

Title: Characterization of drinking in childhood cancer survivors compared to general population

Working Group and Investigators: Anne Lown, Rob Goldsby, and Dan Dohan

Background and Rationale: During the past 40 years survival rates from childhood cancer have increased dramatically and now 70% of children diagnosed with cancer are expected to survive long-term. Research has focused on the many physical health obstacles experienced by survivors of childhood cancer as a result of their cancer or treatments. Psychological and social consequences of childhood cancer have been less of a focus and research has yielded contradictory findings. Descriptions of health risk behaviors such as alcohol consumption among childhood cancer survivors are few and conflicting, with some authors reporting heavy use[1] and others reporting little use[2, 3] or comparable use to peers[4]. An understanding of drinking behaviors in this population is important since childhood cancer survivors may be more vulnerable to adverse health consequences of drinking compared to the general population.

In general populations, alcohol consumption, particularly in higher quantity, is associated with a number of health [5, 6] and social harms[7, 8]. Drinking among survivors is more risky than in general populations since alcohol exposes survivors to further toxins and mutagenic agents which may place individuals at risk for secondary cancers or organ complications[9, 10]. Furthermore alcohol use may interact with prescribed medications, such as those used to treat cardiac problems from chemotherapy [8]. As a result of these late effects it has been recommended by some that childhood cancer survivors abstain from alcohol use[10].

Of particular concern are those diagnosed with cancer during adolescence and young adulthood, while facing developmental issues relating to identity, social acceptance and achievement. A period of serious illness during this time can disrupt these developmental tasks, leaving survivors feeling alone, uncertain about their identity and future. This developmental period coincides with the peak time for alcohol use in the lives of adolescents and young adults.[11, 12] Previous research has described the use of alcohol to reduce stress and anxiety [13] and the correlation between higher stress and adolescent alcohol use[14].

Little research has characterized the quantity and frequency of alcohol consumption and risk factors for potentially harmful drinking among this population or compared cancer survivors drinking patterns to the general population. A clear epidemiological description of alcohol use and risk factors will better characterize the scope of the issue and facilitate the development of targeted recommendations related to screening, education and treatment of alcohol problems in the long-term follow-up of cancer survivors.

Specific Aims/Research Hypotheses:

The proposed study will utilize data from two sources: the Long-Term Follow-Up Study using participants in the Childhood Cancer Survivor's Study (CCSS) (N=14,054) and the National Alcohol Survey (NAS-2000) which was carried out in the year 2000 and assessed alcohol use among a sample of 8,054 English and Spanish speaking men and women in all 50 states of the U.S and Washington D.C.. Participants matching the age range of the CCSS data, ages 18-48 (N=6,065) will be used for this study. The NAS-2000 employed a sample collected through random digit dial techniques and Computer Assisted Telephone Interview. Alcohol variables between the CCSS and the NAS-2000 are closely comparable and allow for the assessment of beverage specific drinking frequency and quantity across both populations. The prevalence of drinking behaviors among childhood cancer survivors will be compared with similar age, racial/ethnic and gender groups in the national population. Predictors for risky and heavy drinking will be examined among childhood cancer survivors especially among the hypothesized highest risk groups; young adults and survivors diagnosed during adolescence. The study has the following specific aims:

Aim 1: To describe drinking patterns among survivors of childhood cancer and compare them to national norms by age, gender and race/ethnicity.

Aim 2: To determine factors associated with risky and heavy drinking. Being a young adult (ages 18-29) and cancer diagnosis as a teen will be associated with heavier drinking controlling for previously identified risk factors or concerns including; adverse health or mental health status, anxieties or fears relating to the cancer or its treatment, having a history of cognitive compromising treatments such as cranial radiotherapy and intrathecal methotrexate, age of initiating drinking, race/ethnicity, income and education, type of cancer.

Analysis Framework: (for variables description, see Appendix A, page 4)

Aim 1: Outcomes of interest

A. Current drinking; (past year)

B. Risky drinking; no more than one drink per day for women and no more than two drinks per day for men [15].

C. Heavy drinking; five or more drinks per day

Predictor Variable:

not applicable, descriptive data

Aim 2: Outcomes of interest:

Risky drinking

Heavy drinking

Predictor Variables:

current age, (young adult vs. other)

age of cancer diagnosis

Controlling for the effects of previously identified risk factors: adverse health or mental health status, fears/anxieties relating to the cancer or its treatment, treatments such as cranial radiotherapy and intrathecal methotrexate, age of initiating drinking, race/ethnicity, income and education, type of cancer

Subject population: Long-Term Follow-Up Study participants in the (CCSS) (N=14,054) and the National Alcohol Survey-2000 (N=6,065).

