

Psychology Working Group
Childhood Cancer Survivor Study

Kevin R. Krull, PhD

June 2017

Objectives

- Working Group membership
- Publications since last meeting
- Concept Proposals
- Short and Long-Term Priorities

Psychology Advisory Group

- Tara Brinkman, Psychology, SJCRH
- Pim Brouwers, Neuropsych, NIMH
- Yin Ting Cheung, Pharmacology, SJCRH
- Kim Edelstein, Neuropsych, Princess Margaret
- Jordan Gilleland, Psychology, Emory
- Kristy Hardy, Neuropsych, Children's National
- I-Chan Huang, Psychometrics, SJCRH
- Bob Hayashi, Oncology, WashU
- Nina Kadan-Lottick, Oncology, Yale
- Allison King, Neuro-Oncology, WashU
- Jin-shei Lai, Psychometrics, Northwestern
- Philip Lupo, Epidemiology, Baylor
- M. Fatih Okcu, Neuro-Oncology, Baylor
- Christopher Recklitis, Psychology, Dana Farber
- Elizabeth Wells, Neurology, Children's National

Recent Publications

Recently Published

Prasad PK, Hardy KK, Zhang N, Edelstein K, Srivastava DK, Zeltzer L, Stovall M, Seibel NL, Leisenring W, Armstrong GT, Robison LL, Krull K. Psychosocial and neurocognitive outcomes in adult survivors of adolescent and early young adult cancer: A report from the Childhood Cancer Survivor Study. *J Clin Oncol*. 2015;33(23):2545-52.

