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A Comparison of Weekly Physical Activity Levels of Cancer Survivors and Caregivers

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I submitted a copy of this paper this morning, but only listed my name (not my name and email address) as the author. Therefore, when I attempted to view the submission to make the necessary corrections, I was notified that I was unauthorized since I was not the author (there is no listed email address for the author). I am re-submitting this paper to ensure that there exists a draft that I am able to edit by the due date. I apologize for the inconvenience and the confusion that I am sure this will cause.

A COMPARISON OF WEEKLY PHYSICAL ACTIVITY LEVELS OF CANCER SURVIVORS AND CAREGIVERS

by

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B.S., Southern Illinois University, 2011

A Research Paper
Submitted in Partial Fulfillment of the Requirements for the
Master of Science in Education.

Department of Kinesiology in the Graduate School
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RESARCH APPROVAL

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CHAPTER 1

INTRODUCTION

Cancer survivors are defined by the National Coalition for Cancer Survivorship (NCCS, 2014) as any individual from the point of diagnosis of cancer throughout the course of the lifespan. As of 2012, there were 13.7 million cancer survivors living in the United States (National Cancer Institute). These individuals typically experience a multitude of adverse physical and psychological consequences, either as a result of the cancer itself, side effects of necessary treatment, or a combination of the two. One of these consequences is a decrease in level of physical activity. Previous research has linked cancer and subsequent treatment to decreases in overall activity levels, muscle mass, energy level, overall well-being, and quality of life (deJong, Courtens, & Abu-Saad, 2002). These changes may be self-propagating; that is believed due to the observation that decreases in activity level, muscle mass, energy, quality of life, and overall well-being are correlated with reduced physical and psychological well-being (McAuley, et al., 2006).

Physical activity in an elderly population has been associated with increased overall quality of life when compared to an inactive control group (Pernambuco et al., 2012). Similarly, the intentional introduction of an exercise or community/home-based physical activity program has been shown to attenuate treatment-related side effects in cancer survivors, and improve performance even after completing high-dose chemotherapy (Dimeo et al., 1997). Exercise interventions have been shown to result in not only significantly better physical outcomes such as body composition, aerobic fitness, muscular strength, and lean body mass (Courneya et al., 2007), but also psychological outcomes such as quality of life (Cheema, Singh, & Gaul, 2006), and anxiety and depression (Menhert et al., 2011) levels in cancer survivors. Courneya and

colleagues (2003) completed a study in which a moderate intensity exercise program was shown to improve quality of life in cancer survivors beyond the known benefits of group psychotherapy. Improvements in quality of life have also been shown with aerobic activity in breast cancer survivors compared to both an exercise placebo and usual care control group (Daley et al., 2007). While such interventions may not always result in a statistically significant increase in either physical or psychological measures, meaningful differences in both physical measures and quality of life outcomes have been shown to occur over long-term exercise interventions (Durak, Lilly, & Hackworth, 1999; Mutrie et al., 2007).

While research in exercise and cancer survivors is well-developed and documented, related research involving cancer patient caregivers (herein referred to simply as "caregivers") is underdeveloped. Caregivers for cancer patients often experience levels of psychological distress that are directly influenced by the cancer survivors' symptom experience (Given, Given, Helms, Stommel, & DeVoss, 1997; Dumont et al., 2006). It is believed that as a result of the increased burden, psychological distress, and physical sacrifice made by caregivers, they may also experience a decline or continued lack of physical activity. This low-level of activity may manifest both physically and psychologically, affecting the caregiver's quality of life drastically. Caregivers often report experiencing sleep disturbances (Carter, 2003; Fletcher et al., 2008), fatigue (Fletcher et al., 2008; Jensen & Given, 1991; Teel & Press, 1999), pain (Fletcher et al., 2008), and loss of physical strength (Nijboer, Triemstra, Tempelaar, Sanderman, & van den Bos, 1999).

