “camping” AND “neoplasm” OR “cancer.” Searches were conducted utilizing the terms “child,” “pediatric,” “adolescent,” and “young adult” to ensure all appropriate studies were captured. Nonresearch articles, with the exception of literature reviews or summaries, consensus, and opinion papers, studies with a primary focus on young adults or family functioning, or whose focus was not relevant to social interactions or peer relations, were excluded. Inclusion criteria included peer-reviewed English language articles. The reference lists of all included studies were hand-searched for additional relevant studies. Searches revealed a total of 710 citations. Authors followed PRISMA guidelines for systematic reviews, leaving 64 articles for inclusion in the synthesis of evidence (Supplementary Fig. I).

The authors of this standard are pediatric psychologists from the field of hematology/oncology. An external team of expert pediatric oncologists, pediatric and developmental psychologists, pediatric oncology social workers, and child life specialists, as well as members of an adolescents and young adult (AYA) panel and family advisors in oncology, reviewed the evidence and recommendation prior to the final draft. Their feedback echoed concerns regarding the limitations of the extant literature, the importance of carefully planned social interactions, and the need to propose specific strategies to overcome barriers; these have been addressed herein.

## RESULTS

The search identified 64 peer-reviewed papers, including 26 quantitative studies, 28 qualitative studies, two systematic reviews of the literature, and eight consensus reports evaluating various aspects of social interaction and support. Supplementary Table I includes the studies that met inclusion criteria and briefly summarizes each study with regard to study design, sample characteristics, main findings related to this standard, study rigor, and the level of evidence. Based primarily upon findings from qualitative and descriptive studies, children undergoing cancer treatment often endorse feeling isolated during the treatment [11,15,16] due to the impact on social interactions.[17–21] Patients endorsed concerns that they cannot participate in activities, spend as much time with friends as they prefer,[15]

feel different from peers as a result of cancer,[17,18] and sometimes withdraw from peers.[22] Children with cancer reported a desire for opportunities that promote social engagement and activity.[11]

Most adolescents with cancer describe the importance of peer support and the desire or need for social interaction to help them cope with active cancer treatment and survivorship care.[23–31] Some adolescents indicate a decrease in or difficulty with social interactions or lack of peer support, whereas others describe an improvement in social relationships due to cancer. [18,19,23,32–35] Adolescents express feeling socially isolated, disconnected, or different from their same-age peers, as well as more emotionally mature based upon their changed life perspective.[36,37] Importantly, adolescents with cancer report unmet needs in peer interaction and support, including a desire for increased access to cancer support programs (i.e., online or in-person support groups, retreats, and camps). [27,38,39]

Evidence regarding the outcomes of social interaction is limited and mixed. Several descriptive studies report that higher perceived peer support during cancer treatment is related to increased positive affect,[35] decreased anxiety and depression,[40–42] less uncertainty,[43] and increased ease during the transition back to school.[44] On the other hand, two descriptive studies found no significant relationship between peer support and psychological outcomes [45] or health-related quality of life.[46] Findings from qualitative research support that adolescents undergoing treatment find peer support to be a helpful distraction during intense phases of treatment.[25] For youth, connecting with other cancer patients or survivors is described as beneficial.[20,39,47–52] and they rate meeting other survivors as even more important than family or friend connections.[53]

Strategies to increase social interaction for children and adolescents with cancer have focused on traditional face-to-face support groups and camp interventions. Qualitative analyses found that participants in support groups,[34] teen outreach programs,[54] and organized hospital activities [55] obtain increased support and connectedness from these programs. Barriers to successful implementation of such groups include the broad age range of participants and treatment phase, potential death of group members, geography, and cost.[56] However, online forums may reduce access barriers and provide bidirectional emotional support among participants [57] and offer social connection with peers.[58,59] While videoconferencing and online groups and message boards decrease barriers to group participation and engage youth, some may prefer face-to-face groups. [60]

Camps increase interaction of youth with cancer and provide opportunities to share information and support. Literature reviews indicate that camp attendance is associated with improvements in self-confidence, independence, and social contact.[56,59,61] Individual studies evaluating camps are comprised primarily of nonrandomized, postcamp surveys, and interviews that highlight benefits, including camp is enjoyable,[62] increased cancer knowledge through participation,[63] diminished sense of isolation,[21] and improved mood.[64] One adolescent camp study reported reduced depression scores for patients 4–6 months after attending camp,[65] whereas another study did not find differences in adolescent adjustment after

TABLE I. Social Interaction as a Standard of Care in Pediatric Oncology Evidence

Standard	Evidence summary <sup>1</sup>	Methodology <sup>2</sup>	Quality of evidence <sup>3</sup>	Strength of recommendation <sup>4</sup>
Children and adolescents with cancer should be provided opportunities for social interaction during cancer therapy and into survivorship following careful assessment of individual needs and social interaction preferences.	<ul style="list-style-type: none"> <li>• Children and adolescents with cancer request opportunities for social interaction and support due to feelings of isolation.</li> <li>• While adolescents cite peers (at home, with cancer) as playing an important role in coping, they report social support as an unmet need.</li> <li>• Social intervention literature suggests that support groups and camp offer positive opportunities for social connectivity and overall adjustment.</li> <li>• Hospital environments can be structured to facilitate peer interactions and support.</li> </ul>	<ul style="list-style-type: none"> <li>• Mixed-methods, qualitative, quantitative, and literature reviews.</li> <li>• Majority cross-sectional retrospective survey and in-depth interviews.</li> <li>• Intervention trials were primarily single-arm qualitative studies using postintervention surveys or interviews.</li> </ul>	Moderate quality given consistent findings without confounding variables from lower level evidence studies.	Strong recommendation given risk–benefit ratio, including need identified by children and adolescents with cancer, evidence that perceived social support is associated with adaptation, and lack of evidence of harm from intervention studies.

<sup>1</sup>Based on summary of evidence. <sup>2</sup>Types of studies: for example, RCT, cross-sectional, longitudinal; consensus; systematic review articles. <sup>3</sup>Quality of evidence: High, moderate, low, and very low. <sup>4</sup>Strength of recommendation: Strong or weak based on GRADE quality criteria.[71]

camp attendance.[62] Additional qualitative analyses suggest improved skills making friends,[65] enhanced normalcy,[66,67] and improved adaptation to cancer and its treatment.[67]

## DISCUSSION

Although no randomized control trials and few quantitative studies have been conducted to evaluate the impact of social interactions and peer support on adaptation of children and adolescents with cancer, there is a considerable body of qualitative studies and surveys outlining social needs. Existing literature suggests that children and adolescents with cancer request peer support to promote coping, and this is an unmet need. There are limited data with mixed findings on the outcomes of social support, with some pointing to peer support being beneficial to mood and coping, and others finding no significant benefits. Results evaluating the impact of camp and support groups point to benefits of these activities; however, the extant intervention research involves small sample, single arm studies describing response to camp/support group interventions through the use of variables such as knowledge and physical behaviors.[62,65,66] Few account for baseline functioning, which include a comparison group or assess psychosocial functioning.

As such, systematic, controlled evaluation of interventions to support interactions with peers is a critical need. These social interactions may include peers from home or with cancer, or in the context of a therapeutic group or activity program such as camp. Interventions should be tailored to the developmental level and individual social interaction preferences. Finally, the efficacy of group interventions to improve specific skills, such as knowledge, coping and social skills, and self-efficacy/problem solving, needs to be evaluated. Consideration should be given to developing interventions that increase engagement of peers with

children with cancer to mitigate social isolation.[47] Barriers to intervention, such as costs and access, may be addressed through the development of web-based/eHealth interventions. Opportunities for children with cancer to engage with peers with cancer and peers from home are preferred, whether it occur in person or electronically (e.g., Face Time and Skype).

