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Topic: Suicide

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98-19

CHILDHOOD CANCER SURVIVOR STUDY  
Analysis Concept Proposal

Submitted: June 11, 1998

1. Title: Suicide and Suicidal Ideation Among Childhood Cancer Survivors
2. Working Group and Investigators: This proposed publication will be within the Neurological/Psychosocial Working Group. Proposed investigators (name/e-mail/fax) will include:

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3. Background and Rationale:

Suicidal ideation and suicide attempt represent the most serious and life-threatening emotional reactions to the diagnosis of cancer. It has been estimated that as many as 25% of adults with cancer experience significant depression (Massie et al. 1994), and may be twice as likely to die by suicide than individuals without a cancer diagnosis (Louhivuori in Massie). Few studies have systematically investigated the rates of depression and suicidality in pediatric samples, but studies of psychiatric referrals indicate that depression is a significant problem, especially for adolescents (Rait, et al, 1988). A descriptive retrospective study completed at our center (Kunin et al., 1995) found only a small number of suicidal incidents (attempts and completed suicides) but this study almost certainly underestimated the incidence of suicidal behavior because of the limited methodology. Interestingly, the majority of cases identified were patients who were off treatment at the time of the incident, suggesting that the period after completion of therapy may be as critical as the diagnostic and treatment phases.

Epidemiological studies indicate that the periods of adolescence and young adulthood show a dramatic increase in suicide attempt and completion. Completed suicide in children under ten is extremely rare while the incidence in the 10-14 year old age group is 2 per 100,000 and rises to 15 per 100,000 in the 20-24 year old age group (Hollinger and Offer, 1989). Suicidal attempt shows an even more dramatic rise in this age group reaching its highest incidence in the 15-24 year old age group (Schukit and Schukit, 1989). Studies of individuals with chronic illness such as diabetes, rheumatic disease etc., show increased incidence of suicidal ideation and behavior, indicating that

these conditions may increase the risk of suicidality even beyond the sizable developmental risk of this age period. Survivors of childhood cancer often experience ongoing medical and psychosocial sequelae long after their treatment is completed. Since the natural history of suicidal behaviors is marked by the overwhelming increase of risk in the second decade of life, understanding to what extent cancer survivorship may further predispose young adults to suicidal behavior, and identifying groups of survivors who are at highest risk will make a substantial contribution to the psychological care of childhood cancer survivors.

The CCSS data set includes self report data on suicidal ideation for subjects 18 and older, as well as cause of death data for deceased subjects of all ages. This investigation will use these data to determine to what extent survivors demonstrate an increased risk of suicidal ideation and completed suicide. Within the survivor group an examination will be made of what medical, demographic and psychosocial variables are associated with suicidal ideation, and completed suicide.

In addition to exploring these questions most pertinent to the study of childhood cancer survivors, this investigation permits an examination of how traditional risk factors for suicide may operate differently in a distinctive population. Gender differences for example are commonly found in suicide research, with females having higher rates of suicidal ideation than males. Some studies with high risk populations such as lesbian and gay adolescents (Bell & Weinberg, 1978; Hecht, 1997) have indicated that gender effects are attenuated when there are generally high rates of suicidal ideation in a population. Similarly, depression is commonly associated with suicidal ideation, but may be a less important factor in populations where other risk factors are more influential. As a secondary area of investigation this study will examine how gender and depression are related to suicidality in the population of childhood cancer survivors.

4. Specific Aims/Objectives/Research Hypothesis: This publication is designed to investigate the incidence of suicidal ideation and completed suicide among survivors. The three main objectives are to:

- 1) Describe the levels of depression, suicidal ideation and completed suicide in the survivor population;
- 2) Determine whether or not the survivors are at increased risk for suicidal ideation and completed suicide compared to the comparison group and epidemiological data, and
- 3) To identify within the survivor group what demographic, psychosocial, treatment, and medical outcome variables are associated with risk of suicide and suicidal ideation.

Secondary objectives will be to describe the relationship of suicide and suicidal ideation to gender and depression in this population.