Statement of Purpose

The purpose of this study was to evaluate the physical activity levels of cancer survivors and caregivers who had enrolled in a free, 12-week exercise and nutrition course (Strong

Survivors) using the Community Healthy Activities Model Program (CHAMPS) Questionnaire for Adults (Appendix 1; Stewart, 2001). The current study compared activity levels between the two groups, and also compared each group to recommended levels of activity according to the American College of Sports Medicine (ACSM). By collecting physical activity data from both groups and comparing them to each other and both to the current ACSM guidelines, this study adds to the growing literature detailing the experience and needs of caregivers, in hopes that effective program development and implementation may follow.

Hypotheses

It was hypothesized that there would be no significant difference in activity levels as measured by the CHAMPS Questionnaire for Adults between the cancer survivor and caregiver groups. It was also hypothesized that both groups would report significantly lower levels of physical activity than currently recommended by the ACSM.

CHAPTER 2

METHODS

Participants

All participants were first-time participants in Strong Survivors, a free, 12-week program including both nutritional and physical activity-related education, as well as individualized exercise prescription provided by student cancer exercise trainers. The program takes place three times per year (fall, spring, and summer) at John A. Logan College in Carterville, Illinois, and is open to participants of all ages that have been diagnosed with cancer as well as a caregiver of each participant. For the current study, any survivor who was more than 60 months removed from his or her most recent cancer-related treatment, or any caregiver whose survivor counterpart also met this criterion was excluded. Forty-seven cancer survivors and 21 caregivers met the treatment criteria and successfully and fully supplied all of the information required for inclusion in the study.

Data Collection Procedures

Participants were given a number of health-related forms and questionnaires, including the Community Healthy Activities Model Program (CHAMPS) Questionnaire for Adults. Distribution and instruction for completion of these questionnaires was completed by the Strong Survivors staff consisting of graduate and undergraduate students involved in related coursework, and supervised by a member of the faculty specializing in cancer rehabilitation research. Only those questionnaires that were completed without error and in their entirety were included for the purposes of this study. Responses were tabulated in raw form into Microsoft Excel (Microsoft, 2007), and then coded into Metabolic Equivalent of Task Hour (MET*HR) values for each response according to the Revised Codebook for CHAMPS Physical Activity

Measures Coding Algorithms from May 22, 2003 (Appendix 2). The sum of these values was calculated to determine MET*HR/week.

ACSM (2011) recommends adults get at least 150 minutes of moderate-intensity exercise per week. The Center for Disease Control estimates that moderate-intensity exercise falls in the range of 3-6 METs (U.S. Department of Health and Human Services). For the purposes of this study, 4.5 METs was considered a moderate intensity. ACSM-recommended activity level was converted from minutes per week to MET*HR/week using this conversion rate to obtain the value of 11.25 MET*HR/week. The sum of all items on the CHAMPS questionnaire estimated to be at a MET value of 3 or higher (Items 7, 9, 14, 15, 16, 19, 21, 23, 24, 25, 26, 29, 30, 31, 32, 33, 36, 37, 38, 40) was calculated for each participant as a moderate-intensity level MET*HR/week.

CHAPTER 3

RESULTS

Comparison Between Groups

No significant differences existed between the survivors (S) and caregivers (CG) in either mean age (S = 60.1 (*SD* = 12.4) years; CG = 57.3 (*SD* = 15.6) years)) or mean time since treatment (S = 15.9 (*SD* = 16.9) months; CG = 18.4 (*SD* = 17.4) months)). The dependent variable was compared using a two-sample *t*-test to compare mean MET*HR/week for the cancer survivor and caregiver groups, using a $p<0.05$ alpha level to determine significance. There was no significant difference in average MET*HR/week between the two groups ($p=0.218$).

Table 1: Group Mean and Standard Deviation (SD): Two-Sample *t*-Test Results

Group	**Mean(SD)**	***t***	***P***
Cancer Survivors	31.77(27.37)		
Caregivers	41.22(28.93)	1.24	0.218

Mean values are MET*HR/week.