Specific Tables and Figures: (See Appendix B)

Table 1: Prevalence of current drinking, risky drinking and heavy drinking described in CCSS and NAS-2000. Table will include prevalence described by gender, age and racial/ethnic groups.

Table 2: Factors associated with risky drinking and heavy drinking; bivariate associations.

Table 3: Factors associated with risky drinking and heavy drinking; multivariate models examining the role of age of diagnosis, current age, adverse health or mental health status and cognitive compromising treatments controlling for demographic and personal variables.

Contact information: Anne Lown, Dr. P.H., Alcohol Research Group, 2000 Hearst Street, Ste 300, Berkeley, CA 94709 (510) 642-5208 X256, e-mail: Alown@arg.org

ENDNOTES

1. Lansky, S., M. List, and R.-S. C. *Psychosocial consequences of cure*. Cancer, 1986. 58(2 Suppl): p. 529-33.

2. Larcombe, I., M. Mott, and L. Hunt, *Lifestyle behaviors of young adult survivors of childhood cancer*. Br J Cancer, 2002. 87(11): p. 1204-9.
3. Tyc, V., W. Hadley, and G. Crockett, *Prediction of health behaviors in pediatric cancer survivors*. Med Pediatr Oncol, 2001. 37(1): p. 42-6.
4. Hollen, P. and W. Hobbie, *Decision making and risk behaviors of cancer-surviving adolescents and their peers*. J Pediatr Oncol Nurs, 1996. 13(3): p. 121-33.
5. Dawson, D., *US low-risk drinking guidelines: an examination of four alternatives*. Alcoholism, Clinical and Experimental Research, 2000. 24(11): p. 1820-1829.
6. Kendell, R., *Drinking sensibly*. Br J. Addict, 1987. 82: p. 1279-1288.
7. Room, R., S. Bondy, and J. Ferris, *The risk of harm to oneself from drinking, Canada 1989*. Addiction, 1995. 90: p. 499-513.
8. Thakker, K., *An overview of health risks and benefits of alcohol consumption*. Alcoholism, Clinical and Experimental Research, 1998. 22(7): p. 285S-298S.
9. National Cancer Policy Board, *Childhood Cancer Survivorship: Improving Care and Quality of Life*, ed. M. Hewitt, S. Weiner, and J. Simone. 2003, Washington, D.C.: The National Academies Press. 224.
10. Schwartz, C., *Long-term survivors of childhood cancer: the late effects of therapy*. Oncologist, 1999. 4(1): p. 45-54.
11. Baer, J., *Etiology and secondary prevention and alcohol problems with young adults*, in *Addictive Behaviors Across the Life Span: Prevention, Treatment, and Policy Issues*, J. Baer, G. Marlatt, and R. McMahon, Editors. 1993, Sage: Thousand Oaks, CA.
12. Johnston, L. and P. O'Malley, *Monitoring the Future: National Survey Results on Drug Use, 1975-2000, Vol I*. 2001, Dept of Health and Human Services: Bethesda, MD.
13. Engstrom, D. and D. Libert, *Muscle tension and experienced control: effects of alcohol intake versus biofeedback on alcoholics and non-alcoholics*, in *Currents Issues in Alcoholism*, M. Galanter, Editor. 1979, Grune & Stratton: New York.
14. Baer, J. and J. Bray, *Adolescent individuation and alcohol use*. J. Stud. Alcohol, 1999. Supplement No. 13: p. 52-62.
15. United States Department of Agriculture, *Nutrition and Your Health: Dietary Guidelines for Americans*. 2000, US Department of Agriculture: Washington, D.C.

Appendix A

Alcohol Questions	p 8
Alcohol variable definitions	p 9
Predictor/control variables	
Health Status	p 9
Demographic Variables	p 10
Cancer Variables	p 10

Equivalency of Alcohol Questions between the Childhood Cancer Survivor Study and the National Alcohol Survey-2000

