

# Recovery Issues in Cancer Survivorship: A New Challenge for Supportive Care

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## ABSTRACT

The growing population of cancer survivors represents a clear challenge to clinicians and researchers to look beyond the search for a cure and to address the multifaceted needs of those living with and beyond a cancer diagnosis. Common sequelae that disrupt the psychosocial aspects of life for adult cancer survivors after primary treatment include: fatigue; cognitive changes; body image; sexual health and functioning; infertility; fear of recurrence; PTSD and stress syndromes; family/caregiver distress; socioeconomic issues; and distress, anxiety, and depression. Psychosocial interventions, particularly group-based interventions and physical activity programs, have shown great promise in improving these outcomes. Future research will identify even better-targeted, more efficacious, and more cost effective programs and disseminate them into cancer care settings. Healthcare providers must realize that they serve as vital gatekeepers to services that will help optimize psychosocial as well as physical outcomes. Addressing these issues in the post-treatment period represents the new challenge to supportive care. (*Cancer J* 2006;12:xxx-xxx)

## KEY WORDS

Cancer, survivors, psychosocial factors, review

As we race into the new millennium and embrace the post-genome era, we are beginning to see the fruits of the war on cancer launched in 1971. Almost two thirds of all adults diagnosed with cancer today will be alive in five years; the figure for those treated as children is even higher. The number of cancer survivors is already close to 10.5 million and will continue to grow as our population ages, as there are fewer deaths from cardiovascular disease, and as advances in cancer detection, treatment, and care diffuse into clinical practice.

While it is a testament to the many successes that have been achieved in controlling and curing the diseases we call cancer, this growing population of cancer survivors represents a clear challenge to clinicians and researchers to look beyond the search for a cure and to address the needs of and provide hope for a valued future to those living with and beyond a cancer diagnosis. Two recent reports make clear that the period after completion of active treatment brings its own set of unique, and in some cases, still poorly understood challenges.<sup>1,2</sup> Although they are relieved to be ending treatment, many survivors report being unprepared to manage the long-term or chronic effects of cancer and its treatment (e.g., pain syndromes, fatigue, changes in body image), and worry about cancer's adverse late effects, problems that may arise months or years later (e.g., cardiovascular disease, second cancers, infertility). Indeed, survivors are telling us that being disease-free does not mean being free of the disease—or as one survivor said, “it ain't over when it's over.”

The interrelated web of adverse medical, psychosocial, and economic issues faced by cancer survivors carries great potential for physical and psychological morbidity.<sup>3,4</sup> A full review of the long-term and late physical effects of cancer and its treatment are beyond the scope of this article, but are

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described in detail elsewhere.<sup>5,6</sup> In this article, we review some of the more common sequelae that disrupt the psychosocial aspects of life for adult cancer survivors after the conclusion of primary treatment, along with information on interventions to address these, as available. We also highlight some of the common factors that increase risk for poor adaptation post-treatment as well as factors that may promote improved well-being.

## CHALLENGES TO CANCER RECOVERY

### Fatigue

One of the most common and often debilitating lingering effects of cancer is fatigue.<sup>7,8</sup> Described as a persistent lack of energy, or weariness that impairs daily functioning and mood, cancer-related fatigue is usually not alleviated by additional rest. Fatigue may be a significant problem even five to seven years post-diagnosis for over a third of breast cancer survivors and is predicted by depression, cardiovascular problems, and treatment with both radiation and chemotherapy.<sup>9</sup> Other work by Bower and colleagues suggests that cancer-related fatigue may be linked to pro-inflammatory cytokine processes and also associated with altered patterns of diurnal cortisol among affected women.<sup>10,11</sup> Among the most promising interventions to address this distressing symptom are those that include some form of physical activity.<sup>12,13</sup>

### Cognitive Changes

Reports of difficulty with memory, attention, and concentration are common among cancer patients during active therapy, and research is beginning to show that problems in cognitive function can persist for months after treatment ends.<sup>14-16</sup> Referred to by survivors as “chemo brain” or “chemo fog,” functional decline in cognitive performance is associated with direct treatment to the brain as well as exposure to high doses of systemic chemotherapy.<sup>15</sup> There is some suggestion that individuals who carry the epsilon 4 allele of the apolipoprotein E gene, also associated with risk for Alzheimer’s disease, may be more vulnerable to chemotherapy-induced cognitive decline.<sup>17</sup> Several studies to address this problem among survivors of childhood cancer (in particular acute lymphoblastic leukemia and primary brain tumors) have been conducted using cognitive retraining, pharmacotherapy (methylphenidate), and environmental manipulations<sup>18</sup>; however, less work has been done among adult survivors. In the future we will need to find ways to screen and refer for rehabilitative intervention survivors whose lives are disrupted by this challenging long-term effect of illness.<sup>14</sup>

### Body Image

Body image concerns are common among breast cancer survivors given the integral role of breasts in feelings of femininity and attractiveness for many women. Women treated with breast-conserving surgeries (e.g., lumpectomy) and those who have reconstructive surgery have better body image compared to women treated with mastectomy,<sup>19-23</sup> who may continue to have significant body image disturbances as much as 8 years post-surgery.<sup>24</sup> However, as many as 25% of women treated with breast-conserving surgery may have significant body image problems as well,<sup>25</sup> and women pursuing breast reconstruction may be at high risk for problems with body image since they tend to be younger and to place a higher value on their breasts.<sup>26,27</sup> Some research has suggested that the reconstruction using the more demanding autologous tissue procedures, although resulting in a more “natural” appearing breast than reconstructions performed with implants, may increase risk for body image disruption due to the extensive surgical scarring, in particular of the abdomen.<sup>28</sup>

Body image concerns have been associated with poor psychosocial adjustment and decreased sexual activity and functioning across cancers,<sup>24,29</sup> including among gynecologic cancer survivors,<sup>30</sup> prostate cancer survivors who underwent orchiectomy,<sup>31</sup> those with stoma and collection appliances such as colorectal and bladder cancer survivors,<sup>32,33</sup> and in head and neck cancer survivors.<sup>34</sup> Weight gain from treatment may be an additional source of increased anxiety<sup>35</sup> and decreased quality of life<sup>36</sup> in breast cancer survivors.

Despite the body of research identifying body image as an important concern for cancer survivors, research on interventions to improve body image in survivors is sparse. Psychosocial interventions in cancer survivors that focus on general distress should improve body image by proxy as they help improve self-esteem more broadly. One promising intervention specifically targeting body image is physical activity. Cross-sectional<sup>37</sup> and intervention studies<sup>38</sup> suggest improved body image in physically active breast cancer survivors. Also of note is that one of the American Cancer Society’s (ACS) most popular services nationwide is their *Look Good . . . Feel Better* program, which sponsors educational group sessions during which women learn how to find and fit a wig and use scarves and turbans to hide hair loss, and to use makeup to cover changes in skin tone, coloration, and texture from treatment. While the immediate pre-post effect of these sessions on participants’ appearance and affect can be dramatic, only one study of the impact of this program has been conducted, suggesting at least short term benefit on women’s appearance

concerns.<sup>39</sup> Unknown is whether these body-image enhancing skills are retained by women and what impact this brief intervention, now available for teens and adult males undergoing cancer treatment, may have on longer term psychosocial outcomes.