Comparison of Both Groups to ACSM Recommendations

Each group mean was compared to the ACSM recommended MET*HR/week value (11.25 MET*HR/week) using a one-sample *t*-test. There exists no significant difference in mean MET*HR/week when comparing cancer survivors ($p=0.265$) to ACSM recommendations for moderate- to vigorous-intensity physical activity. A significant difference was found when comparing caregivers ($p=0.037$) to the calculated ACSM recommendations for the mean MET*HR/week value. In contrast to the expected outcome, the caregivers mean MET*HR/week averages were significantly higher than the ACSM recommendations.

Table 2: Moderate-Intensity Activity Group Mean and SD: One-Sample *t*-Test Results

Comparison to ACSM	**Mean(SD)**	***t***	***P***
Survivors	13.95(16.40)	1.13	0.265
Caregivers	23.43(24.94)	2.24	0.037

Mean values are MET*HR/week.

CHAPTER 4

DISCUSSION

While there exists a vast amount of previous research on cancer patient activity levels and exercise, such research has not often considered the effect of cancer diagnosis on the activity level of caregivers. The purpose of this study was to compare the daily-life activity levels, both physical activity and exercise, of cancer survivors and their caregivers. The raw data for the activity levels was measured using the self-reported CHAMPS questionnaire. As hypothesized, there was no statistically significant difference found between activity levels as measured by MET*HR/week between the cancer survivors and caregivers. Contrary to the hypothesis, however, caregivers did self-report significantly higher levels of moderate- to vigorous-level activity than suggested as a minimum by the ACSM. This phenomenon may be explained by any number or combination of the limitations to be listed in subsequent sections.

Explanation and \Limitations

As the design of this research was extremely applied in nature, there exist a large number of potential limitations that may explain the unexpected results. The first of such limitations is that of a self-selection bias caused by using a sample solely from the Strong Survivors population. It may be reasonable to assume that an individual that willingly registers and intends to participate in an exercise-based course may be generally more active, or more apt to report himself or herself as more active, than an individual that does not register for the course. Self-selection bias has been found to exist, specifically in an older adult population as it relates to physical activity (Martinson et al., 2010). Evidence in support of the self-report bias for social desirability has also been shown to exist, specifically in physical activity recall (Adams et al., 2005). With the knowledge and expectation that the coursework will be based in exercise and

activity, participants may also have inflated or over-estimated previous levels of activity in an effort to meet the perceived expectations of the Strong Survivors staff.

There is an innate lack of experimental control within this study in terms of prior medical history. In an effort to boost participant numbers, participants in the study were not excluded based on any criteria except for the 60-month maximum time since treatment. Some criteria of particular future interest as potential exclusionary or study group organizational variables may include: comorbidities, current treatment status, time since diagnosis (shorter time frame than current study), type of cancer, stage of cancer, or prognosis. These uncontrolled variables have the potential to significantly alter activity levels over the course of even one cancer survivor's diagnosis, let alone over 47 individuals' experiences. The participant sample included survivors who were actively undergoing chemotherapy and radiation treatment, as well as those that had not yet begun any treatment, and those that had not received any form of treatment in up to five years. The longitudinal effects and changes associated with chemotherapy treatment have been detailed in previous studies as they relate to psychological measures (Alhes et al., 2010) and exercise-adherence (Courneya et al., 2014). Suggestions for future directions that address this concern, as well as others will be provided in the conclusion of this report.

The Strong Survivors program is extremely accessible, very intentionally; the primary focus is to provide a service to the local community. As such, any participant who has been told, "You have cancer," is accepted into the program, and allowed to have one caregiver accompany him or her. The term caregiver is not strictly defined by the program. In the spirit of accessibility, and the belief in the benefit of the support of a companion in the course, each individual cancer survivor's caregiver may or may not be (or have been) the primary caregiver throughout the diagnosis. Any relative or friend of the cancer survivor is allowed to attend the program and is

termed that individual's caregiver. Potential direct caregivers that were not fit to attend the course, or hesitant to participate in exercise may have been substituted with friends or other family that was previously more active. This may have had a drastic effect on the activity levels reported by the caregiver group. This hypothetically high degree of variability based on program design was supported when the data was analyzed as demonstrated by the standard deviations of all measured values (age, time since treatment, MET*HR/week) for each group. Although no statistical differences were found between groups, the large variability in each group may account for the lack of significant differences found.