## CONCLUSION

Children and adolescents with cancer should be provided opportunities for social interaction during cancer therapy and into survivorship following careful consideration of the patient's unique characteristics, including the developmental level, preferences for social interaction, and health status. The patient, parent(s), and a psychosocial team member (e.g., designee from child life, psychology, social work, or nursing) should participate in this evaluation at the time of diagnosis, throughout treatment, and when the patient enters survivorship; it may be helpful to include school personnel or additional providers. Social interaction may be promoted through camps/activity programs, group interventions (e.g., face-to-face, eHealth), or structured hospital environments and activities, facilitated by a psychosocial team member. The hospital environment can be structured to promote social interaction. For example, visitation policies that allow for family and friend visitors when feasible given medical restrictions [68] as well as facilities that include group spaces to allow for peer-to-peer interactions [69] can promote social support.[16,70] Further, inclusion of adolescents in designing hospital spaces that facilitate connection and maintain a focus on social development goals is underscored.[50]

Current evidence for this recommendation is of moderate quality based on consistent evidence across low quality studies, primarily cross-sectional descriptive surveys, and in-depth

interviews.[71] Overall, this is a strong recommendation given the risk–benefit ratio that weighs significant implications for mood, coping, adaptation, and health-related quality of life and lack of evidence of significant, negative consequences of interventions (Table I).

## ACKNOWLEDGMENTS

Special thanks to the external stakeholders who participated in reviews of the standard, including expert psychologists, members of the Child Life Network, pediatric oncology social workers, and AYA living with cancer and their parents.

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SUPPLEMENTAL TABLE I. Evidence Table for Social Interactions as a Standard of Care in Pediatric Oncology

Study	Design	Sample	Findings*	Study Rigor	Level of evidence
<b>Quantitative</b> Bellizzi KM, Smith A, Schmidt S, Keegan TH, Zebrack B, Lynch CF, Deapen D, Shnorhavorian M, Tompkins BJ, Simon M, and the AYA HOPE Study Collaborative Group (2012) [1]	Descriptive study of AYA with cancer evaluating their life impact.	Eligible AYA cancer patients selected from 7 SEER registries ages 15–39 years (n = 523), stratified by 3 age groups (15–20, 21–29, 30–39 years).	<ul style="list-style-type: none"> <li>Majority of AYA reported that cancer had a negative impact on the way they felt about the appearance of their body (62.5% ages 15–20).</li> <li>In the age group of 15–20 years, almost 17% reported a negative impact on friendships.</li> <li>More than 75% of respondents aged 15–20 reported a positive impact in their relationship with mothers (77.5%), siblings (79.7%), fathers (67.1%) and friends (48.1%).</li> <li>47% (n = 24) spoke of positive and rewarding friendships.</li> <li>Some recounted negative experiences, although they often turned them into opportunities for personal growth.</li> <li>Among respondents who reported poor peer relationships, 8 repeated a grade, 7 were in exceptional student education classes and none were in honors or gifted classes.</li> </ul>	Sufficient sample size; no selective reporting; appropriate analysis, study completed as planned, no significant losses to follow up or missing data.	6
Bessell AG (2001) [2]	Single sample, descriptive study evaluating psychosocial adjustment in the areas of scholastic competence, emotional stability and social competence.	51 survivors of childhood cancer age 8–17 years old.	<ul style="list-style-type: none"> <li>Adjustment, as rated by parent, following camp attendance was not significantly different from that of a similar clinical group not included in study or that of the general population.</li> <li>Camp attendees reported higher frequency of emotional/esteem-enhancing support over other tangible-support.</li> <li>Adjustment scores were not significantly correlated with level of support during camp attendance.</li> <li>Findings may be influenced by gender differences in activities experienced during camp and characteristics of volunteer staff.</li> <li>Results do not clearly identify what type of support is more effective.</li> </ul>	Insufficient sample size; research question clearly stated; study context clearly described; role of the researcher clearly described; sampling strategy appropriate for research question; method of data collection clearly described; method of data analysis clearly described; analysis appropriate for research question.	6
Conrad AL, Altmaier EM (2009) [3]	Analysis of emotional / behavioral adjustment and levels of social support at post-camp attendance.	25 families, campers ages 9–18 years old diagnosed with cancer, 85% returning attendees.	<ul style="list-style-type: none"> <li>Adjustment, as rated by parent, following camp attendance was not significantly different from that of a similar clinical group not included in study or that of the general population.</li> <li>Camp attendees reported higher frequency of emotional/esteem-enhancing support over other tangible-support.</li> <li>Adjustment scores were not significantly correlated with level of support during camp attendance.</li> <li>Findings may be influenced by gender differences in activities experienced during camp and characteristics of volunteer staff.</li> <li>Results do not clearly identify what type of support is more effective.</li> </ul>	Research question clearly stated; method of data collection clearly described; insufficient sample size; sample strategy inappropriate for research question-lack of baseline data: sample setting/sample experience not uniform or structured.	6

(Continued)

SUPPLEMENTAL TABLE I. (Continued)

Study	Design	Sample	Findings*	Study Rigor	Level of evidence
Corey AL, Haase JE, Azzouz F, Monahan PO (2008) [4]	Secondary analysis of data from two earlier studies to describe the relationships between support and pain, fatigue, depression, and insomnia; original data cross-sectional.	Sample 1: 127 AYA (11–26 years) with current or previous cancer diagnosis; Sample 2: 72 newly diagnosed AYA (10–21 years).	<ul style="list-style-type: none"> <li>Groups differed with newly diagnosed sample reporting significantly greater perceived support from friends, family, and healthcare providers.</li> <li>Higher perceived support from healthcare providers (but not friends or family) associated with less insomnia.</li> <li>Social support not associated with ratings of pain or fatigue.</li> <li>Higher perceived support from family, friends or healthcare provider associated with better mental health.</li> <li>Girls with higher perceived family and healthcare provider support had less depression.</li> </ul>	Adequate sample size; no selective reporting; analysis appropriate for study question.	6
Dunsmore J, Quine S (1995) [5]	Exploratory, cross-sectional, descriptive study evaluating AYA information, support and decision-making needs.	AYA with cancer (n = 51; 27 males) 12–24 years old.	<ul style="list-style-type: none"> <li>Respondents reported that they would like to discuss information related to their cancer and treatment with a physician first followed by another teenager with cancer.</li> <li>Respondents reported that they would like to talk about their feelings first with parents, followed by a teenager with cancer.</li> <li>Most respondents (n = 47) participated in peer-group discussions with young people with cancer and 44 of them found these discussions helpful.</li> </ul>	Moderate sample size; inappropriate sampling methods.	6
Ellis SJ, Drew D, Wakefield CE, Saikal SL, Punch D, Cohn RJ (2013) [6]	Pilot/feasibility study of videoconferencing program.	8 parents, 3 patients and 5 teachers (n = 16) of children between 5–18 years who participated in the Connectivity Project.	<ul style="list-style-type: none"> <li>Parents reported that videoconferencing provided the family with a sense of normalcy and connection.</li> <li>Stronger relationships with classmates and teachers.</li> <li>Improved peer acceptance.</li> </ul>	Insufficient sample size; cost and time barriers; technical and logistical difficulties.	3
Enskar K, von Essen L (2007) [7]	Cohort, descriptive study utilizing a survey (Life Situation Scale for Adolescents) given at pediatric ward in Sweden.	Convenience sample of 54 AYA (15 on treatment, 39 off-treatment; mean age 16 years old (age 13–22), 27 female/25 male).	<ul style="list-style-type: none"> <li>60% on treatment reported often feeling alone compared to 54% off treatment.</li> <li>87% on treatment reported feeling isolated in the hospital compared to 74% off treatment.</li> <li>100% of both groups reported that friends supported them.</li> </ul>	Research questions clearly stated; measures with adequate psychometric properties utilized; insufficient sample size; losses to follow-up; use of self-report data only.	6

(Continued)

SUPPLEMENTAL TABLE I. (Continued)