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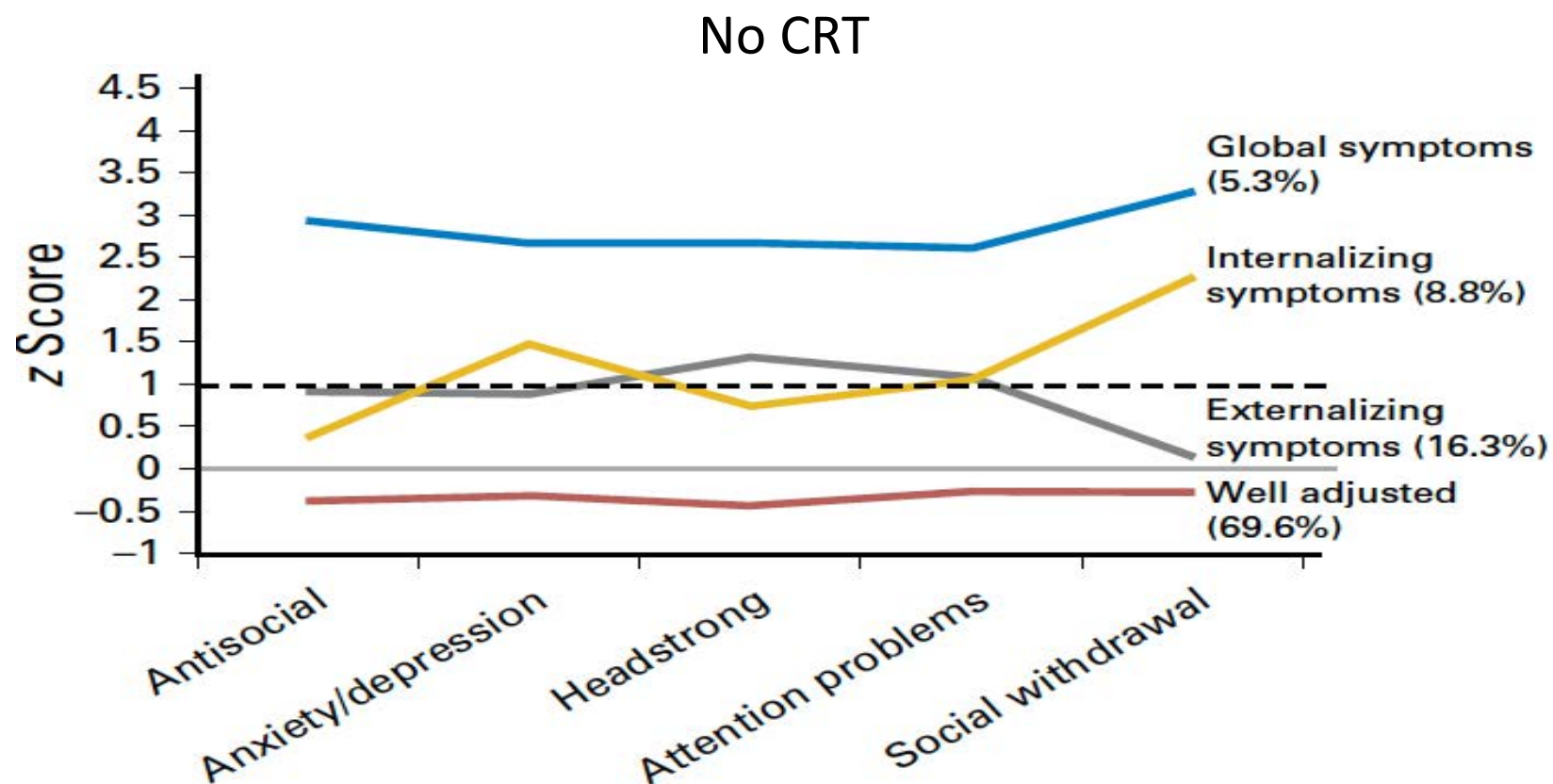
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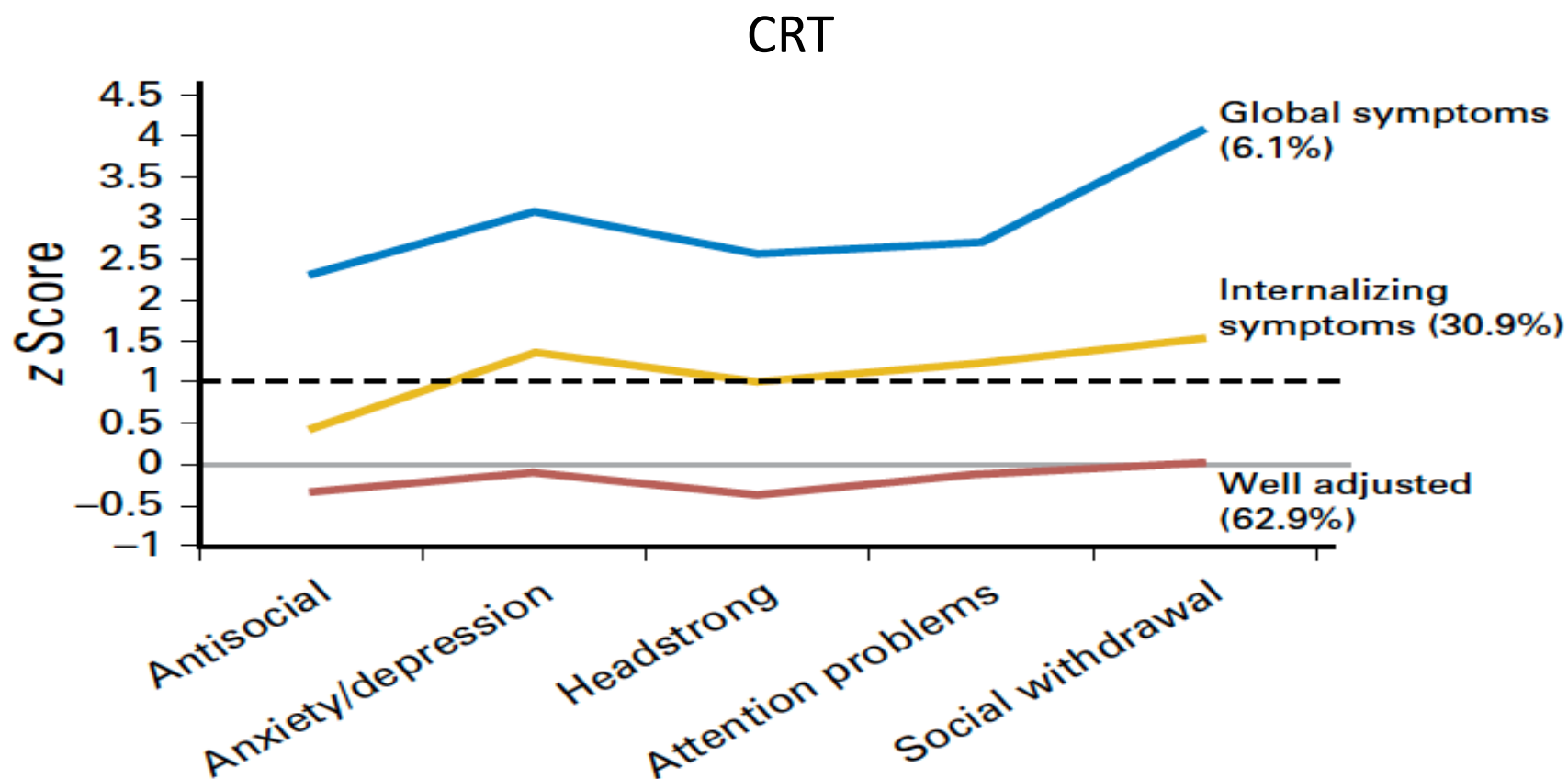
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Brinkman TM, Li C, Vannatta K, Marchak JG, Lai JS, Prasad PK, Kimberg C, Vuotto S, Di C, Srivastava D, Robison LL, Armstrong GT, Krull KR. Behavioral, social and emotional symptom comorbidities and profiles in adolescent survivors of childhood cancer: A report from the Childhood Cancer Survivor Study. *J Clin Oncol*. 2016;34(28):3417-25.