Hypotheses:

1. Survivors will have higher levels of suicidal ideation and suicide than controls and higher than the incidence reported in epidemiological studies of normative samples.

2. Within the survivor group medical variables- diagnosis, treatment intensity, medical late effects, number of surgeries, level of physical impairment, chronic pain and disfigurement will all be positively associated with suicidal ideation and completed suicide. Intensive cranial radiation is also hypothesized to be related to suicidal ideation and suicide because of the association with cognitive deficits. Demographic variables- age, time since diagnosis, marital status, education, and employment status will be significantly associated with suicidal ideation and suicide.
3. Suicidal ideation will be significantly associated with the psychosocial variables of depression, anxiety, alcohol use and functional impairment.
4. The relationship between suicidal ideation and depression will be significant in both the survivor and sibling groups, but in the survivor group the relationship will be significantly smaller than in the control group reflecting the influence of other variables on suicidal ideation in the survivor group.
5. Within the control group the common gender effect will be found with suicidal ideation will be more prevalent among females. In the survivor group gender is not expected to be significantly associated with suicidal ideation reflecting the influence of other variables on suicidal ideation in the survivor group.

#### 5. Analysis Framework

- a. Outcomes of interest include: Suicidal ideation (patients >18 J.19); Completed suicide from death certificates. *not sample*
- b. Subject population: CCSS survivor group and matched controls. Suicidal ideation will be available for subjects >18. Cause of death will be available for all deceased subjects.
- c. Predictor variables:  
Demographic variables: constant- gender, ethnicity, religion, age at study entry; potentially moderated- marital status, education, employment status, and income.

Treatment/medical variables: diagnosis, age at diagnosis, time since diagnosis, type of therapy ; surgery: total number of procedures; radiation: amount, location, duration; chemotherapy: duration. Total intensity: combination irradiation and chemotherapy and surgery, bone marrow transplant.

#### Chronic Medical Illness:

Sensory Deficits: C.3, 8.; Kidney Disease D.4, I.25.; Diabetes: E.5-7.; Infertility: E.13-16, M.5-8.; Heart Disease: F.4-6,8-15, I.7-19, 14, 23.; Pulmonary disease: G.9,11, I.19, 20, 24; Gastrointestinal: H.3, 14, 16, I.11-13.; Nervous: J1-12, 14, 15.; Recurrence/Secondary cancers: K.1-8.; Pain: J13, J37.; Disfigurement B.9, I.1, 2, 4, 5.

#### Psychosocial:

Depression and anxiety: J.16-36.; Alcohol: N3-8.; Functional impairment N.9-15.

d. Specific tables:

1) Suicidal ideation of survivors v. sibling controls, and normative samples. Suicidal ideation by demographic variables, treatment/medical variables, chronic medical illness variables and psychosocial variables.

2) Cause of death among survivors v. sibling controls, and normative samples. Completed suicide and all death from external causes by demographic variables, and medical treatment variables.

3) Predictor final models for suicidal ideation, and completed suicide within the survivor group. If sample size allows the survivor group could be randomly divided in two and the model developed in subsample could be tested for reproducibility in the other.

6. Special Considerations

1. Control of Type I error. Because of the significant number of potential independent variables in the study, attention will need to be paid to the inflation of type I error. For descriptive purposes it will be useful to examine the relationship of single variables to outcomes of interest. Reduction of the number of variables will be accomplished in many cases by combining several variables into one overall score; For example several symptoms of heart disease can be combined into one heart disease score. In addition, the multivariate analyses can eliminate independent variables that do not contribute unique variance to the final model. Overall type I error rate will be computed for each analysis and for the study as a whole.

2. In some cases information from the death certificate may not make it clear whether a death was a suicide or not. Drug overdoses and unwitnessed accidental deaths in particular can be difficult to distinguish from intentional suicidal acts. Following the convention used in large scale suicide studies, the causes of death will be classified by ICD-9 codes and the incidence of all categories of death from "external" causes will be determined. The incidence of these causes of death in the survivor group, as well as the incidence of substantiated suicide can then be compared with the sibling group and with findings from epidemiological studies.