Study	Design	Sample	Findings*	Study Rigor	Level of evidence
Enskar K, von Essen L (2008) [8]	One time self-report questionnaire on physical health and psychosocial function.	39 children aged 7–12 years who presented within the study window and were either on (n = 17) or off cancer treatment (n = 22).	<ul style="list-style-type: none"> <li>• More children on vs off treatment reported that they couldn't play every game they wanted and felt isolated in their hospital room.</li> <li>• Fewer children on vs off treatment reported that they could play with friends as much as they liked.</li> <li>• Of the 16 children who reported their life was less satisfying, 75% felt isolated in their hospital room.</li> <li>• Children who reported a satisfying life were more likely to report that they get to play with friends as often as they would like (<math>p &lt; .05</math>).</li> </ul>	Insufficient sample size; no selective reporting; appropriate analysis; study completed as planned.	6
Haluska HB, Jesse PO, Nagy MC (2002) [9]	Cross-sectional survey to compare the perceived social support and degree of satisfaction with support of adolescents with cancer and healthy controls.	64 adolescents aged 12–19 years old with cancer and attending a camp for teens with cancer and 115 healthy adolescents.	<ul style="list-style-type: none"> <li>• Adolescents with cancer and healthy controls had a similar number of social supports in their lives and were similarly satisfied with the degree of support provided.</li> <li>• Adolescents with cancer reported having more support from parents than healthy controls.</li> <li>• As the number of supports increased, so did satisfaction with that support. In the adolescents with cancer, this was particularly true if that support was from friends. In the healthy controls, it didn't matter if the support came from friends or parents.</li> </ul>	Adequate sample size but inappropriate sampling methods; no selective reporting.	4
Manne S, Miller D (1998) [10]	Cross-sectional study looking at the relationships between perceived support, conflict in relationships, and psychological distress.	50 AYA (age 12–20) on active treatment for cancer and healthy comparisons from previously published norms.	<ul style="list-style-type: none"> <li>• Adolescents with cancer report more conflict with parents than healthy comparisons. No differences in sibling or friend conflict.</li> <li>• Positive support from family and friends was not predictive of psychological distress; however, maternal conflict accounted for distress, even after family and friend supports were accounted for.</li> </ul>	Adequate sample size; no selective reporting, analysis appropriate for study question.	4

(Continued)

**SUPPLEMENTAL TABLE I. (Continued)**

Study	Design	Sample	Findings*	Study Rigor	Level of evidence
Martiniuk, AC, Amylon MD, Briery BG, Shea-Perry M, Kelsey KP, Lam GW, Körver S (2014) [11]	Quantitative descriptive cross-sectional study. Used standardized perceived change questionnaire administered post-camp attendance to assess impact of camps on learning (in younger children) and friendship (in older children).	N = 518 (298 = ages 8–19, 120 = ages 6–9) Sample obtained from pediatric oncology camps in North America.	<ul style="list-style-type: none"> <li>Younger campers reported learning about friendship and family citizenship and increased competence, independence and interest in teamwork/responsibility.</li> <li>Older campers perceived increase in friendship skills and enjoyment of time spent with others.</li> <li>Study outcomes related to attendance to camps represented by the Children's Oncology Camping Association International (COCA-I).</li> </ul>	Research question clearly stated; adequate sample size; results from statistical analysis not clearly described-lack of comprehensive reporting; limited outcome domains; lack of baseline data.	6
Maurice-Stam H, Oort FJ, Last BF, Grootenhuis MA(2009) [12]	Cross-sectional study aimed at determining which variables best predict HRQL.	353 young adult (aged 18–30 years) Dutch cancer survivors, diagnosed with cancer before age 18 years and off treatment for at least 5 years.	<ul style="list-style-type: none"> <li>Social support had no significant effect on HRQL.</li> </ul>	Adequate sample size; no selective reporting; analysis appropriate for study question; incomplete outcome data addressed.	6
Maurice-Stam H, Silberbusch L, Last BF, Grootenhuis MA (2009) [13]	Quasi-experimental pilot study (intervention with no control group) of outcomes following a 6 session group interventions focused on 1) information seeking and giving about disease, 2) relaxation, 3) social competence, and 4) positive thinking.	10 Dutch children (aged 8–12 years) who completed cancer treatment within the past 6 years and their parents.	<ul style="list-style-type: none"> <li>Half of the children reported an improvement in their ability to explain their disease to others. The remainder reported that it was more difficult to talk to their friends about their disease after the intervention.</li> <li>Parents reported that attending a group with other survivors was beneficial to their child.</li> <li>Low response (20%) to the invitation to participate in the group. Authors feel this was due to accessibility (offered to patients at one facility only).</li> </ul>	Inadequate sample size; no selective reporting; analysis appropriate for study question; incomplete outcome data addressed.	3
Meltzer L, Rourke M (2005) [14]	Pre-post design using Self-Perception Profile and Social Loneliness Measure.	34 adolescents aged 13–18 years (primarily cancer survivors) who attended a summer camp for children with cancer.	<ul style="list-style-type: none"> <li>Adolescents viewed themselves as more similar to peers with cancer at camp than peers at home.</li> <li>Self-concept improved from pre-camp levels but there was no measurable change in social isolation.</li> <li>The more different adolescents felt from their peers, the more loneliness and social isolation they experienced.</li> </ul>	Clear research question; appropriate design and measures but only two questions used to evaluate social comparison.	4

(Continued)



SUPPLEMENTAL TABLE I. (Continued)

Study	Design	Sample	Findings*	Study Rigor	Level of evidence
Neville K (1998) [15]	Quantitative, cross-sectional, descriptive using questionnaires.	60 adolescents (ages 14–22).	<ul style="list-style-type: none"> <li>Perceived social support was significantly negatively correlated with illness uncertainty.</li> <li>Uncertainty was significantly positively correlated with psychological distress.</li> <li>Perceived social support was significantly negatively correlated with psychological distress.</li> <li>Uncertainty most associated with psychological distress in the context of low perceived social support (moderation).</li> </ul>	Research question clearly stated; study context and role of research clearly stated; appropriate sampling strategy; data collection and analyses clear.	6
Nichols ML (1995) [16]	Cross-sectional, self-report data on structure and function of social support systems utilizing Norbeck Social Support Questionnaire (NSSQ) and the Adolescent Coping Orientation for Problem Experience (A-COPE).	Adolescents with cancer aged 10–16 years old (n = 20; 15 males).	<ul style="list-style-type: none"> <li>Adolescents with cancer reported a range of 2–13 people in their social support network.</li> <li>93% of respondents reported daily or weekly contact with friends.</li> <li>Positive correlation between functional support and coping indicating that adolescents with more support reported higher coping scores.</li> </ul>	Insufficient sample size; sampling methods not well defined.	6
Noll RB, Gartstein MA, Vannatta K, Correll J, Bukowski WM, Davies WH (1999) [17]	Case control study comparing peer relationships, well-being and behavior. Self-report questionnaires and WISC-R.	Children with cancer aged 8–15 years receiving chemotherapy, excluding brain tumors were compared to same aged classroom peers by parent, self, teacher and peer report. Data collected for 70 children with cancer after phase II of study.	<ul style="list-style-type: none"> <li>Compared to case controls, children with cancer were perceived by teachers as more social, by teachers and peers as being less aggressive and by peers as having greater social acceptance.</li> <li>Measures of depression, anxiety, loneliness and self-concept showed no significant differences.</li> </ul>	Sufficient sample size; no selective reporting; correct analysis; minimal losses to follow-up.	4
Reiter-Purtill J, Vannatta K, Gerhardt CA, Correll J, Noll RB (2003) [18]	Longitudinal, case control study evaluating social difficulties in children 2 years post cancer treatment.	69 children with cancer (CCT) 9–17 years of age compared with 77 comparison peers (COMP) through parent, self, teacher and peer report.	<ul style="list-style-type: none"> <li>No significant differences were obtained on the Revised Class Play or on any measures of social acceptance.</li> <li>CCTs demonstrated better stability in self-reported prosocial scores.</li> <li>Peers perceived CCTs as sicker, more tired and as missing more school.</li> <li>Children who received a more intensive treatment were perceived by peers as more prosocial and less aggressive; however, they had fewer best friends 2 years later.</li> </ul>	Sufficient sample size; no selective reporting; correct analysis; multi-informant data; minimal losses to follow-up.	4

(Continued)

SUPPLEMENTAL TABLE I. (Continued)