### Sexual Health and Functioning

Sexual dysfunction in survivors can be caused by numerous mechanisms including biological changes secondary to the cancer itself or treatment (e.g., disruption in the sexual response cycle from pelvic surgery or radiation, estrogen or testosterone deficiency from hormonal manipulation, malaise symptoms from chemotherapy or other medications<sup>40</sup>), or from an individual's psychosocial response to cancer (e.g., stress, anxiety, depression, poor body image<sup>40</sup>). In women, approximately 20-30% of breast cancer survivors develop sexual problems including general sexual disruption, decreased frequency of intercourse, and difficulties reaching orgasm, that may persist 20 years post-treatment.<sup>41</sup> Key predictors of sexual health in breast cancer survivors are similar to those in healthy women: sexual self-image,<sup>42</sup> emotional well-being, body image, the quality of the partnered relationship, vaginal dryness, and whether the woman's partner has sexual problems.<sup>29</sup>

In men, survivors treated for prostate cancer, and to a lesser extent, bladder and testicular cancers, are at high risk for erectile dysfunction.<sup>43</sup> Nerve-sparing surgery techniques for prostate cancer have decreased the rates of erectile dysfunction; however, prostatectomy, external beam radiotherapy, and androgen blockade treatments still carry risks as high as 43-66%.<sup>44-46</sup> Younger men,<sup>47</sup> African Americans,<sup>46</sup> and those with stronger erections before surgery<sup>47</sup> have better recovery of erection after surgery.

Arguably, the key barrier to effectively addressing survivors' sexual well-being is failure to raise the issue. Resistance to broach this topic can come from both sides: healthcare providers don't ask, and patients are reluctant or embarrassed to bring up the subject.<sup>48</sup> With growing attention to this domain of function and techniques to manage specific syndromes, lack of awareness of these should no longer be an excuse for clinicians not to offer help.

Standard treatment of sexual dysfunction includes educational interventions, pharmacologic treatments, and psychotherapeutic methods<sup>49</sup>; however, randomized clinical trials of such programs for cancer survivors are rare.<sup>40</sup> Promising interventions to improve sexual functioning in women treat both the physical and psychological factors influencing the problem, examples of which include the comprehensive menopausal assessment intervention for breast cancer

survivors developed by Ganz and colleagues,<sup>50</sup> and brief therapy groups designed to help women with gynecologic cancer resume sexual activity after treatment.<sup>51</sup> In men, treatment with sildenafil has been shown to improve erectile dysfunction in prostate cancer survivors<sup>47</sup>; however, psychotherapy or other treatments may be needed, depending on the etiology of the dysfunction.

### Infertility

Among survivors treated as young adults, infertility (e.g. from treatments for Hodgkin's disease, testicular cancer, and from bone marrow transplant) is linked to increased distress.<sup>24,52</sup> Survivors who were childless before cancer, have poor sexual self-image, body image, or self-worth, received chemotherapy with retroperitoneal lymphadenectomy, and those with lower socio-economic status are at highest risk for infertility-related distress.<sup>53</sup>

Recent guidelines for fertility preservation released by the American Society of Clinical Oncology (ASCO)<sup>54</sup> underscore the need for provider-patient conversations about the impact of cancer treatment on this aspect of future function that occur early in the course of care, before treatments are selected or commence. Because this arena of intervention is still relatively new, the impact of such interventions on survivors' subsequent fertility-related distress or quality of life remains to be tested.

### Fear of Recurrence

Fear of recurrence, one of the most universal and durable legacies of surviving cancer, is prevalent in cancer survivors across disease sites, ranging from 5-89% of survivors.<sup>53,55</sup> Fear of recurrence has been ranked as the single largest concern of breast cancer survivors<sup>56</sup> and ovarian and other gynecologic cancer survivors,<sup>57</sup> in whom these fears can be compounded by concerns about the risk of other family members being diagnosed with the disease.<sup>58</sup>

Although it tends to diminish over time,<sup>53</sup> the degree of worry about recurrence may fluctuate and be triggered by a variety of sources including doctor visits, unexplained symptoms, reports of cancer in the media, death of fellow survivors, and learned reminders of the experience (e.g., smell of alcohol, sight of the cancer center),<sup>59,60</sup> and by continuing physical problems after treatment.<sup>61,62</sup> When triggered, fear levels may be as high as those observed during diagnosis and treatment.<sup>63</sup> High fear levels may result in disruptive behavior such as heightened body monitoring (frequent self-exam for signs and symptoms of a recurrence), anxiety around follow-up doctor visits,

and worry about the future, or severely disabling reactions including hypochondriac preoccupation with health at one extreme or avoidance and denial at the other, inability to plan for the future, and despair.

Surprisingly, few studies have reported on interventions to address fear of recurrence specifically. The one exception to this general pattern is work by Mishel and colleagues that focuses on cognitive reframing, cancer knowledge, patient—healthcare provider communication and diverse coping skills among older breast cancer survivors.<sup>64</sup> Although other interventions that effectively reduce distress and improve a sense of well-being might be expected to result in decreased worry about disease recurrence, this remains to be tested.

### PTSD and Stress Syndromes

Symptoms of Post-traumatic Stress Disorder (PTSD) have been repeatedly shown to develop in the context of cancer,<sup>65</sup> including cognitive avoidance, emotional reactivity, hypervigilance, sleep disruption, difficulty concentrating, intrusive thoughts related to surgery, chemotherapy effects, fear of recurrence, and physical reactions such as heart palpitations or nausea.<sup>66</sup> Estimates of the prevalence of PTSD range from 3–35%, depending on assessment method, populations studied, and time since treatment,<sup>65,67–69</sup> and are more similar to estimates of PTSD after trauma than to lower national prevalence rates.<sup>70</sup> While only a small number of cancer patients actually meet full criteria for cancer-related PTSD, subclinical syndromes are common,<sup>66</sup> and significant PTSD symptoms have been reported by some survivors even 20 years after cancer treatment.<sup>41</sup>

Risk factors for the development and severity of PTSD symptoms in cancer survivors include persistent physical problems that limit activities,<sup>41,69</sup> poor psychosocial or familial adjustment to cancer, an avoidant coping style, lower SES, educational or financial resource level,<sup>65,69</sup> younger age at diagnosis or female gender,<sup>65,69</sup> poor premorbid physical and mental health,<sup>65,69</sup> prior traumas,<sup>71,72</sup> or current or prior negative stressful life events,<sup>41,65,68,69</sup> inadequate social support,<sup>41,68,69</sup> cancer type and stage, and treatment severity.<sup>68,69</sup>

While there is good evidence that cognitive-behavioral therapy is an effective treatment for PTSD in non-cancer samples, there have been few studies in cancer survivors.<sup>66,68,69</sup> Interventions such as cognitive-behavioral and supportive-expressive therapies that target both reduction of posttraumatic stress and promotion of posttraumatic growth should be helpful,<sup>66</sup> with the caveat that focus on benefit finding without addressing the negative side of the cancer experience may lead to further distress.<sup>73,74</sup>

### Family/Caregiver Distress

It is increasingly recognized that cancer affects not only the individual diagnosed, but also his or her family.<sup>75,76</sup> Despite the key role they play in survivors' well-being,<sup>77</sup> there has been relatively little research examining family members' functioning either during, much less after the cancer treatment experience.<sup>78</sup> This is a period in which family members must adapt to the changes brought on by cancer (e.g., role changes, economic shifts, ongoing care needs), deal with their loved ones' lingering effects of illness (altered appearance, function and or behavior), and learn to live with potential uncertainty about the future.<sup>79</sup>

Research indicates that like survivors, family members too may exhibit emotional adjustment problems after treatment ends,<sup>80,81</sup> and further that these patterns of adaptation (of survivors and their caregivers) may be interdependent.<sup>76,82,83</sup> Due to limited longitudinal data, it is not clear how long family members' distress continues. However, cross sectional studies suggest that there is a gradual decrease in adjustment problems over time.<sup>83–85</sup> Family members may also experience changes in their physical well-being, although the extent to which this occurs and how it may be complicated by pre-existing health conditions has not been well studied.<sup>86</sup> In one of the few reports documenting the physical impact of cancer on caregivers, 45% reported mild fatigue, 25% moderate fatigue, and 28% severe fatigue related to the caregiving role.<sup>87</sup> Largely unknown is the impact on family members' general health behaviors of caring for a loved one with cancer, although this experience may provide a “wake up call” for them to attend to their own health.<sup>85</sup> Problems in sexual function have also been reported.<sup>88</sup>