Childhood Cancer Survivor Study	National Alcohol Survey-2000
N.8 Have you had at least one drink of beer, wine, or liquor during the past year? No Yes	Use B4 (below), but for those who answered, less than once a month, then ask: B5. Think back over the last year, since (current date last year). Did you have a whole drink of any alcoholic beverage like wine, beer, or liquor in these last twelve months?
N.6 During the past 2 years, on average how many times per month did you drink the following: (listed separately by wine, beer and mixed drink) <i>Responses:</i> 0-999	B4. How often do you have any kind of beverage containing alcohol—whether it is wine, beer, whiskey, or any other drink? Is it (average over past 12 months) <i>Responses:</i> 3+ daily 2+ daily once a day nearly every day three or four times a week once or twice a week Two or three times a month About once a month Less than once a month...
N.7 On the days that you drink, on average, how many drinks do you have? No drinks in past 2 years One drink/day Two drinks/day Three drinks/day Four drinks/day Five drinks/day six or more drinks/day	(Skips lifelong abstainer or ex-drinker) L15. How many drinks did you have at that time? (By “drink”, we mean one can or bottle of beer, one bottle or wine cooler, one glass of wine or a drink with a shot of hard liquor. _____ # of drinks
N.4 How old were you when you stated drinking? ____ Years old	B31. About how old were you when you first started drinking alcoholic beverages, not including small tastes? _____ AGE

Risky drinking is a variable which we can construct from existing questions about quantity and frequency of alcohol consumption*. Risky drinking is defined by the United States Department of Health and Human Services and published in *The Physicians' Guide to Helping Patients with Alcohol Problems*, (1995) and specifies drinking more than three drinks per day or seven drinks per week for women and more than four drinks per day or more than fourteen drinks per week for men—at least one day in the last year, to be risky drinking.[United States Department of Health and Human Services, 1995 #462] This definition for risky drinking was chosen since it balances both daily and weekly drinking guidelines and best reflects the health impact of drinking patterns.[Dawson, 2000 #460] Specifically, this measure best balanced the need for high sensitivity to outcomes such as alcohol dependence, impaired driving, liver disease, peptic ulcer and hypertension without decreasing specificity to an unacceptable standard.[Dawson, 2000 #460] Heavy drinking is defined as five or more drinks per day at least once a month and can also be constructed from existing questions in the CCSS and the NAS.

PREDICTOR VARIABLES

Data will be collected in the Baseline survey or the Medical Abstraction Form

1.) HEALTH STATUS: Questions from CCSS

Six domains of Health Status will be employed including: general health, mental health, functional impairment, activity limitations, pain, or anxiety/fears as a result of the cancer or its treatment. Scoring for adverse health status for each domain will be constructed to be consistent with the use of these measure in Hudson et al, 2003.[Hudson, 2003 #461]

Domaine	Item #	Item Wording
Mental Health-based on Brief Symptom Inventory-18	J.16-J.35	Includes a global measure, (global severity index), and sub-scales for depression, anxiety and somatization
Pain as a result of cancer and its treatment	J.36	“Do you currently have pain as a result of our cancer, leukemia, tumor or similar illness, or its treatment?”
Anxiety/fears as a result of the cancer or its treatment	J.37	“Do you currently have anxieties/fears as a result of your cancer, leukemia, tumor or similar illness, or its treatment?”
Functional status (from National Health Interview Survey)	N.10- N.12	“Because of any impairment or health problems, do you need the help of other persons with personal care needs, such as eating, bathing, dressing, or getting around your home?” “Because of any impairment or health problems, do you need the help of other persons in handling routine needs, such as everyday household chores, doing necessary business, shopping, or getting around for other purposes.” “Does any impairment or health problem keep you from holding a job or attending school?”
Limitations of activity, (from Behavioral Risk Factor Surveillance System Survey Questionnaire)	N.14	See instrument for exact question wording
Self-assessed health	N.15	Would you say that your health is: Excellent, very good, good, fair, poor.

* Description of survey questions for both instruments is available in Appendix A.

Additional control variables

Question	Item #	Wording
Age	A.1	
Gender	A.2	What is your sex?
Race/ethnicity	A.4, A.4a	
Income	Q.8, Q.9	Over the last year, what is the total income of the household you live in? Over the last year, what is your personal income?
Education	O.1	What is the highest grade or level of schooling that you have completed? (made dichotomous, high school or less and more than high school)
Special educational programs Learning disabled Advance placement Homebound education	0.3	O.3 In elementary, junior, or high school were you ever in any of the following programs? (learning disabled or special education, advanced placement or homebound education > 1 year)
Cancer		Information collected from each institution
Age of diagnosis		Information collected from each institution (not in baseline survey)
Methotrexate, IT	Chemo II	Medical Abstraction Form, Chemotherapy, Question II.
Cranial radiation		Medical Abstraction Form, Radiation Therapy, (p. 10-11)

APPENDIX B

PROPOSED TABLES FOR Characterization of drinking behaviors in survivors of childhood cancer compared to a general population

Table 1: Prevalence of current drinking, risky drinking and heavy drinking described in CCSS and NAS-2000. Table will include prevalence described by survivor, sibling and general population and subdivided by gender, age and racial/ethnic groups.