Comorbidity in Adolescent Survivors (N=3893)



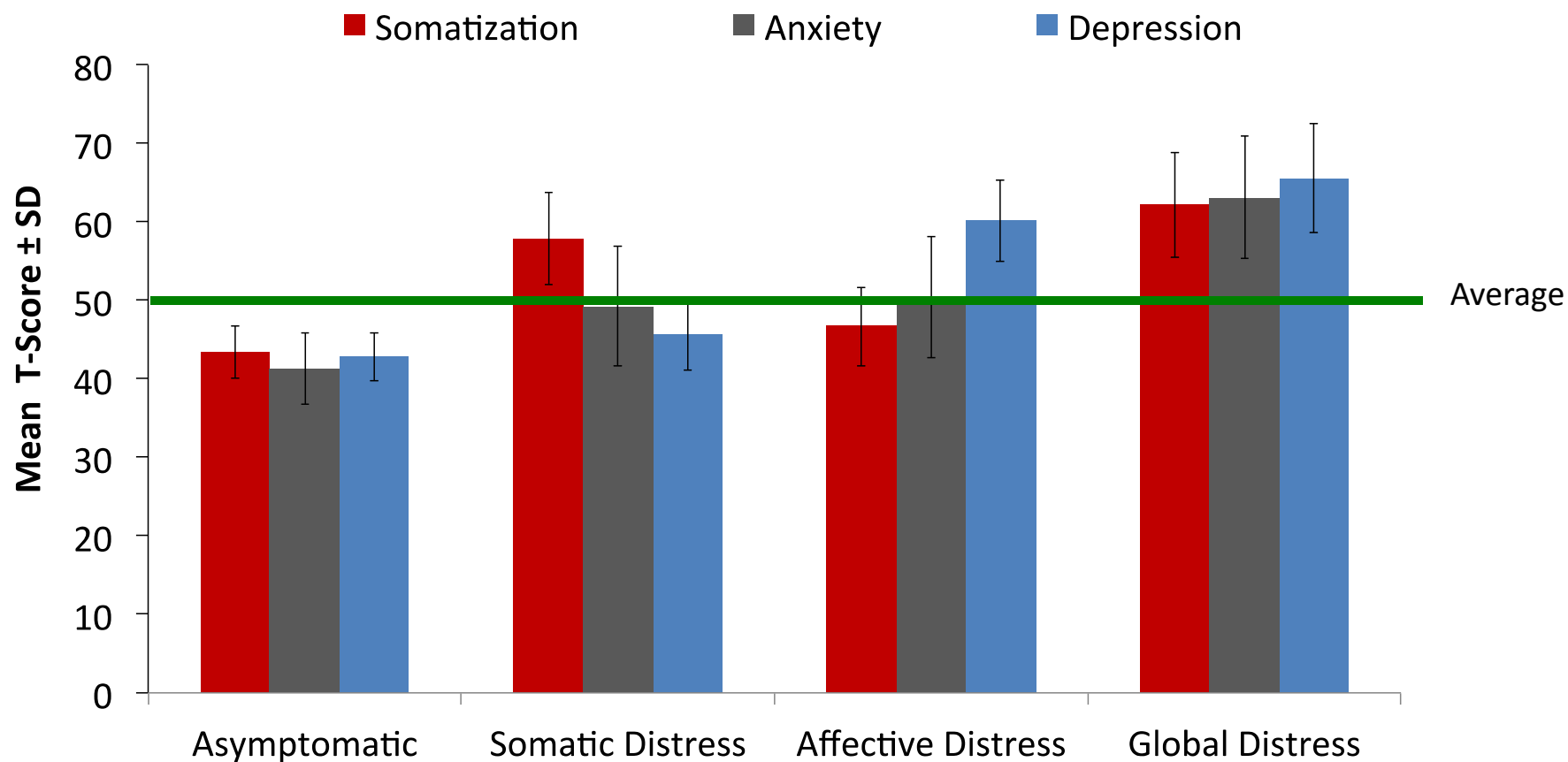
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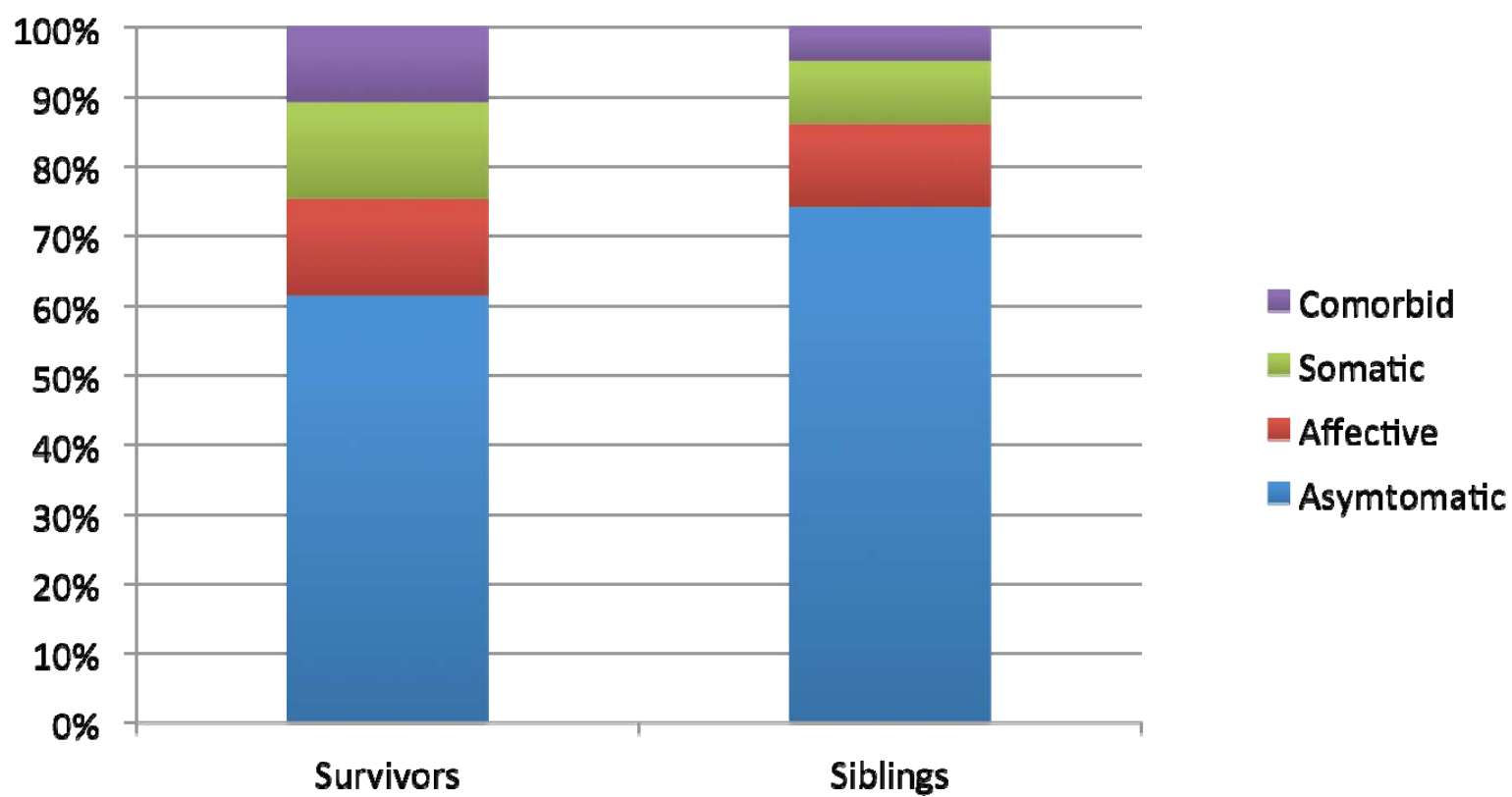
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Comorbidity in Adult Survivors (N=16,079)