Despite the demands of illness and treatment, there is little evidence to suggest that divorce or separation is a common aftermath of cancer. In some cases the illness may serve to strengthen partnership bonds.<sup>83,89</sup> This does not mean that these relationships remain free of strain. A number of factors have been identified that characterize families at increased risk of poor adaptation. Many of these parallel those identifying cancer survivors at similar risk and include: illness demands,<sup>90,91</sup> persistent symptoms of distress (e.g., depression, anxiety),<sup>92,93</sup> uncertainty and hopelessness,<sup>94</sup> concurrent stressors,<sup>80,95</sup> role problems,<sup>80,96</sup> communication difficulties,<sup>97–99</sup> and lack of support.<sup>76,93,100</sup> Family members' adaptation can also be affected by the point at which the cancer occurs in the course of a family's developmental phase (e.g., young family with small children and work demands, versus older couple who are retired but have competing health concerns and more limited supports).<sup>101</sup>





Interventions to promote coping conducted with family caregivers alone,<sup>102–105</sup> or in combination with the survivor,<sup>106–108</sup> have yielded modest effects including less depression,<sup>105</sup> lower mood disturbance, greater confidant support and greater marital satisfaction,<sup>102</sup> less emotional discomfort, and higher sexual satisfaction,<sup>109</sup> and greater use of adaptive coping and more positive growth.<sup>110</sup> In a few of these studies patients of the family member also appeared to benefit from their caregiver's participation in the intervention even though they were not part of the intervention suggesting a ripple effect of these programs.<sup>102,104</sup> A major limitation to this work is that few of these studies have been conducted post-treatment or included longitudinal assessments of impact beyond the active or early treatment period.

### Socioeconomic Issues

A significant economic toll is part of the psychosocial cost of cancer for most survivors. Outpatient, multimodal treatment approaches combined with inadequate reimbursement for cancer care have increased the economic burden on patients and families.<sup>111</sup> Concurrently, the increased cancer survival rates, governmental policies (e.g. Social Security) that favor people working beyond age 65, and the lack of mandatory retirement are resulting in more cancer survivors continuing to function in the workplace.<sup>112</sup>

Research suggests that the employability of cancer survivors is a good news bad news situation. The good news is that today, the majority (> 62%) of employment-age survivors appear to remain in or return to the workforce shortly after cancer,<sup>113–117</sup> and may work more hours and have higher wages and earnings than their non-cancer colleagues.<sup>116,117</sup> This is a very different picture from an earlier period when survival was more limited, the side effects of treatment were more poorly controlled, and few legal protections (e.g., the Americans with Disabilities Act) were in place to prevent discrimination against those with a cancer history.<sup>118</sup>

The bad news is that for a distinct subset of survivors, cancer is a disabling event.<sup>119</sup> An estimated 16.8% of working-age survivors (compared with 5% of matched controls) are unable to work because of a physical, mental or emotional problem, and an additional 7.4% of those who can work (compared with 3.2% of matched controls) are limited in the kind or amount of work they can do.<sup>120</sup> Many cancer survivors find themselves trapped in jobs they do not like (job lock) for fear of losing employment and its associated health benefits. Unwanted changes in their job or roles, changes in work relationships,<sup>121</sup> or the need for special accommodation may also present

problems. The latter may adversely affect more lower-income survivors and those from racial and ethnic minorities who are more likely to be employed in physically demanding jobs.<sup>113,122,123</sup>

Survivorship reports from The President's Cancer Panel and the Institute of Medicine<sup>1,2,123</sup> emphasize the need for all survivors to receive information and counseling about their employment rights at the time of diagnosis. We are unaware of any specific trials of interventions to improve cancer survivors' ability to remain in or return to the workforce post-treatment. However, interventions that enabled survivors to better manage fatigue, cope with stress, and reduce symptoms of anxiety and depression would be expected to enhance work performance. Interventions such as "Taking CHARGE,"<sup>125</sup> that target coping strategies for work-related stress should be helpful. There are also a number of educational materials (NCI's Facing Forward; NCCS's Toolbox and Almanac), programs (Cancer Care teleconference series; MSKCC's post-treatment resource program), and not-for-profit advocacy agencies available to help survivors understand and successfully navigate employment issues after cancer.

### Distress, Anxiety, and Depression

Upwards of 80% of survivors of cancer show rates of psychological distress, anxiety, depression, and quality of life that are similar to those seen in healthy, population-based samples<sup>126</sup>; however, there is a subset who show poor adjustment and may be in need of psychiatric treatment.<sup>24,57</sup> Estimates of the prevalence of depression in cancer survivors vary from 0–38% for major depression, and from 0%–58% for depression spectrum syndromes.<sup>127</sup> Depression symptoms are more common in survivors of oropharyngeal (22%–57%), pancreatic (33%–50%), breast (1.5%–46%), and lung (11%–44%) cancers and less common in colon cancer (13%–25%), gynecological cancers (12%–23%), and lymphoma (8%–19%).<sup>127</sup> Significant anxiety or depression symptoms that do not meet full diagnostic criteria for a mood disorder are also common.<sup>24</sup>

Almost 30 years ago, Weisman and Worden first identified risk factors for continued vulnerability to high emotional distress after cancer.<sup>128</sup> For the most part, these factors continue to predict poorer adjustment in studies conducted since then, and include: a past history of depression, persistent medical sequelae of cancer and treatment or comorbid physical problems, poor social support, low economic resources, multiple external stressors, psychological factors (coping style, personality factors), and proximity to treatment.<sup>33</sup>

Among cancer survivors who manifest resilience in the face of illness, two factors in particular are consistently found to be associated with successful adaptation: perceived social support especially from the spouse/partner, and coping style (specifically, those with a positive, active coping style do well, while those who are negative, prone to distress, and feel helpless or hopeless have a harder time moving forward to reclaim their lives).<sup>129,130</sup> Other protective factors include optimism,<sup>129</sup> expression of emotions,<sup>131</sup> finding a positive meaning from the cancer experience,<sup>132</sup> maintaining self-esteem and “normal” life roles,<sup>129</sup> and religiosity or use of spiritual coping, though here the results have been mixed.<sup>129,133</sup> Literally dozens of studies have been conducted to test the efficacy of interventions to decrease the emotional toll of cancer. Because of the importance of this body of work to the present special journal issue, summary points about these are discussed in more detail below.

### Positive Effects

Historically, research on the psychosocial impact of cancer focused only on the negative impact of the disease and its treatment. More recently, there has been burgeoning interest in investigating the positive effects of cancer on survivors. This shift has been driven by survivors’ often unsolicited reports of the benefits they have derived from their experience with cancer, and the recognition by clinical researchers of the enormous resilience manifested by cancer survivors in the face of life-threatening illness. Survivors have reported renewed vigor in their approach to life, more positive social experiences, and improved view of the self, life changes, and outlook on life,<sup>134</sup> greater appreciation of life, reprioritization of values, and growth in self-confidence,<sup>70</sup> greater satisfaction with religious concerns and strengthened spirituality,<sup>135,136</sup> and stronger interpersonal relationships.<sup>70,134,135</sup> Many cancer survivors also report interest in, or actually making major changes to their health behaviors,<sup>135–137</sup> including quitting smoking, reducing alcohol intake and sun exposure, controlling exposure to known environmental toxins, and striving for a healthy diet and ideal weight through diet and exercise. Survivors also report that the positive and negative sequelae of cancer coexist.<sup>66</sup> That is, cancer survivors may concurrently report both decrements in functioning and positive changes. Further, these positive changes are greater than, and likely different from, positive changes reported by healthy peers.<sup>74</sup>

Several variables are associated with greater post-traumatic growth after breast cancer, including the perceived degree of threat posed by cancer, time since diagnosis, the extent to which the woman had dis-

cussed her experience with others,<sup>66</sup> and distress; however, directionality may vary by race/ethnicity. More distress predicts less positive growth among Hispanic survivors but more positive growth among non-Hispanic White survivors.<sup>138</sup> Breast cancer survivors report that cancer changes their lives through an increased sense of both vulnerability and meaning, with African-American survivors reporting finding greater meaning.<sup>139</sup>

### PSYCHOSOCIAL INTERVENTIONS IN CANCER SURVIVORS: THE TAKE HOME MESSAGE

The use of psychosocial interventions in cancer has a long history.<sup>140,141</sup> Though varying by type (e.g., individual vs. group), orientation (e.g., behavioral vs. cognitive vs. supportive), mode of delivery (e.g., in person vs. by phone, internet, or teleconference), duration, timing in cancer care, and target population, the core goal of interventions developed to date has been the same: to equip or empower survivors to be able to cope with cancer and enhance their quality of life.<sup>23</sup> Education about the challenges of illness, treatment and recovery and techniques or skills to manage these is a universal component of every intervention. Several important take home points can be made with respect to this large body of research.