Variable	CCSS-Survivors N= % reporting drinking types			CCSS-Siblings N= % reporting drinking types			NAS N= % reporting drinking types		
	Current	Risky	Heavy	Current	Risky	Heavy	Current	Risky	Heavy
Total Population									
Gender									
Female									
Male									
Race/ethnicity									
White, non-Hispanic									
Black, non-Hispanic									
Hispanic									
Other									
Age at interview									
18-20									
20-29									
30-39									
40+									
Age at diagnosis									
0-4									
5-9									
10-14									
15-21									

A: statistically significant differences ($p \leq .05$) between survivors and siblings.

B: statistically significant differences ($p \leq .05$) between survivors and NAS.

C: statistically significant differences ($p \leq .05$) between siblings and NAS.

Table 2: Factors associated with risky drinking and heavy drinking; bivariate associations; OR (95% CI).

Variable	CCSS-Survivors N=	
	OR (95% CI)	
	Risky	Heavy
Gender Female (ref) Male		
Race/ethnicity White, non-Hispanic (ref) Black, non-Hispanic Hispanic Other		
Age at interview 18-20 20-29 30-39 40+ (ref)		
Household Income <\$9,999 \$10,000-19,999 \$20,000-39,000 \$40,000-59,999 over \$60,000		
Age at diagnosis 0-4 5-9 (ref) 10-14 15-21		
Education High school or less More than High school		
Educational programs Special Education Advanced Placement Homebound ≥ 1 year		
IT Methotrexate or Cranial radiation		
Adverse Health, Any Domain General Health Mental Health Functional Impairment Activity Limitations Pain Anxiety about Cancer		
Cancer Diagnosis Leukemia Central Nervous System Hodgkin disease Non-hodgkin Lymphoma Wilms Tumor Neuroblastoma		

Sarcoma Bone		
Household Income <\$9,999 \$10,000-19,999 \$20,000-39,000 \$40,000-59,999 over \$60,000		

Table 3: Two models examining factors associated with risky drinking and heavy drinking. Model 1 examines known risk factors in general populations. Model 2 examines cancer specific variables. Model 2 is created using items starting with and below “age at diagnosis.” Variables will be added one at a time using forward stepwise regression techniques and retaining those variables that make a significant contribution to the model.

Variable	CCSS-Survivors N= OR (95% CI)		CCSS-Survivors N= OR (95% CI)	
	Risky Drinking		Heavy Drinking	
Total Population	Model 1	Model 2	Model 1	Model 2
Age at interview				
18-20	Xx	Xx	Xx	Xx
20-29	Xx	Xx	Xx	Xx
30-39	Xx	Xx	Xx	Xx
40+	ref	ref	ref	ref
Race/ethnicity				
White, non-Hispanic	ref	ref	ref	ref
Black, non-Hispanic	Xx	Xx	Xx	Xx
Hispanic	Xx	Xx	Xx	Xx
Other	xx	xx	xx	xx
Gender				
Female	ref	ref	ref	ref
Male	xx	xx	xx	xx
Household Income				
<\$9,999	Xx	Xx	Xx	Xx
\$10,000-19,999	Xx	Xx	Xx	Xx
\$20,000-39,000	Xx	Xx	Xx	Xx
\$40,000-59,999	Xx	Xx	Xx	Xx
over \$60,000	ref	ref	ref	ref
Education				
High school or less	Xx	Xx	Xx	Xx
More than High school	ref	ref	ref	ref
Educational programs				
Special Education	Xx	Xx	Xx	Xx
Advanced Placement	Ref	Ref	Ref	Ref
Homebound ≥1 year	xx	xx	xx	xx
Age at diagnosis				
0-4		Xx		Xx
5-9 (ref)		Ref		Ref
10-14		Xx		Xx
15-21		xx		xx
Adverse Health, Any Domain (vs				

better health-ref)				
General Health		Xx		Xx
Mental Health		Xx		Xx
Depression		Xx		Xx
Anxiety		Xx		Xx
Somatization		Xx		Xx
Functional Impairment		Xx		Xx
Activity Limitations		Xx		Xx
Pain		Xx		Xx
Anxiety about Cancer		xx		xx
IT Methotrexate or Cranial radiation		xx		xx
Cancer Diagnosis				
Leukemia		Ref		Ref
Central Nervous System		Xx		Xx
Hodgkin disease		Xx		Xx
Non-hodgkin Lymphoma		Xx		Xx
Wilms Tumor		Xx		Xx
Neuroblastoma		Xx		Xx
Sarcoma		Xx		Xx
Bone		xx		xx