Study	Design	Sample	Findings*	Study Rigor	Level of evidence
Salley CG, Hewitt LL, Patenaude AF, Vasey MW, Yeates KO, Gerhardt C, Vannatta K (2014) [19]	Case control study evaluating temperament and social behavior utilizing self-report questionnaires.	75 children aged 8–15 years who were 1–5 years post treatment for a brain tumor.	<ul style="list-style-type: none"> <li>Survivors were perceived by classmates as lower in leadership-popularity and higher in sensitive-isolated and victimization.</li> <li>Survivors had lower surgency/positive affect compared to peers.</li> <li>Parents rated survivors as demonstrating less effortful control.</li> <li>Group differences in social behavior were not consistently accounted for by effortful control.</li> </ul>	Research questions clearly stated; measures with strong psychometric properties utilized; sufficient sample size; appropriate analyses; multi-informant data.	4
Vannatta K, Gerhardt CA, Wells RJ, Noll RB 2007 [20]	Quantitative, cohort study using multi-informant data collection.	82 cancer survivors who had completed treatment for leukemia, lymphoma and solid tumors aged 9–17 years.	<ul style="list-style-type: none"> <li>Children who received more CNS-directed treatment received lower peer acceptance ratings, more likely to be viewed as socially isolated and were less likely to be identified as a friend.</li> <li>Associations of CNS treatment intensity and social acceptance/friendship were only significant for boys and children younger at diagnosis.</li> <li>Children with more CNS-directed treatment at a younger age were associated with higher levels of aggressive-disruptive behavior and less prosocial by teacher report.</li> </ul>	Research questions clearly stated; measures with strong psychometric properties utilized; sufficient sample size; appropriate analyses; multi-informant data.	4
Vannatta K, Zeller M, Noll RB, Koontz K 1998 [21]	Case control study comparing peer relationships, well-being and behavior through self-report questionnaires.	48 children in school (aged 8–16 years) post-BMT and comparison peers.	<ul style="list-style-type: none"> <li>BMT survivors were selected more often for Passive-Anxious and Active-Isolation roles and were chosen by peers significantly less as a best friend.</li> <li>Teachers nominated BMT survivors significantly less often for aggressive-disruptive roles.</li> </ul>	Sufficient sample size; no selective reporting; correct analysis; minimal losses to follow-up.	4
Varni JW, Katz ER (1997) [22]	Quantitative, descriptive. Questionnaires completed at diagnosis, 6 months post-diagnosis, and 9 months post-diagnosis.	32 children with cancer aged 8–13 years (M = 10.2 years); 15 boys.	<ul style="list-style-type: none"> <li>Perceived stress and perceived social support associated with negative affectivity at 9 months post-diagnosis although findings of associations of perceived social support with negative affectivity are less strong.</li> <li>Cognitive-behavioral interventions targeting stress and support are indicated.</li> </ul>	Research questions clearly stated and based on theoretical framework (cognitive-behavior therapy/risk and resistance models); measures with strong psychometric properties utilized; insufficient sample size; large losses at follow-up; incorrect analyses in that conducted multiple regression analyses with insufficient sample.	6

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SUPPLEMENTAL TABLE I. (Continued)

Study	Design	Sample	Findings*	Study Rigor	Level of evidence
Wellisch DK, Crater B, Wiley FM, Belin TR, Weinstein K (2006) [23]	Pre-post evaluation of camp (baseline, immediately post-camp, 4–6 months later).	31 patients and 35 siblings (7–17 years) at all three time points.	<ul style="list-style-type: none"> <li>Pre-post changes not found for siblings on measures of depression but were observed at 4–56 month follow-up for patients. No change for total score on CBCL.</li> <li>Both patients and siblings endorsed positive memories of activities at camp.</li> </ul>	Research questions clearly stated; measures with strong psychometric properties utilized; insufficient sample size; incorrect analyses (t-tests instead of repeated measures ANOVA); losses to follow-up, use of self-report data only.	3
Wesley KM, Zelikovsky N, Schwartz LA (2013) [24]	Descriptive cohort study of physical functioning, affect and social support for adolescents on cancer treatment.	Adolescents aged 13–19 years currently undergoing cancer treatment (n = 102).	<ul style="list-style-type: none"> <li>Adolescents report average levels of positive and negative affect.</li> <li>Patients with a greater number of physical symptoms reported high amounts of negative affect.</li> <li>Adolescents reported high levels of social support from friends and family.</li> <li>Perceived social support from both friends and family were not related to physical symptoms.</li> <li>Perceived social support from friends was related to positive affect.</li> <li>Perceived social support not directly related to negative affect.</li> <li>Female patients reported significantly lower social support from friends and higher levels of negative affect.</li> </ul>	Sufficient sample size; no selective reporting; correct analysis.	6
Zebrack B, Block R, Hayes-Lattin B, Embry L, Aguilar C, Meeske KA, Li Y, Butler M, Cole S (2013) [25]	Longitudinal survey of AYA patients with cancer assessed psychosocial support service use and unmet needs 4 times over 2 years following initial diagnosis.	215 AYA ages 14–39; age was stratified across 3 age groupings: 14–19 years included 97 patients treated in pediatric setting.	<ul style="list-style-type: none"> <li>Teens were more likely than young adults to utilize camps/retreats, mental health counseling, religious/spiritual counseling and family counseling.</li> <li>25% of teens reported camps and retreat programs were an unmet need.</li> </ul>	Moderately sized and ethnically diverse, multi-institutional sample of AYA; no large losses to follow up or missing data.	6
Zebrack B, Butler M (2012) [26]	Part of prospective longitudinal study – within 4 months of diagnosis, again at 6–12 months after baseline.	215 AYA (14–39 years) with new cancer diagnosis (14–19 years n = 103).	<ul style="list-style-type: none"> <li>Within first 4 months, 42% of adolescents reported a need for peer support programs.</li> <li>At time 2 (12 months later), 59% of adolescents reported a need for peer support.</li> </ul>	Sufficient sample size; no selective reporting; correct analysis; no missing data.	4

(Continued)

Study	Design	Sample	Findings*	Study Rigor	Level of evidence
<p><b>Qualitative</b>                      Anderzen-Carlsson A, Sorlie V, Kihlgren A (2012) [27]</p>	<p>Qualitative descriptive study using semi-structured interviews to examine adolescents' perspectives of coping with cancer-related fear.</p>	<p>N = 6 adolescent girls between the ages of 14–16 years who were off treatment for leukemia or solid tumors (1.5–6 years post-diagnosis) in Sweden.</p>	<ul style="list-style-type: none"> <li>6 themes emerged from the adolescent girls, one of which indicated that support from family, friends, hospital staff, and teachers were important for dealing with cancer-related fear.</li> <li>Girls reported fears related to losing their friends due to cancer. Some friendships ended whereas others became closer.</li> <li>Nursing staff, play therapist and hospital teachers provided distraction which helped the adolescent girls cope with fearful situations.</li> </ul>	<p>Research objective clearly stated; qualitative approach clearly justified; study context and role of researchers clearly described; researchers reported using purposeful sampling but no adolescent males were included in the sample; limited details provided about interview questions; content analysis appropriate.</p>	6
<p>Balen R, Fielding D, Lewis IJ (1998) [28]</p>	<p>Questionnaire with open- and closed-ended (Likert response) questions. Completed at home and mailed-in.</p>	<p>135 parents (mostly mothers) of children 9–16 years old with primarily leukemia or solid tumor diagnoses.</p>	<ul style="list-style-type: none"> <li>Families of children who are confident, active and able to separate from parents were more likely to enroll their children in a one-week camp program.</li> <li>Parents who encourage independence and new experiences were more likely to enroll their children in a one-week camp program.</li> <li>Parents must find balance between protection and independence for their children with cancer in order to allow children to engage in social activities such as camp.</li> </ul>	<p>Research question clearly stated; method of data collection clearly described; sampling strategy appropriate to research question; no psychometric properties reported for the questionnaire; coding of qualitative data is not described.</p>	6
<p>Beckwith AE (2014) [29]</p>	<p>Qualitative analysis of telephone interviews during which participants were asked to describe their camp experiences, what camp means to them and motivation for returning to camp as a counselor or participant.</p>	<p>23 adult survivors of childhood cancer who had cancer between the ages of 1 and 18 years recruited from one of eight childhood cancer camps.</p>	<ul style="list-style-type: none"> <li>Three themes were identified: normalcy (opportunity to feel normal, engage in typical activities, and connect with other adult childhood cancer survivors), meaningful camp experiences (give back to camp and other children with cancer) and access to information.</li> <li>Camps can reduce sense of isolation, promote friendships, and identify with other campers.</li> </ul>	<p>Research question clearly stated; qualitative approach clearly justified; study context clearly described; role of the researcher clearly described; method of data collection clearly described; method of data analysis clearly described and appropriate to research question.</p>	6
<p>Berrios-Rivera R, Rivero-Vergne A, Romero I (2008) [30]</p>	<p>Qualitative study using semi-structured interviews of adolescents and a parent to capture their hospital experience.</p>	<p>7 children and adolescents aged 6–17 years with ALL who completed treatment and were in remission during the last 1–4 years.</p>	<ul style="list-style-type: none"> <li>Patients described visits from family, friends, and celebrities as positive.</li> <li>Well-decorated room, watching TV, drawing and crafts described as making the hospitalization positive and safe.</li> <li>Relationship developed between mothers and patients with the oncology team contributed to a positive experience.</li> </ul>	<p>Research question clearly stated; qualitative approach justified; study context clearly described; role of the researcher clearly described; method of data collection clearly described; method of data analysis clearly described; analysis appropriate for research question.</p>	6