First, taken as a whole, researchers have found that patients who receive an intervention designed to improve their function or well-being do better than those who do not. Depending on their target outcome, published interventions have been shown to be effective to some extent in alleviating distress,<sup>68,70</sup> improving mood, physical functioning, perceived meaning in life, and self-efficacy, and lessening illness-related problems,<sup>134</sup> improving QOL,<sup>142,143</sup> improving compliance with treatment, health behaviors, biologic responses, and disease outcomes,<sup>143,144</sup> and potentially in reducing health care costs.<sup>145</sup> Further, patients and oncologists report moderate to high satisfaction with psychological therapies.<sup>146</sup>

The main criticism leveled against this research, however, is the often small magnitude (e.g.,  $< 0.3$ )<sup>147</sup> of effect sizes achieved.<sup>70</sup> Factors potentially responsible for these small effect sizes include difficulty evaluating intervention studies due to insufficient reporting detail and methodological limitations,<sup>146</sup> and the inclusion of survivors who were not in need of intervention. Psychosocial intervention effect sizes are much higher in the trials that included only those who were at risk for or suffering from significant distress.<sup>148,149</sup>

Second, the majority of interventions developed to date to alleviate the psychosocial burden of cancer rely heavily on the use of support groups.<sup>146–148,150</sup>

This is important given that it may not be feasible, suitable, or even desirable to provide individually-tailored programs. Group interventions have been found to be as effective as individually-tailored programs in reducing patient distress.<sup>151,152</sup> Further, groups can offer a uniquely supportive and normalizing experience for patients struggling to deal with their post-treatment physical health and identity as survivors. Barriers to support group participation may be both practical (e.g., limited access to groups, poor fit between personal needs and group membership or content) as well as psychological (fear of stigma associated with use; lack of perceived usefulness of the group; lack of encouragement or support to attend)<sup>153</sup>; however, many of these barriers are remediable with support, outreach and education and the application of new technologies that permit access for those who are in remote locales or homebound<sup>154</sup>. Internet-based programs address these practical barriers while providing additional advantages such as 24-hour accessibility from the convenience of home, anonymity, and the removal of age, gender, and social status issues, with the exception that low-income survivors may not have internet access.<sup>155,156</sup>

Third, physical activity interventions have shown great promise in promoting health and well-being among survivors. Four recent reviews of this literature show that such interventions are feasible, well-tolerated, and can have positive effects on psychosocial measures including depression, anxiety, self-esteem, and QOL, as well as physical symptoms (e.g., fatigue, pain), fitness measures, body composition, and biological changes like immune functioning, cognition, and sleep.<sup>157–160</sup> Provocative observational data also suggest that physical activity after cancer may help alter recurrence and survival outcomes<sup>161–163</sup>; however, the mechanisms hypothesized to be in the causal chain between physical activity and recurrence/survival are not well-understood.<sup>157</sup>

Fourth, the generalizability of currently available interventions is not known. The vast majority of interventions have been developed for breast cancer survivors who are 45–65 years of age, and it is not clear if these will work equally well in diverse populations of survivors. Though widely used, interventions involving peer discussion/support groups delivered through self-help organizations remain largely untested.<sup>70</sup> An additional limitation to these studies—and critical to this review—is that with rare exceptions (e.g.,<sup>64,164</sup>), few of these are designed specifically to target the post-treatment period of adaptation.

Finally, despite the evidence that survivors would like more help dealing with their disease and its aftereffects,<sup>1,2,165</sup> use of these types of programs and services remains sparse. Data indicate that relatively few

cancer patients or survivors avail themselves of mental health services in general, or support group interventions specifically. Mental health service use may be higher for cancer survivors than for individuals without a cancer history; however, utilization for both groups is low (7.2% vs 5.7%).<sup>166</sup> Insurance coverage for mental health services is likely a factor: as many as one in six survivors may fail to receive mental health services because of cost.<sup>166</sup> Similar problems limit health promotion services for cancer survivors.

No discussion about the impact of psychosocial interventions is complete without an examination of their role in extending survival. Despite the considerable body of literature documenting the psychological and social benefits of a variety of psychosocial interventions in cancer survivors, three recent reviews and a meta-analysis have found no consistent survival benefit of psychological intervention.<sup>144,167–169</sup> However, the lack of benefit may be due to the small number of trials, small trial sizes, or to inadequate follow-up time, since the studies that have found a survival effect have included longer follow-up time.<sup>169</sup> There are three purported mechanisms for a survival benefit: 1) increased social support, 2) stress reduction, resulting in better adoption of health behaviors or increased adherence to medical treatment, or 3) stress reduction interacting with neuroendocrine or immune factors that improve disease outcomes.<sup>144,168</sup>

## FUTURE DIRECTIONS

Despite the considerable research identifying the multifaceted effects of cancer, there are many obvious gaps in our knowledge. Future work must identify the complex interplay between psychosocial and physical sequelae of cancer in survivors from diverse race/ethnic and socioeconomic backgrounds, in elderly populations, and in those with cancers other than breast cancer, including determining risk and protective factors in these diverse groups. Studies should use screening instruments with clinically valid cutoffs to determine and recruit subgroups of survivors who are in need of intervention. Future efforts should identify those survivors who are doing well to understand the factors that might promote positive adaptation, rehabilitation, post-traumatic growth, and continued employment. More attention to the promotion of healthy lifestyle behaviors in survivorship, including how healthy behaviors may influence second cancers, comorbidities, and survival is also needed. Future studies should develop and test interventions to assist survivors with employment-related difficulties and to help distressed caregivers and family members of survivors. Finally, both cross-sectional and longitudinal studies in all of these areas are especially

needed to enable us to understand the impact on survivorship outcomes of changes in treatment and to gain a better understanding of the terrain of recovery over time.

The practice of cancer care is also changing. New therapeutic agents are being developed and tested and the psychosocial impact of these new agents will need to be determined. Ongoing national efforts to widely implement screening for distress in survivorship populations will help bring attention to those in need of help,<sup>170</sup> necessitating quick and appropriate referrals for psychosocial care. Clinical attention must be paid to treating the interrelated web of physical, psychological, and social cancer-related symptoms in the acute term, before these symptoms develop into more severe persistent problems. This can only be accomplished through increased healthcare provider-patient communication about these cancer sequelae, both prior to and during cancer treatment. At the conclusion of treatment, survivors must be provided with a treatment summary and leave with an appropriate follow-up care plan to facilitate a healthy and fully informed transition. Future research will incorporate new knowledge into better-targeted, more efficacious, and cost effective interventions which will then need to be disseminated into cancer care settings. Treating cancer alone is no longer enough: we now must also focus on the goal of helping those living with and beyond a cancer diagnosis lead full, productive, and meaningful lives.