Conclusion

The findings of this study suggest that there does not exist a statistically significant difference in the self-reported levels (using MET*HR/week as measured by the CHAMPS questionnaire) of physical activity and exercise between cancer survivors and caregivers. It is also suggested by this study that caregiver groups engage in a higher level of moderate to vigorous exercise than is currently recommended by the American College of Sports Medicine. Future research should establish exclusionary and further inclusionary medical criteria for both cancer survivors and caregivers, including proximity to diagnosis and further delineation of treatment status and time since treatment. Data collection of a non-self-selected population, especially those self-selecting for an exercise course, will reduce the potential for self-selection bias as it relates to the activity level measure. Use of a more direct measure of activity levels (e.g., accelerometer), while less feasible, may provide a solution to the suspected self-report bias for social desirability. When using the caregiver population, future research should strictly define what constitutes the role of a caregiver for the purposes of the study in order to better analyze and understand caregiver experiences, and the direct influence that being the primary caregiver

to a cancer survivor has on these individuals. Future samples should also be drawn from caregivers not electing to attend and participate in the Strong Survivors course, such that a more representative sample of the caregiver population may be analyzed. Further studies to assess the efficacy of the Strong Survivors program should include pre-participation sampling and post-participation sampling using the CHAMPS questionnaire to demonstrate any changes in behavior associated with completion of the Strong Survivors program. Future research may also find value in considering the persistence of exercise behaviors beyond completion of the Strong Survivors course.

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APPENDICES

APPENDIX 1

STRONG SURVIVORS

CHAMPS Activities Questionnaire for Adults

Date:_____

Name:_____

ID:_____

(Research use only)

CHAMPS: Community Healthy Activities Model Program
Institute for Health & Aging, University of California San Francisco
Stanford Center for Research in Disease Prevention, Stanford University

Contact: Anita L. Stewart, Ph.D., UCSF, anitast@itsa.ucsf.edu

This questionnaire is about activities that you may have done in the past 4 weeks. The questions on the following pages are similar to the example shown below.

INSTRUCTIONS

If you DID the activity in the past 4 weeks:

Step #1 **Check the YES box.**

Step #2 **Think about <u>how many</u> TIMES <u>a week</u> you usually did it, and write your response in the space provided.**

Step #3 **Circle how many TOTAL HOURS <u>in a typical week</u> you did the activity.**

Here is an example of how Mrs. Jones would answer question #1: Mrs. Jones usually visits her friends Maria and Olga <u>twice a week</u>. She usually spends <u>one</u> hour on Monday with Maria and <u>two</u> hours on Wednesday with Olga. Therefore, the total hours a week that she visits with friends is <u>3</u> hours a week.

In a typical week during the past 4 weeks, did you...							
1. Visit with friends or family (other than those you live with)? X **YES** How many TIMES a week? 2 → **NO**	How many TOTAL <u>hours a week</u> did you usually do it? →	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

If you DID NOT do the activity:

- **Check the NO box and move to the next question**

In a typical week during the past 4 weeks, did you ...							
1. Visit with friends or family (other than those you live with)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL <u>hours a week</u> did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
2. Go to the local community center? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL <u>hours a week</u> did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
3. Do volunteer work? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL <u>hours a week</u> did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
4. Attend church or take part in church activities? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL <u>hours a week</u> did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
5. Attend other club or group meetings? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL <u>hours a week</u> did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
6. Use a computer? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL <u>hours a week</u> did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
7. Dance (such as square, folk, line, ballroom) (do <u>not</u> count aerobic dance here)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL <u>hours a week</u> did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

8. Do woodworking, needlework, drawing, or other arts or crafts? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
9. Play golf, carrying or pulling your equipment (count walking time only)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
10. Play golf, riding a cart (count walking time only)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
11. Attend a concert, movie, lecture, or sport event? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
12. Play cards, bingo, or board games with other people? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
13. Shoot pool or billiards? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
14. Play singles tennis (do not count doubles)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