(Continued)

SUPPLEMENTAL TABLE I. (Continued)

Study	Design	Sample	Findings*	Study Rigor	Level of evidence
Boydell KM, Stastulis E, Greenberg M, Greenberg C, Spiegler B (2008) [31]	Qualitative analysis of focus groups and in-depth interviews. Secondary analysis of data from a larger study of school/vocational program for survivors with significant neurocognitive late effects transitioning to adulthood.	14 survivors of childhood brain tumors (17–29 years old) in Canada and 22 family members.	<ul style="list-style-type: none"> <li>• Themes comprise contradictory concepts of: integration/isolation, realistic/unrealistic goals, and the need for special help/no help.</li> <li>• Contradictory factors result in acceptance of and resistance to feelings of competence.</li> <li>• Social life limited and motivation for remaining in school is in part social (being with peers and forging new friendships).</li> <li>• Feelings of not fitting in and difficulty with social interaction are related to loneliness.</li> </ul>	Research question clearly stated; qualitative approach justified; study context clearly described; role of researcher described; method of data collection described; method of data analysis described and appropriate.	6
Cassano J, Nagel K, O'Mara L (2008) [32]	Qualitative descriptive study to explore adolescent perceptions of a teen support group.	11 Canadian adolescents with cancer (age 14–20 years) who participated in teen activities organized by the hospital.	<ul style="list-style-type: none"> <li>• Satisfying elements of the group: 1) talking to others who “just know,” 2) sharing experiences and having fun, and 3) inspiring or receiving hope.</li> <li>• Challenges in the group: 1) finding appropriate activities for those with physical challenges, and 2) dealing with the death of a group member.</li> </ul>	Research question clearly stated; approach justified; study context and role of researcher not clearly defined; appropriate sampling strategy; data collection and analysis not clearly defined.	6
Cavusoglu H (2000) [33]	Descriptive study utilizing demographic data and semi-structured interview of adolescents to determine problems faced.	Adolescents 13–18 years old at least 1 year into treatment for ALL (n = 30).	<ul style="list-style-type: none"> <li>• 16 adolescents reported social problems (e.g., reduction in peer relationships and interruption of school).</li> <li>• Social problems increased in the treatment and recurrence stages.</li> <li>• All adolescents said their peer relationships were affected by cancer.</li> <li>• 77% reported peer relationships decreased whereas 23% reported their friendships increased.</li> </ul>	Insufficient sample size; no selective reporting; appropriate analysis; study completed as planned; no significant losses to follow up or missing data./	6

(Continued)

**SUPPLEMENTAL TABLE I. (Continued)**

Study	Design	Sample	Findings*	Study Rigor	Level of evidence
D'Agostino NM, Edelstein K (2013) [34]	Qualitative analysis of focus group interviews using thematic analysis. Questions focused on challenges for survivors and recommendations for programming.	22 young adult survivors of childhood cancer (18–35 years old) selected based on current age, age at diagnosis, type of cancer.	<ul style="list-style-type: none"> <li>Common challenges were physical appearance, late effects, social relationships (disclosure, feelings of isolation), and changing priorities.</li> <li>Those diagnosed as young adults noted challenges gaining financial independence and desire to protect parents.</li> <li>Those diagnosed with brain tumors noted challenges with neurocognitive late effects, limited career opportunities, and poor social skills.</li> <li>Resource needs include peer support (opportunities to connect with other young adults with cancer), professional counseling, and age-specific information about diagnosis, treatment, and late effects (such as fertility).</li> </ul>	Research question clearly stated; qualitative approach clearly justified; study context clearly described; sampling strategy appropriate for research question; method of data collection clearly described; method of data analysis clearly described and appropriate; refusal rate not reported.	6
Elwell L, Grogan S, Coulson N (2010) [35]	Qualitative (thematic) analysis of messages posted to computer-mediated support group for adolescents with cancer and survivors (Teens Living with Cancer).	Random sample 393 (of 1977) messages posted on a bulletin board over a period of 62 months posted by 151 unique senders in the UK.	<ul style="list-style-type: none"> <li>Provision of informational support (treatment fears, diet, continuing to play sports, cancer camps, media) and emotional support (I'll pray for you, keep fighting, losing friends, struggling with school, I know what it's like) are frequent.</li> <li>Adolescents access the group with requests for social support and to provide social support.</li> <li>Research examining benefits of receiving social support through computer-mediated support groups is needed.</li> </ul>	Research question clearly stated; study context clearly described; role of the researcher/who completed the coding is not noted; coding focused only on informational and emotional support may have limited identification of range of reasons adolescents accessed the computer-mediated support group.	6

(Continued)

SUPPLEMENTAL TABLE I. (Continued)

Study	Design	Sample	Findings*	Study Rigor	Level of evidence
Enskar K, Carlsson M, Golsater M, Hamrin E (1997) [36]	Qualitative study using interviews with open-ended questions to identify adolescents' experiences about disease-related problems.	N = 10 AYA (7 females, 3 males) ages 15–20 years who are 1.2–15 years post-diagnosis in Sweden.	<ul style="list-style-type: none"> <li>• Themes that emerged included youth association groups for adolescents with cancer were supportive by providing an opportunity to meet same-aged peers with cancer especially when other friendships diminished.</li> <li>• Relationship to best friends strongest initially during treatment but some friends disappeared especially as treatment progressed.</li> <li>• Nearness to family increased during treatment but adolescents also described a need for privacy.</li> <li>• The greatest support came from family.</li> <li>• The need for professional support from a psychologist or social worker if the cancer treatment was long.</li> </ul>	Research objective clearly stated; qualitative approach clearly justified; study context and role of researchers clearly described; researchers reported using purposeful sampling but the majority of sample was female; some AYA were recruited to complete interviews by study participants so the sample may not be representative; method of data collection and analysis clearly described and appropriate.	6
Enskar K, von Essen L (2000) [37]	Single time point, structured interview; qualitative study of children, parents and nurses perspectives on important caring and support needs.	25 children hospitalized for cancer treatment aged 8–12 years, parents (n = 31) and nurses for each represented child (n = 32).	<ul style="list-style-type: none"> <li>• Children's most frequently mentioned needs were social competence, amusement and satisfaction of basic needs.</li> <li>• Parents and nurses most frequently mentioned needs of the children were information, social competence and participation in decision making.</li> <li>• 2/3 of the children and 1/3 of nurses felt children did not need any help, whereas only 4 parents thought their children didn't need help.</li> <li>• Parents reported that children most need emotional support, rehabilitation, school support and help meeting friends.</li> </ul>	Insufficient sample size; appropriate reporting; appropriate analysis; study completed as planned; no significant losses to follow up or missing data.	6

(Continued)

SUPPLEMENTAL TABLE I. (Continued)