We've reviewed here a number of challenges faced by cancer survivors in the post-treatment period. As they transition to recovery, survivors want to know who will follow them, which symptoms to monitor, when to be alert to changes in health, what will be their "new normal" and how they can reduce their risk of a recurrence and remain healthy. The question about who best to follow survivors post-treatment is currently being clarified. Perhaps more important, however, is that whomever assumes this role is aware of the types of problems survivors face and takes a proactive stand to ask about these and, as appropriate, offer further help. Healthcare providers must realize that they serve as vital gatekeepers to services that will help optimize psychosocial as well as physical outcomes. Addressing these issues in the post-treatment period represents the new challenge to supportive care.

## REFERENCES

- Hewitt M, Greenfield, Stovall E, eds. From Cancer Patient to Cancer Survivors. Lost in Transition. Washington, D.C.: The National Academies Press, 2005.
- President's Cancer Panel. Living Beyond Cancer: Finding a New Balance. Bethesda, MD: National Cancer Institute, 2004.
- Aziz NM. Cancer survivorship research: challenge and opportunity. *J Nutr* 2002;132(11 Suppl):3494S-3503S.
- Aziz NM, Rowland JH. Trends and advances in cancer survivorship research: challenge and opportunity. *Semin Radiat Oncol* 2003;13(3):248-266.
- Aziz NM. Late effects of cancer treatment. In: Chang AE, Ganz PA, Hayes DF et al., eds. *Oncology: An evidence-based approach*. New York: Springer; 2006. p. 1768-1790.
- Ganz PA. Late effects of cancer and its treatment. *Semin Oncol Nurs* 2001;17(4):241-248.
- Barton-Burke M. Cancer-related fatigue and sleep disturbances. *Am J Nursing* 2006;106:72-77.
- Lawrence DP, Kupelnick B, Miller K et al. Evidence report on the occurrence, assessment, and treatment of fatigue in cancer patients. *J Natl Cancer Inst Monogr* 2004(32):40-50.
- Bower JE, Ganz PA, Desmond KA et al. Fatigue in long-term breast carcinoma survivors: a longitudinal investigation. *Cancer* 2006;106(4):751-758.
- Bower JE, Ganz PA, Aziz N, Fahey JL. Fatigue and proinflammatory cytokine activity in breast cancer survivors. *Psychosom Med* 2002;64(4):604-611.
- Bower JE, Ganz PA, Aziz N. Altered cortisol response to psychologic stress in breast cancer survivors with persistent fatigue. *Psychosom Med* 2005;67(2):277-280.
- McNeely ML, Campbell KL, Rowe BH et al. Effects of exercise on breast cancer patients and survivors: a systematic review and meta-analysis. *CMAJ* 2006;175(1):34-41.
- van Weert E, Hoekstra-Weebers J, Otter R et al. Cancer-related fatigue: predictors and effects of rehabilitation. *Oncologist* 2006;11(2):184-196.
- Nail LM. Cognitive changes in cancer survivors. Cancer and cancer treatment often cause cognitive deficits, but no guidelines exist for screening or treatment. *Am J Nurs* 2006;106(3 Suppl):48-54.
- Anderson-Hanley C, Sherman ML, Riggs R et al. Neuropsychological effects of treatments for adults with cancer: a meta-analysis and review of the literature. *J Int Neuropsychol Soc* 2003;9(7):967-982.
- Heflin LH, Meyerowitz BE, Hall P et al. Cancer as a risk factor for long-term cognitive deficits and dementia. *J Natl Cancer Inst* 2005;97(11):854-856.
- Ahles TA, Saykin AJ, Noll WW et al. The relationship of APOE genotype to neuropsychological performance in long-term cancer survivors treated with standard dose chemotherapy. *Psychooncology* 2003;12(6):612-619.
- Butler RW, Mulhern RK. Neurocognitive interventions for children and adolescents surviving cancer. *J Pediatr Psychol* 2005;30(1):65-78.
- Moyer A. Psychosocial outcomes of breast-conserving surgery versus mastectomy: a meta-analytic review. *Health Psychol* 1997;16(3):284-298.
- Al-Ghazal SK, Fallowfield L, Blamey RW. Comparison of psychological aspects and patient satisfaction following breast conserving surgery, simple mastectomy and breast reconstruction. *Eur J Cancer* 2000;36(15):1938-1943.
- Roth RS, Lowery JC, Davis J, Wilkins EG. Quality of life and affective distress in women seeking immediate versus delayed breast reconstruction after mastectomy for breast cancer. *Plast Reconstr Surg* 2005;116(4):993-1002; discussion 1003-1005.
- Nano MT, Gill PG, Kollias J et al. Psychological impact and cosmetic outcome of surgical breast cancer strategies. *ANZ J Surg* 2005;75(11):940-947.
- Rowland JH, Massie MJ. Issues in breast cancer survivorship. In: Harris JR, Lippman ME, Morrow M, Osborne CK, editors. *Breast Diseases*, 3rd edition. Philadelphia, PA: Lippincott, Williams & Wilkins; 2004. pp. 1419-1452.
- Kornblith AB. Psychosocial adaptation of cancer survivors. In: Holland JC, editor. *Psycho-oncology*. New York: Oxford University Press; 1998. pp. 223-254.