15. Play doubles tennis (do not count singles)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
16. Skate (ice, roller, in-line)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
17. Play a musical instrument? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
18. Read? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
19. Do heavy work around the house (such as washing windows, cleaning gutters)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
20. Do light work around the house (such as sweeping or vacuuming)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
21. Do heavy gardening (such as spading, raking)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

22. Do light gardening (such as watering plants)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
23. Work on your car, truck, lawn mower, or other machinery? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

****Please note: For the following questions about running and walking, include use of a treadmill.**

24. Jog or run? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
25. Walk uphill or hike uphill (count only uphill part)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
26. Walk fast or briskly for exercise (do not count walking leisurely or uphill)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
27. Walk to do errands (such as to/from a store or to take children to school (count walk time only)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

28. Walk leisurely for exercise or pleasure? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
29. Ride a bicycle or stationary cycle? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
30. Do other aerobic machines such as rowing, or step machines (do not count treadmill or stationary cycle)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
31. Do water exercises (do not count other swimming)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
32. Swim moderately or fast? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
33. Swim gently? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
34. Do stretching or flexibility exercises (do not count yoga or Tai-chi)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

35. Do yoga or Tai-chi? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
36. Do aerobics or aerobic dancing? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
37. Do moderate to heavy strength training (such as hand-held weights of more than 5 lbs., weight machines, or push-ups)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
38. Do light strength training (such as hand-held weights of 5 lbs. or less or elastic bands)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
39. Do general conditioning exercises, such as light calisthenics or chair exercises (do not count strength training)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
40. Play basketball, soccer, or racquetball (do not count time on sidelines)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

41. Do other types of physical activity not previously mentioned (please specify)?	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
_____							
YES How many TIMES a week?_____ ➔							
NO							

Thank You

APPENDIX 2

Table B1: Revised Codebook for CHAMPS Physical Activity Measures
The only change is that item number 36 is included in all measures
May 22, 2003

Variable Label	Item Numbers	Coding Algorithms
Caloric expenditure/week in all exercise-related activities[1]	7, 9, 10, 14-16, 19-35, **36**-40	For each activity: 1. Create new duration variables for each activity recoded as follows: 1=0.5, 2=1.75, 3=3.75, 4=5.75, 5=7.75, 6=9.75; If duration variable is not answered, score = 0. Duration is hours/week. 2. For each recoded duration variable, create new weighted duration variable for each activity by multiplying duration variable (#1) by corresponding MET value (see Table 2). 3. For each weighted duration variable, create caloric expenditure per week variable for each activity by multiplying weighted duration variable (#2) by 3.5 and by 60 (to convert METs/minute to METs/hour) and by (weight in kg/200). 4. Sum caloric expenditure per week variables across activities to create caloric expenditure/week.
Caloric expenditure/week in moderate-intensity exercise-related activities	7, 9, 14-16, 19, 21, 23-26, 29-33, **36**-38, 40	Same as above, subset of activities with MET values $\geq$3.0.
Frequency/week of all exercise-related activities	7, 9, 10, 14-16, 19-35, **36**-40	SUM frequency scores/week for each of the activities (allow those with missing data on frequency to be included in the sum).
Frequency/week of moderate-intensity exercise-related activities	7, 9, 14-16, 19, 21, 23-26, 29-33, **36**-38, 40	SUM frequency scores/week for each of the activities (allow those with missing data on frequency to be included in the sum).

[1] Based on American College of Sports Medicine formula: kcal/minute = METs * 3.5 * (body weight in kg/200). Our formula converts this into kcal/week. ACSM's Guidelines for Exercise Testing and Prescription, 5th Edition. Baltimore: Williams & Wilkins (1995).

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Research Paper Title:
A COMPARISON OF WEEKLY PHYSICAL ACTIVITY LEVELS OF CANCER SURVIVORS AND CAREGIVERS

Major Professor: Dr. Phil Anton