Study	Design	Sample	Findings*	Study Rigor	Level of evidence
Fern L, Taylor RM, Whelan J, Pearce S, Grew T, Brooman K, Starkey C, Millington H, Ashton J, Gibson F (2013) [38]	Qualitative study based upon participatory research methods using semi-structured peer-to-peer interviews to explore AYA cancer experience.	11 AYA (aged 13–25 years) in England who were diagnosed and treated with cancer in the last 5 years.	<ul style="list-style-type: none"> <li>8 themes emerged from AYA responses, one of which indicated that peer contact with cancer survivors after diagnosis was an important source of emotional support. Peer interaction should be patient-initiated in a natural environment versus enforced by health care providers.</li> <li>Nurses were described as good listeners and promoted social interaction.</li> </ul>	Research objective stated; qualitative approach justified; study context not clearly described; role of the researchers not clearly described (some participants also participated in a research role); sampling strategy appropriate for the research question; method of data collection and analysis lacking details.	6
Gillard A, Watts CE (2013) [39]	Qualitative study of the recreational camp experience of youth with cancer.	Semi-structured interviews of campers aged 8–14 years (n = 22), adult staff members (n = 19), 4 JR counselors aged 18–20 years who were former campers and from observations (data from pilot program used in analyses).	<ul style="list-style-type: none"> <li>Increased positive attitudes was one theme that emerged (e.g., increased sociability).</li> <li>Another theme was proximity to others who are alike due to cancer.</li> <li>Positive relationships between campers and staff made them feel more valued.</li> </ul>	Research question clearly stated; role of researcher not described; convenience sample; analysis appropriate.	6
Gonzalez-Morkos B, Zavala O, Malogolowkin M, Kuperberg A (2014) [40]	Qualitative study looking at teens perspectives about a web-based support group in response to the H1N1 flu pandemic called Teen Impact (TI).	Adolescents on cancer treatment (n = 6) aged 15–18 years.	<ul style="list-style-type: none"> <li>TI provides year-round clinical social therapy, twice monthly groups, retreats, adventure therapy overnights and special events with the goal to mitigate psychosocial effects and social isolation the diseases impose.</li> <li>Long term TI members did not feel fulfilled with webcast; missed connections and interactions.</li> <li>New members appear to have benefitted from avenue of support which increased interest in the face to face group.</li> </ul>	Small sample size; no formal pre or post survey; regarding role of researcher not defined; methodology not defined.	6

(Continued)



SUPPLEMENTAL TABLE I. (Continued)

Study	Design	Sample	Findings*	Study Rigor	Level of evidence
Hokkanen H, Eriksson E, Ahonen O, Salanterä S (2004) [41]	Qualitative, focus groups to describe what adolescents with cancer think about their experience.	20 Finnish adolescents (age 13–18 years) with cancer attending a cancer adjustment camp.	<ul style="list-style-type: none"> <li>• Illness affected relationship with parents, making it more difficult to gain independence.</li> <li>• Changes in friendship experienced, some friendships lost during periods of isolation, others strengthened.</li> <li>• Bullied at school due to changes in appearance and physical abilities.</li> <li>• Parents, extended family, and teachers sources of support but friends remain primary supporters.</li> <li>• Wished there had been more face-to-face or internet opportunities to connect with others their age with cancer.</li> </ul>	Research question clearly stated; approach justified; study context and role of researcher not clearly defined; appropriate sampling strategy; data collection and analysis clearly defined.	6
Katz L, Leary A, Breiger D, Friedman D (2010) [42]	Case control study; observational methods to assess quality of peer relationships; children audiotaped as they engaged in free play with their best friend and interactions were coded to assess their ability to maintain engagement.	ALL survivors aged 7–12 years old as compared to healthy children (n = 26).	<ul style="list-style-type: none"> <li>• Dyads with survivors of childhood cancer were less likely to be highly engaged with their best friend and more likely to experience disengagement than dyads with healthy participants.</li> <li>• Data suggests that interventions that target skills specifically aimed at increasing peer engagement and reducing disengagement have the greatest likelihood of mitigating against social isolation commonly reported in childhood cancer survivors.</li> </ul>	Insufficient sample size; No selective reporting; incorrect analysis; no large losses to follow-up or missing data.	4
Kyngas H, Mikkonen R, Nousiainen EM, Ryttilähti M, Seppänen P, Vaattiovaara R, Jamsa T (2001) [43]	Qualitative analysis of interview data/thematic analysis.	14 AYA with cancer (aged 16–22 years).	<ul style="list-style-type: none"> <li>• Emotion-focused, appraisal-focused and problem-focused coping strategies were used.</li> <li>• The major coping strategies were social support, belief in recovery and getting back to normal life as soon as possible.</li> <li>• Emotional support from family was a coping resource.</li> </ul>	Research question clearly stated; sampling method not identified; unclear role of the researcher.	6
Ljungman G, McGrath PJ, Cooper E, Widger K, Ceccolini J, Fernández CV, Frager G, Wilkins K (2003) [44]	Cross-sectional structured telephone interview about the needs of children with cancer from the perspective of parents and adolescents.	56 families, including 56 parents of a child with a malignancy (M age of child = 8.9 years) and 13 adolescents (M age = 14.8 years).	<ul style="list-style-type: none"> <li>• Parents and adolescents rated needs on a 0–10 scale: Average of adolescents' ratings of peer support needs was 7.20 and how well they were met was 4.90.</li> <li>• Parents' average endorsement of their belief that their child would like informal contact with peers was 6.50 and felt those needs were being met at 4.0.</li> </ul>	Insufficient sample size; no selective reporting; appropriate analysis; study completed as planned; no significant losses to follow up or missing data.	6

(Continued)

SUPPLEMENTAL TABLE I. (Continued)

Study	Design	Sample	Findings*	Study Rigor	Level of evidence
Olsen PR, Harder I (2009) [45]	Grounded theory study/qualitative program evaluation of Network-Focused nursing program.	12 male adolescents aged 15–22 years old (M age = 19.5 years) with solid tumors and 19 significant others (17 parents, 2 partners).	<ul style="list-style-type: none"> <li>Two subcategories: Embracing the program and Building Strength.</li> <li>Adolescents and significant others were aware of significance of telling social network about their situation.</li> <li>Adolescents in this study found to make efforts to avoid being left behind or outside of their social circle.</li> <li>Shift in attention from “illness in the foreground” to “wellness in the foreground.”</li> </ul>	Research question clearly stated; qualitative approach clearly justified; study context clearly described; role of the researcher clearly described; sampling strategy appropriate for research question; method of data collection clearly described; method of data analysis clearly described.	6
Olsen PR, Harder I (2010) [46]	Qualitative—integrated model and Hybrid model to explore and clarify the concept of network-focused nursing (designed to identify social network, improve communication, and increase involvement for teens and young adults with cancer).	Fieldwork or observational study of 7 nurses, 12 adolescents aged 15–22 years, and 19 significant others over a 17 month period.	<ul style="list-style-type: none"> <li>Network-focused nursing = care in which nurses are in tune to and support social relationships as part of healing process.</li> <li>Antecedents = risk of social isolation, acknowledged need for social support.</li> <li>Attributes = reaching beyond the family to activate all parts of the AYA social network.</li> </ul>	Research question clearly stated; qualitative approach clearly justified; study context clearly described; procedure for literature review not described; data analysis for synthesis of fieldwork observations not described.	5
Palmer L, Erickson S, Shaffer T, Koopman C, Amylon M, Steiner H (2000) [47]	Qualitative study of themes arising in adolescent support groups.	Adolescents with cancer and their parents who participated in support groups aged 11–19 years (sample size not reported).	<ul style="list-style-type: none"> <li>Adolescents experienced changes and challenges in peer relationships following the diagnosis of cancer, including withdrawing from peer groups due to concerns that they were misunderstood.</li> </ul>	Research question not clearly stated; qualitative approach justified; study context not clearly described; role of the researcher not described; sampling strategy not appropriate for research question; method of data collection not clearly described; method of data analysis not clearly described.	6
Patterson P, Millar B, Desille N, McDonald F (2012) [48]	Needs-based qualitative study including a focus group & 1-1 interviews	14 young adults with a cancer diagnosis (9 focus group, 5 individual interview); 12–22 years at diagnosis; 11 off treatment; 8 female.	<ul style="list-style-type: none"> <li>One emerging theme was interpersonal support from family, friends, and partners.</li> <li>Individual comments noting support from friends as important but that friends were unsure what to say.</li> </ul>	Research question clearly stated; qualitative approach clearly justified; study context clearly described; role of the researcher clearly described; sampling strategy appropriate for research question; method of data collection clearly described; method of data analysis clearly described.	6