25. Sneeuw KC, Aaronson NK, Yarnold JR et al. Cosmetic and functional outcomes of breast conserving treatment for early stage breast cancer. 2. Relationship with psychosocial functioning. *Radiother Oncol* 1992;25(3):160–166.
26. Rowland JH, Desmond KA, Meyerowitz BE et al. Role of breast reconstructive surgery in physical and emotional outcomes among breast cancer survivors. *J Natl Cancer Inst* 2000;92(17):1422–1429.
27. Nissen MJ, Swenson KK, Ritz LJ et al. Quality of life after breast carcinoma surgery: a comparison of three surgical procedures. *Cancer* 2001;91(7):1238–1246.
28. Cederna PS, Yates WR, Chang P et al. Postmastectomy reconstruction: comparative analysis of the psychosocial, functional, and cosmetic effects of transverse rectus abdominis musculocutaneous flap versus breast implant reconstruction. *Ann Plast Surg* 1995;35(5):458–468.
29. Ganz PA, Desmond KA, Belin TR et al. Predictors of sexual health in women after a breast cancer diagnosis. *J Clin Oncol* 1999;17(8):2371–2380.
30. Stead ML. Sexual dysfunction after treatment for gynaecologic and breast malignancies. *Curr Opin Obstet Gynecol* 2003;15(1):57–61.
31. Fan A. Psychological and psychosocial effects of prostate cancer. *Nurs Stand* 2002;17(13):33–37.
32. Sprangers MA, Taal BG, Aaronson NK, te Velde A. Quality of life in colorectal cancer. Stoma vs. nonstoma patients. *Dis Colon Rectum* 1995;38(4):361–369.
33. Mansson A, Mansson W. When the bladder is gone: quality of life following different types of urinary diversion. *World J Urol* 1999;17(4):211–218.
34. De Boer MF, McCormick LK, Pruyn JF et al. Physical and psychosocial correlates of head and neck cancer: a review of the literature. *Otolaryngol Head Neck Surg* 1999;120(3):427–436.
35. Knopf MK, Mullen JC, Xistris D, Moritz DA. Weight gain in women with breast cancer receiving adjuvant chemotherapy. *Oncol Nurs Forum* 1983;10(2):28–33.
36. Kornblith AB, Hollis DR, Zuckerman E et al. Effect of megestrol acetate on quality of life in a dose-response trial in women with advanced breast cancer. The Cancer and Leukemia Group B. *J Clin Oncol* 1993;11(11):2081–2089.
37. Pinto BM, Trunzo JJ. Body esteem and mood among sedentary and active breast cancer survivors. *Mayo Clin Proc* 2004;79(2):181–186.
38. Pinto BM, Clark MM, Maruyama NC, Feder SI. Psychological and fitness changes associated with exercise participation among women with breast cancer. *Psychooncology* 2003;12(2):118–126.
39. Manne SL, Girasek D, Ambrosino J. An evaluation of the impact of a cosmetics class on breast cancer patients. *J Psychosoc Oncol* 1994;12:83–99.
40. Shell JA. Evidence-based practice for symptom management in adults with cancer: sexual dysfunction. *Oncol Nurs Forum* 2002;29(1):53–66; quiz 67–69.
41. Kornblith AB, Herndon JE, 2nd, Weiss RB et al. Long-term adjustment of survivors of early-stage breast carcinoma, 20 years after adjuvant chemotherapy. *Cancer* 2003;98(4):679–689.
42. Andersen BL, Woods XA, Copeland LJ. Sexual self-schema and sexual morbidity among gynecologic cancer survivors. *J Consult Clin Psychol* 1997;65(2):221–229.
43. Incrocci L, Slob AK, Levendag PC. Sexual (dys)function after radiotherapy for prostate cancer: a review. *Int J Radiat Oncol Biol Phys* 2002;52(3):681–693.
44. Costabile RA. Cancer and male sexual dysfunction. *Oncology (Huntingt)* 2000;14(2):195–200, 203; discussion 203–205.
45. Hamilton AS, Stanford JL, Gilliland FD et al. Health outcomes after external-beam radiation therapy for clinically localized prostate cancer: results from the Prostate Cancer Outcomes Study. *J Clin Oncol* 2001;19(9):2517–2526.
46. Stanford JL, Feng Z, Hamilton AS et al. Urinary and sexual function after radical prostatectomy for clinically localized prostate cancer: the Prostate Cancer Outcomes Study. *JAMA* 2000;283(3):354–360.
47. Mirone V, Imbimbo C, Palmieri A et al. Erectile dysfunction after surgical treatment. *Int J Androl* 2003;26(3):137–140.
48. Auchincloss S. Sexual dysfunction in cancer patients: issues in evaluation and treatment. In: Holland JC, Rowland JH, editors. *Handbook of Psycho-Oncology: Psychological Care of the Patient with Cancer* New York: Oxford University Press; 1989, pp. 383–413.
49. Schover LR. *Sexuality and Fertility after Cancer*. New York: John Wiley; 1997.
50. Ganz PA, Greendale GA, Petersen L et al. Managing menopausal symptoms in breast cancer survivors: results of a randomized controlled trial. *J Natl Cancer Inst* 2000;92(13):1054–1064.
51. Capone MA, Good RS, Westie KS, Jacobson AE. Psychosocial rehabilitation of gynecologic oncology patients. *Arch Phys Med Rehabil* 1980;61(3):128–132.
52. Schover LR. Psychosocial aspects of infertility and decisions about reproduction in young cancer survivors: a review. *Med Pediatr Oncol* 1999;33(1):53–59.
53. Ronson A, Body JJ. Psychosocial rehabilitation of cancer patients after curative therapy. *Support Care Cancer* 2002;10(4):281–291.
54. Lee SJ, Schover LR, Partridge AH et al. American Society of Clinical Oncology recommendations on fertility preservation in cancer patients. *J Clin Oncol* 2006;24(18):2917–2931.
55. Kornblith AB, Herndon JE, 2nd, Zuckerman E et al. Comparison of psychosocial adaptation of advanced stage Hodgkin's disease and acute leukemia survivors. Cancer and Leukemia Group B. *Ann Oncol* 1998;9(3):297–306.
56. Spencer SM, Lehman JM, Wynings C et al. Concerns about breast cancer and relations to psychosocial well-being in a multiethnic sample of early-stage patients. *Health Psychol* 1999;18(2):159–168.
57. Kattlove H, Winn RJ. Ongoing care of patients after primary treatment for their cancer. *CA Cancer J Clin* 2003;53(3):172–196.
58. Hamilton AB. Psychological aspects of ovarian cancer. *Cancer Invest* 1999;17(5):335–341.
59. Mast ME. Survivors of breast cancer: illness uncertainty, positive reappraisal, and emotional distress. *Oncol Nurs Forum* 1998;25(3):555–562.
60. Gil KM, Mishel MH, Belyea M et al. Triggers of uncertainty about recurrence and long-term treatment side effects in older African American and Caucasian breast cancer survivors. *Oncol Nurs Forum* 2004;31(3):633–639.
61. Deimling GT, Kahana B, Bowman KF, Schaefer ML. Cancer survivorship and psychological distress in later life. *Psychooncology* 2002;11(6):479–494.
62. Holzner B, Kemmler G, Kopp M et al. Quality of life in breast cancer patients—not enough attention for long-term survivors? *Psychosomatics* 2001;42(2):117–123.
63. Nelson JP. Struggling to gain meaning: living with the uncertainty of breast cancer. *Adv Nurs Sci* 1996;18:59–76.
64. Mishel MH, Germino BB, Gil KM et al. Benefits from an uncertainty management intervention for African-American and Caucasian older long-term breast cancer survivors. *Psychooncology* 2005;14(11):962–978.
65. Smith MY, Redd WH, Peyser C, Vogl D. Post-traumatic stress disorder in cancer: a review. *Psychooncology* 1999;8(6):521–537.