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SUPPLEMENTAL TABLE I. (Continued)

Study	Design	Sample	Findings*	Study Rigor	Level of evidence
Ritchie MA (2001) [49]	Qualitative descriptive study to identify who are the primary sources of emotional support and how helpful their support was in helping them cope with cancer.	N = 45 adolescents diagnosed with cancer who were between the ages of 12–18 years (24 male, 21 female); majority receiving active treatment.	<ul style="list-style-type: none"> <li>Parents and friends were the most frequently reported sources of emotional support and described them as very helpful to them.</li> <li>Supportive behaviors provided by mothers were described as accompanying patients to clinic for treatment and during hospitalizations, talking to and comforting them, and understanding the treatment.</li> <li>Participants described being comforted by friends' support despite them not being able to understand the cancer experience.</li> <li>Single occupancy rooms fostered greater interaction of parent with child.</li> </ul>	Research question clearly stated; justification for qualitative approach not reported but approach appropriate for the research question; study context clearly described; role of researcher not reported; sampling strategy (convenience sample) appropriate for the research question; method of data collection and analysis not clearly described.	6
Rollins JA (2009) [50]	Examination of how policies on space at a UK hospital and a US hospital affect children's ability to use social interaction as strategy to cope with the stress of cancer. Reviewed children's drawings, interviews, and observations as well as floor plans. Assumption is that families need both privacy and social interaction to cope.			Research question clearly stated; role of researcher clearly explained (however researcher collected and analyzed all data); problems with sampling strategy (unclear how these two wards were selected); no assessment of actual coping; no data collected on amount of social interaction.	6
Shama W, Lucchetta S (2007) [51]	Program evaluation of a gender-specific event coordinated by a teen outreach program.	10 female and 16 male Canadian adolescents (aged 14–19 years) with leukemia/lymphoma.	<ul style="list-style-type: none"> <li>The vast majority of teens were very satisfied with the event, met peers that they would consider approaching in the future, and find it important to connect with other teens with cancer</li> </ul>	Inadequate sample size; no selective reporting; analysis appropriate for study question.	4

(Continued)

SUPPLEMENTAL TABLE I. (Continued)

Study	Design	Sample	Findings*	Study Rigor	Level of evidence
Stegenga K, Ward-Smith P (2009) [52]	Qualitative, phenomenological semi-structured interviews.	10 adolescents (13–17 years old) newly diagnosed with cancer in the past 4–6 months.	<ul style="list-style-type: none"> <li>• Six themes emerged: (1) stunning loss of normalcy; (2) gaining information; (3) importance of friends and their reactions; (4) getting used to it; (5) giving back; (6) family support.</li> <li>• Adolescents noted desire to reengage in activities and receive support from friends.</li> <li>• Develop and test programs to support participation in activities with peers and to educate friends on how to support the adolescent with cancer.</li> <li>• Develop and test programs in which survivors provide information and support at the time of diagnosis.</li> <li>• Survivors described being more mature and having a different life perspective, values, and priorities than their peers.</li> <li>• Many survivors indicated having a different life perspective has a positive impact on their relationships but also posed challenges with forming close relationships with others, including potential romantic partners.</li> <li>• Survivors described difficulty disclosing cancer-specific and personal thoughts and feelings to peers or partners.</li> <li>• Over half of the survivors indicated that negative body image resulted in difficulty forming romantic relationships.</li> <li>• Adolescents described support from a “special friend” who stood by them through the cancer experience; for ¼ it was someone adolescent befriended in cancer clinic while most described them as a friend known prior to cancer.</li> <li>• Special friend helped the adolescent not feel lonely.</li> </ul>	Research questions clearly stated; qualitative approach clearly justified; study context clearly described; method of data collection clearly described; purposive sampling not defined and resulted in small, majority female sample of unknown diagnoses; unclear who completed coding.	6
Thompson CM, Long B, Marsland A (2012) [53]	Qualitative descriptive study using a semi-structured telephone interview to investigate perceptions of romantic relationships of emerging adult survivors of childhood cancer.	N = 18 female childhood cancer survivors (aged 19–25 years at time of evaluation and aged 2–15 years at time of diagnosis) who were 2 or more years off treatment; excluded brain tumor survivors.	<ul style="list-style-type: none"> <li>• Survivors described being more mature and having a different life perspective, values, and priorities than their peers.</li> <li>• Many survivors indicated having a different life perspective has a positive impact on their relationships but also posed challenges with forming close relationships with others, including potential romantic partners.</li> <li>• Survivors described difficulty disclosing cancer-specific and personal thoughts and feelings to peers or partners.</li> <li>• Over half of the survivors indicated that negative body image resulted in difficulty forming romantic relationships.</li> <li>• Adolescents described support from a “special friend” who stood by them through the cancer experience; for ¼ it was someone adolescent befriended in cancer clinic while most described them as a friend known prior to cancer.</li> <li>• Special friend helped the adolescent not feel lonely.</li> </ul>	Research question clearly stated; qualitative approach clearly justified; there were no male participants in the sample; study context and role of researches clearly described; method of data collection adequately described; data analysis appropriate but with limited details provided.	6
Woodgate RL (2006) [54]	Qualitative interviews from longitudinal interpretive study.	15 adolescent cancer patients between ages 12 and 18; 8 male, 12 leukemia/ lymphoma.	<ul style="list-style-type: none"> <li>• Adolescents described support from a “special friend” who stood by them through the cancer experience; for ¼ it was someone adolescent befriended in cancer clinic while most described them as a friend known prior to cancer.</li> <li>• Special friend helped the adolescent not feel lonely.</li> </ul>	Research question clearly stated; qualitative approach clearly justified; study context clearly described; role of the researcher not described; sampling strategy appropriate for research question; method of data collection adequately described; method of data analysis not thoroughly described.	6

(Continued)

SUPPLEMENTAL TABLE I. (Continued)

Study	Design	Sample	Findings*	Study Rigor	Level of evidence
<b>Systematic Reviews</b> Martiniuk A, Silva M, Amylon M, Barr R (2014) [55]	Systematic literature review of therapeutic/recreation camp.	581 articles published; 20 articles considered relevant and used for results section.	<ul style="list-style-type: none"> <li>Over past decade, expanded but limited evidence of research as therapeutic intervention.</li> <li>New findings show increase in HRQL, self-esteem and mood.</li> <li>Findings at times non-linear, suggesting need for repeated post-camp measures to allow for adjustment to daily living environment post-camp.</li> <li>Need remains for having larger samples, more constructs, sub-group analyses for different demographics and malignancies, and more data from post-camp attendance.</li> <li>Suggestions for future research to address specific therapeutic interventions at camp, continued use of standardized measures, use of control groups and use of combined qualitative/quantitative method.</li> <li>Overall, camps help children and siblings improve self-esteem and emotional skills.</li> </ul>	Important, relevant studies included; method of data collection clearly described; important outcomes considered.	1
National Comprehensive Cancer Network (NCCN) Guidelines (2015) [56]	NCCN's Clinical Practice Guidelines in Oncology for AYA.	Literature search on PubMed of relevant terms with 267 citations included in final reference list.	<ul style="list-style-type: none"> <li>Notes that support groups have been developed in a variety of formats.</li> <li>Social networking groups are particularly helpful in providing advice and empathy.</li> <li>Summer camps and adventure programs have resulted in improved self-confidence, independence, and social contacts.</li> <li>Many AYA less willing to participate in conventional support groups but more likely to participate in social networking with other patients and survivors.</li> <li>73% on therapy and 74% off treatment reported needs for retreats and camps were unmet.</li> </ul>	Right types of papers included; important, relevant studies included; appropriately assessed for quality of studies; important outcomes considered.	7