66. Cordova MJ, Andrykowski MA. Responses to cancer diagnosis and treatment: posttraumatic stress and posttraumatic growth. *Semin Clin Neuropsychiatry* 2003;8(4):286–296.
67. Schmitt A, Singer S, Schwarz R. Evaluation of posttraumatic psychological problems in cancer patients. *Onkologie* 2003;26(1):66–70.
68. Gurevich M, Devins GM, Rodin GM. Stress response syndromes and cancer: conceptual and assessment issues. *Psychosomatics* 2002;43(4):259–281.
69. Kangas M, Henry JL, Bryant RA. Posttraumatic stress disorder following cancer. A conceptual and empirical review. *Clin Psychol Rev* 2002;22(4):499–524.
70. Kornblith AB, Ligibel J. Psychosocial and sexual functioning of survivors of breast cancer. *Semin Oncol* 2003;30(6):799–813.
71. Green BL, Krupnick JL, Rowland JH, Epstein SA, Stockton P, Spertus I, et al. Trauma history as a predictor of psychologic symptoms in women with breast cancer. *J Clin Oncol* 2000;18(5):1084–1093.
72. Wyatt GE, Loeb TB, Desmond KA, Ganz PA. Does a history of childhood sexual abuse affect sexual outcomes in breast cancer survivors? *J Clin Oncol* 2005;23(6):1261–1269.
73. Wortman CB. Posttraumatic growth: progress and problems. *Psychol Inq* 2004;15:81–90.
74. Tomich PL, Helgeson VS. Is finding something good in the bad always good? Benefit finding among women with breast cancer. *Health Psychol* 2004;23(1):16–23.
75. Northouse LL, Mellon S, Harden J, Schafenacker A. Effects of cancer on families of adult cancer survivors. In: Bowen D, Miller S, Croyle R, J R, editors. *Handbook of Behavioral Science and Cancer*: American Psychological Association Press; (in press).
76. Northouse LL, Mood D, Templin T et al. Couples' patterns of adjustment to colon cancer. *Soc Sci Med* 2000;50(2):271–84.
77. Morse SR, Fife B. Coping with a partner's cancer: adjustment at four stages of the illness trajectory. *Oncol Nurs Forum* 1998;25(4):751–760.
78. Northouse LL, Rosset T, Phillips L et al. Research with families facing cancer: the challenges of accrual and retention. *Res Nurs Health* 2006;29(3):199–211.
79. Walker BL. Adjustment of husbands and wives to breast cancer. *Cancer Pract* 1997;5(2):92–98.
80. Ell K, Nishimoto R, Mantell J, Hamovitch M. Longitudinal analysis of psychological adaptation among family members of patients with cancer. *J Psychosom Res* 1988;32(4–5):429–438.
81. Hagedoorn M, Buunk BP, Kuijer RG et al. Couples dealing with cancer: role and gender differences regarding psychological distress and quality of life. *Psychooncology* 2000;9(3):232–42.
82. Baider L, Kaplan De-Nour A. Adjustment to cancer: who is the patient—the husband or the wife? *Isr J Med Sci* 1988;24(9–10):631–636.
83. Gritz ER, Wellisch DK, Siau J, Wang HJ. Long-term effects of testicular cancer on marital relationships. *Psychosomatics* 1990;31(3):301–312.
84. Hoskins CN. Adjustment to breast cancer in couples. *Psychol Rep* 1995;77(2):435–454.
85. Mellon S. Comparisons between cancer survivors and family members on meaning of the illness and family quality of life. *Oncol Nurs Forum* 2002;29(7):1117–1125.
86. Hilton BA. Issues, problems, and challenges for families coping with breast cancer. *Semin Oncol Nurs* 1993;9(2):88–100.
87. Jensen S, Given B. Fatigue affecting family caregivers of cancer patients. *Support Care Cancer* 1993;1(6):321–325.
88. Neese LE, Schover LR, Klein EA et al. Finding help for sexual problems after prostate cancer treatment: a phone survey of men's and women's perspectives. *Psychooncology* 2003;12(5):463–473.
89. Lewis FM, Hammond MA. Psychosocial adjustment of the family to breast cancer: a longitudinal analysis. *J Am Med Womens Assoc* 1992;47(5):194–200.
90. Lewis FM, Hammond MA, Woods NF. The family's functioning with newly diagnosed breast cancer in the mother: the development of an explanatory model. *J Behav Med* 1993;16(4):351–70.
91. Lewis FM, Woods NF, Hough EE, Bensley LS. The family's functioning with chronic illness in the mother: the spouse's perspective. *Soc Sci Med* 1989;29(11):1261–1269.
92. Northouse L. A longitudinal study of the adjustment of patients and husbands to breast cancer. *Oncol Nurs Forum* 1989;16(4):511–516.
93. Oberst MT, James RH. Going home: patient and spouse adjustment following cancer surgery. *Top Clin Nurs* 1985;7(1):46–57.
94. Northouse LL, Laten D, Reddy P. Adjustment of women and their husbands to recurrent breast cancer. *Res Nurs Health* 1995;18(6):515–524.
95. Northouse LL, Mood D, Kershaw T et al. Quality of life of women with recurrent breast cancer and their family members. *J Clin Oncol* 2002;20(19):4050–4064.
96. Vess JD, Moreland JR, Schwebel A. A follow-up study of role functioning and the psychological environment of families of cancer patients. *Journal of Psychosocial Oncology* 1985;3:1–13.
97. Chekryn J. Cancer recurrence: personal meaning, communication, and marital adjustment. *Cancer Nurs* 1984;7(6):491–498.
98. Edwards B, Clarke V. The psychological impact of a cancer diagnosis on families: the influence of family functioning and patients' illness characteristics on depression and anxiety. *Psychooncology* 2004;13(8):562–576.
99. Hilton BA. Family communication patterns in coping with early breast cancer. *West J Nurs Res* 1994;16(4):366–388; discussion 388–391.
100. Lethborg CE, Kissane D, Burns WI. 'It's not the easy part': the experience of significant others of women with early stage breast cancer, at treatment completion. *Soc Work Health Care* 2003;37(1):63–85.
101. Cimprich B, Ronis DL, Martinez-Ramos G. Age at diagnosis and quality of life in breast cancer survivors. *Cancer Pract* 2002;10(2):85–93.
102. Bultz BD, Specia M, Brasher PM et al. A randomized controlled trial of a brief psychoeducational support group for partners of early stage breast cancer patients. *Psychooncology* 2000;9(4):303–313.
103. Pasacrete JV, Barg F, Nuamah I, McCorkle R. Participant characteristics before and 4 months after attendance at a family caregiver cancer education program. *Cancer Nurs* 2000;23(4):295–303.
104. Toseland RW, Blanchard CG, McCallion P. A problem solving intervention for caregivers of cancer patients. *Soc Sci Med* 1995;40(4):517–528.
105. Blanchard C, Toseland R, McCallion P. The effects of a problem-solving intervention with spouses of cancer patients. *J Psychosoc Oncol* 1996;14:1–21.
106. Bucher JA, Loscalzo M, Zabora J et al. Problem-solving cancer care education for patients and caregivers. *Cancer Pract* 2001;9(2):66–70.
107. Donnelly JM, Kornblith AB, Fleishman S et al. A pilot study of interpersonal psychotherapy by telephone with cancer patients and their partners. *Psychooncology* 2000;9(1):44–56.
108. Hoskins CN, Haber J, Budin WC et al. Breast cancer: education, counseling, and adjustment—a pilot study. *Psychol Rep* 2001;89(3):677–704.

109. Christensen DN. Postmastectomy couple counseling: an outcome study of a structured treatment protocol. *J Sex Marital Ther* 1983;9(4):266–275.
110. Manne S, Babb J, Pinover W et al. Psychoeducational group intervention for wives of men with prostate cancer. *Psychooncology* 2004;13(1):37–46.
111. Lipscomb J, Donaldson MS, Hiatt RA. Cancer outcomes research and the arenas of application. *J Natl Cancer Inst Monogr* 2004(33):1–7.
112. Main DS, Nowels CT, Cavender TA et al. A qualitative study of work and work return in cancer survivors. *Psychooncology* 2005;14(11):992–1004.
113. Spelten ER, Sprangers MA, Verbeek JH. Factors reported to influence the return to work of cancer survivors: a literature review. *Psychooncology* 2002;11(2):124–131.
114. Short PF, Vasey JJ, Tunceli K. Employment pathways in a large cohort of adult cancer survivors. *Cancer* 2005;103(6):1292–1301.
115. Bradley CJ, Bednarek HL. Employment patterns of long-term cancer survivors. *Psychooncology* 2002;11(3):188–198.
116. Bradley CJ, Bednarek HL, Neumark D. Breast cancer survival, work, and earnings. *J Health Econ* 2002;21(5):757–779.
117. Bradley CJ, Bednarek HL, Neumark D. Breast cancer and women's labor supply. *Health Serv Res* 2002;37(5):1309–1328.
118. Hoffman B. Cancer survivors at work: a generation of progress. *CA Cancer J Clin* 2005;55(5):271–280.
119. Chirikos TN, Russell-Jacobs A, Jacobsen PB. Functional impairment and the economic consequences of female breast cancer. *Women Health* 2002;36(1):1–20.
120. Yabroff KR, Lawrence WF, Clauser S et al. Burden of illness in cancer survivors: findings from a population-based national sample. *J Natl Cancer Inst* 2004;96(17):1322–1330.
121. Maunsell E, Brisson C, Dubois L et al. Work problems after breast cancer: an exploratory qualitative study. *Psychooncology* 1999;8(6):467–473.
122. Satariano WA, DeLorenze GN. The likelihood of returning to work after breast cancer. *Public Health Rep* 1996;111(3):236–241.
123. Bradley CJ, Neumark D, Bednarek HL, Schenk M. Short-term effects of breast cancer on labor market attachment: results from a longitudinal study. *J Health Econ* 2005;24(1):137–160.
124. Hewitt M, Weiner SL, Simone JV, editors. *Childhood Cancer Survivorship: Improving Care and Quality of Life*. Washington, DC: The National Academies Press; 2003.
125. Cimprich B, JKanz NK, Northouse L et al. Taking CHARGE: a self-management program for women following breast cancer treatment. *Psychooncology* 2005;14:704–717.
126. van't Spijker A, Trijsburg RW, Duivenvoorden HJ. Psychological sequelae of cancer diagnosis: a meta-analytical review of 58 studies after 1980. *Psychosom Med* 1997;59(3):280–293.
127. Massie MJ. Prevalence of depression in patients with cancer. *J Natl Cancer Inst Monogr* 2004(32):57–71.
128. Weisman AD, Worden JW. The existential plight in cancer: significance of the first 100 days. *Int J Psychiatry Med* 1976;7(1):1–15.
129. Kneier AW. Coping with melanoma—ten strategies that promote psychological adjustment. *Surg Clin North Am* 2003;83(2):417–430.
130. Spencer SM, Carver CS, Price AA. Psychological and social factors in adaptation. In: Holland JC, editor. *Psycho-oncology*. New York: Oxford University Press; 1998, pp. 211–222.
131. Spiegel D, Kato PM. Psychosocial influences on cancer incidence and progression. *Harv Rev Psychiatry* 1996;4(1):10–26.
132. Bower JE, Meyerowitz BE, Desmond KA et al. Perceptions of positive meaning and vulnerability following breast cancer: predictors and outcomes among long-term breast cancer survivors. *Ann Behav Med* 2005;29(3):236–245.
133. Mytko JJ, Knight SJ. Body, mind and spirit: towards the integration of religiosity and spirituality in cancer quality of life research. *Psychooncology* 1999;8(5):439–450.
134. Shapiro SL, Lopez AM, Schwartz GE et al. Quality of life and breast cancer: relationship to psychosocial variables. *J Clin Psychol* 2001;57(4):501–519.
135. Ganz PA, Desmond KA, Leedham B et al. Quality of life in long-term, disease-free survivors of breast cancer: a follow-up study. *J Natl Cancer Inst* 2002;94(1):39–49.
136. Alfano CM, McGregor BA, Kuniyuki A et al. Psychometric evaluation of the brief cancer impact assessment among breast cancer survivors. *Oncology* 2006;70(3):190–202.
137. Demark-Wahnefried W, Aziz NM, Rowland JH, Pinto BM. Riding the crest of the teachable moment: promoting long-term health after the diagnosis of cancer. *J Clin Oncol* 2005;23(24):5814–5830.
138. Culver JL, Arena PL, Antoni MH, Carver CS. Coping and distress among women under treatment for early stage breast cancer: comparing African Americans, Hispanics and non-Hispanic Whites. *Psychooncology* 2002;11(6):495–504.
139. Giedzinska AS, Meyerowitz BE, Ganz PA, Rowland JH. Health-related quality of life in a multiethnic sample of breast cancer survivors. *Ann Behav Med* 2004;28(1):39–51.
140. Andersen BL. Psychological interventions for cancer patients to enhance the quality of life. *J Consult Clin Psychol* 1992;60(4):552–568.
141. Fawzy FI, Fawzy NW, Arndt LA, Pasnau RO. Critical review of psychosocial interventions in cancer care. *Arch Gen Psychiatry* 1995;52(2):100–113.
142. Blake-Mortimer J, Gore-Felton C, Kimerling R et al. Improving the quality and quantity of life among patients with cancer: a review of the effectiveness of group psychotherapy. *Eur J Cancer* 1999;35(11):1581–1586.
143. Andersen BL. Biobehavioral outcomes following psychological interventions for cancer patients. *J Consult Clin Psychol* 2002;70(3):590–610.
144. Andersen BL, Farrar WB, Golden-Kreutz DM et al. Psychological, behavioral, and immune changes after a psychological intervention: a clinical trial. *J Clin Oncol* 2004;22(17):3570–3580.
145. Simpson JS, Carlson LE, Trew ME. Effect of group therapy for breast cancer on healthcare utilization. *Cancer Pract* 2001;9(1):19–26.
146. Newell SA, Sanson-Fisher RW, Savolainen NJ. Systematic review of psychological therapies for cancer patients: overview and recommendations for future research. *J Natl Cancer Inst* 2002;94(8):558–584.
147. Meyer TJ, Mark MM. Effects of psychosocial interventions with adult cancer patients: a meta-analysis of randomized experiments. *Health Psychol* 1995;14:101–108.
148. Sheard T, Maguire P. The effect of psychological interventions on anxiety and depression in cancer patients: results of two meta-analyses. *Br J Cancer* 1999;80(11):1770–1780.
149. Ross L, Boesen EH, Dalton SO, Johansen C. Mind and cancer: does psychosocial intervention improve survival and psychological well-being? *Eur J Cancer* 2002;38(11):1447–1457.
150. Rehse B, Pukrop R. Effects of psychosocial interventions on quality of life in adult cancer patients: meta-analysis of 37 published controlled outcome studies. *Patient Educ Couns* 2003;50(2):179–186.
151. Farash JL. Effects of counseling on resolution of loss and body image disturbance following mastectomy. *Dissertation Abstracts International* 1979;394017.



152. Cain EN, Kohorn EI, Quinlan DM, Latimer K, Schwartz PE. Psychosocial benefits of a cancer support group. *Cancer* 1986;57(1):183–189.
153. Grande GE, Myers LB, Sutton SR. How do patients who participate in cancer support groups differ from those who do not? *Psychooncology* 2006;15(4):321–334.
154. Lieberman MA, Golant M, Giese-Davis J et al. Electronic support groups for breast carcinoma: a clinical trial of effectiveness. *Cancer* 2003;97(4):920–925.
155. Klemm P, Bunnell D, Cullen M, Soneji R, Gibbons P, Holecsek A. Online cancer support groups: a review of the research literature. *Comput Inform Nurs* 2003;21(3):136–142.
156. Shaw BR, Hawkins R, Arora N et al. An exploratory study of predictors of participation in a computer support group for women with breast cancer. *Comput Inform Nurs* 2006;24(1):18–27.
157. Irwin ML, Ainsworth BE. Physical activity interventions following cancer diagnosis: methodologic challenges to delivery and assessment. *Cancer Invest* 2004;22(1):30–50.
158. Schwartz AL. Physical activity after a cancer diagnosis: psychosocial outcomes. *Cancer Invest* 2004;22(1):82–92.
159. Oldervoll LM, Kaasa S, Hjermstad MJ et al. Physical exercise results in the improved subjective well-being of a few or is effective rehabilitation for all cancer patients? *Eur J Cancer* 2004;40(7):951–962.
160. McTiernan A. Physical activity after cancer: physiologic outcomes. *Cancer Invest* 2004;22(1):68–81.
161. Holmes MD, Chen WY, Feskanich D et al. Physical activity and survival after breast cancer diagnosis. *JAMA* 2005;293(20):2479–2486.
162. Meyerhardt JA, Heseltine D, Niedzwiecki D et al. Impact of physical activity on cancer recurrence and survival in patients with stage III colon cancer: findings from CALGB 89803. *J Clin Oncol* 2006;24(22):3535–41. Epub 2006 Jul 5.
163. Meyerhardt JA, Giovannucci EL, Holmes MD et al. Physical activity and survival after colorectal cancer diagnosis. *J Clin Oncol* 2006;24(22):3527–34. Epub 2006 Jul 5.
164. Stanton AL, Ganz PA, Kwan L et al. Outcomes from the Moving Beyond Cancer psychoeducational, randomized controlled trial with breast cancer patients. *J Clin Oncol* 2005;23:6009–6018.
165. Rutten LJ, Arora NK, Bakos AD et al. Information needs and sources of information among cancer patients: a systematic review of research (1980–2003). *Patient Educ Couns* 2005;57(3):250–261.
166. Hewitt M, Rowland JH. Mental health service use among adult cancer survivors: analyses of the National Health Interview Survey. *J Clin Oncol* 2002;20(23):4581–4590.
167. Smedslund G, Ringdal GI. Meta-analysis of the effects of psychosocial interventions on survival time in cancer patients. *J Psychosom Res* 2004;57(2):123–131; discussion 133–135.
168. Goodwin PJ. Support groups in breast cancer: When a negative result is positive. *J Clin Oncol* 2004;22(21):4244–4246.
169. Chow E, Tsao MN, Harth T. Does psychosocial intervention improve survival in cancer? A meta-analysis. *Palliat Med* 2004;18(1):25–31.
170. Holland JC, Jacobsen PB, Riba MB. NCCN: Distress management. *Cancer Control* 2001;8(6 Suppl 2):88–93.