(Continued)

SUPPLEMENTAL TABLE I. (Continued)

Study	Design	Sample	Findings*	Study Rigor	Level of evidence
<p><b>Consensus Reports</b>                      D'Agostino NM, Penney A, Zebrack B (2011) [57]</p>	<p>Review, consensus paper utilizing evidence in the literature and information collected from an AYA workshop.</p>	<p>AYA who are or were being treated for cancer (15–29 years old).</p>	<ul style="list-style-type: none"> <li>To minimize developmental disruption caused by cancer and maintain a sense of normalcy, AYA need to sustain a sense of connection with peers.</li> <li>Peer support interventions offer opportunities for AYA to connect, share experiences, learn from each other and feel genuinely understood in an atmosphere that encourages age appropriate activities. These activities promote achievement of age-related developmental tasks and positive psychosocial growth.</li> </ul>	<p>Methodology of review or data collection not defined; difficult to determine appropriateness of articles included.</p>	7
<p>Morgan S, Davies S, Palmer S, Plaster M (2010) [58]</p>	<p>Summary of relevant issues related to being an AYA with cancer, particularly how the Teenage Cancer Trust is working to improve the physical environment to be more AYA friendly.</p>	<p>Not reported</p>	<ul style="list-style-type: none"> <li>AYA desire the support of healthy peers and those impacted by cancer. Treatment centers should facilitate this.</li> </ul>	<p>Right types of papers included; important, relevant studies included; did not appropriately assess for quality of studies; reasonable conclusions drawn; important outcomes were not considered.</p>	7
<p>Roberts CS, Turney ME, Knowles AM (1998) [59]</p>	<p>Informal review of 9 psychosocial issues: 1) Health concerns; 2) Family relationships; 3) Sexual and reproductive issues; 4) Peer relationships; 5) Body image; 6) School disruption; 7) Interaction with treatment teams; 8) Future goals and career and 9) Positive life changes. Also reviewed support groups.</p>	<p>Not reported</p>	<ul style="list-style-type: none"> <li>Highlighted social isolation in children and adolescents with cancer.</li> <li>Highlighted positive outcomes of support groups for adolescents with cancer.</li> </ul>	<p>Methodology of review not provided; relevant studies included; did not assess for quality of studies; important outcomes considered.</p>	7

(Continued)

SUPPLEMENTAL TABLE I. (Continued)

Study	Design	Sample	Findings*	Study Rigor	Level of evidence
Treadgold CL, Kuperberg A (2010) [60]	Review of current literature about peer support groups for AYA patients.	Not reported	<ul style="list-style-type: none"> <li>• Social support acts as a protective factor for adolescents going through cancer treatment.</li> <li>• Peer support groups offer psychosocial support, in addition to a forum to increase education about disease and coping strategies.</li> <li>• There are many different formats for support group (e.g., camp, online).</li> <li>• Barriers to utilization (e.g., broad age range, death of a group member, funding) exist and need to be addressed.</li> <li>• AYA can feel more isolated. They should be encouraged to connect with peers with and without cancer.</li> <li>• AYA should be encouraged to return to school as soon as possible to increase sense of normalcy and opportunities for social interaction.</li> </ul>	Right types of papers included; important, relevant studies included; appropriately assessed for quality of studies; reasonable conclusion; important outcomes considered.	7
Wilkins KL, D'Agostino N, Penney AM, Barr RD, Nathan PC (2014) [61]	Position statement from the Canadian Task Force on AYA 15–39 years old with cancer focusing on transition and how to increase a sense of control.	Not reported	<ul style="list-style-type: none"> <li>• Mixed results. In addition to support from parents, peer support is important in children and adolescents with cancer by both “healthy” peers and other children with cancer.</li> <li>• On the other hand, some research reported children with cancer reported receiving less help from peers.</li> <li>• In a comparison of children with cancer to healthy peers, had a reputation of being socially isolated but no other differences.</li> </ul>	Right types of papers included; important, relevant studies included; did not appropriately assess for quality of studies; important outcomes were not considered.	7
Woodgate RL (1999) [62]	Review of literature on social functioning of children with cancer.	Broadly defined social functioning and searched in Cancer-CD, CINH/L, HealthStar, Medline, PsycLit and Sociofile (not exhaustive review).		Right types of papers included although not an exhaustive list; important, relevant studies included; did not appropriately assess for quality of studies; reasonable to combine results in this way; important outcomes considered.	7

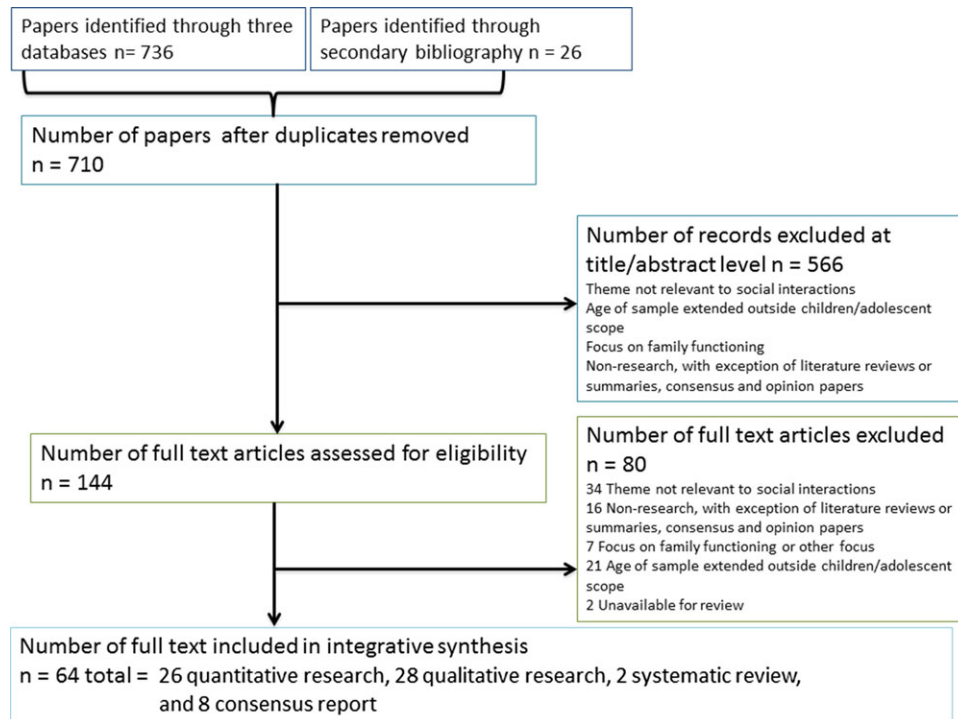
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**SUPPLEMENTAL TABLE I. (Continued)**

Study	Design	Sample	Findings*	Study Rigor	Level of evidence
Zebraek B (2011) [63]	Informal review of psychosocial issues of AYA; consensus.	Not reported	<ul style="list-style-type: none"> <li>● Identity development occurs within the context of social interaction.</li> <li>● Isolation/alienation are commonly reported among AYA patients and survivors.</li> <li>● Opportunities for AYA to retain or re-establish engagement with same age peers (e.g., participation in camps, support groups) will promote successful achievement of healthy identity development.</li> <li>● Social networking sites provide opportunities for AYA to connect.</li> </ul>	Methodology of review or data collection not defined; difficult to determine appropriateness of articles included.	7
Zebraek B, Isaacson S (2012) [64]	Review	Not reported	<p>Recommendations for social support including:</p> <ul style="list-style-type: none"> <li>● Identify and refer AYA to peer support programs, inform regarding camps, recreation programs, and social media resources.</li> <li>● Consider use of survivors as peer counselors/role models for young patients.</li> </ul>	Review strategies not defined.	7

\*Note. Only findings relevant to the social interactions standard are presented. AYA = Adolescent and young adults





**SUPPLEMENTAL Figure I.** PRISMA: Preferred Reporting for Systematic Reviews and Meta-Analyses

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