Comorbidity in Adult Survivors



Comorbidity in Adult Survivors

TABLE 5. Multivariate Models Predicting Survivor Distress Cluster Membership: Diagnosis and Sociodemographic Factors

Risk Factor	Comorbid		Somatic		Affective	
	OR	95% CI	OR	95% CI	OR	95% CI
Diagnosis						
Solid tumors	1.0		1.0		1.0	
Bone and soft tissue sarcomas	1.26	1.01-1.57	0.99	0.82-1.20	1.15	0.95-1.40
CNS tumors	1.30	1.05-1.61	0.88	0.73-1.06	1.29	1.08-1.55
Leukemia	1.34	1.12-1.61	0.88	0.75-1.03	1.04	0.88-1.22
Lymphomas	1.16	0.93-1.44	0.97	0.80-1.16	1.17	0.97-1.41
Age at diagnosis (per year)	1.01	0.99-1.02	1.02	1.01-1.03	0.98	0.97-0.99
Time since diagnosis (per year)	1.01	0.99-1.02	1.01	1.00-1.02	0.98	0.97-0.99

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Behavior Problems in Adolescent ALL Survivors (N=1,560 Survivors)

	Antisocial	Anxiety-depression	Headstrong	Inattention-hyperactivity	Social withdrawal	Special education
Sibling comparison*						
Siblings	1	1	1	1	1	1
Survivors	1.15 (0.88–1.52)	1.44 (1.09–1.89)	1.38 (1.09–1.75)	1.56 (1.24–1.96)	1.86 (1.45–2.37)	2.46 (1.95–3.10)
Age at diagnosis†	1.08 (0.97–1.21)	1.06 (0.96–1.17)	1.07 (0.99–1.16)	1.01 (0.93–1.08)	1.01 (0.94–1.09)	0.95 (0.90–1.01)
Sex†						
Male	1	1	1	1	1	1
Female	0.67 (0.47–0.95)	1.26 (0.93–1.71)	0.85 (0.65–1.10)	0.84 (0.66–1.07)	1.07 (0.85–1.35)	0.97 (0.81–1.17)
CRT (Gy)†						
None	1	1	1	1	1	1
<20	0.83 (0.55–1.25)	1.66 (1.17–2.35)	1.15 (0.86–1.54)	1.71 (1.30–2.24)	1.94 (1.47–2.57)	1.69 (1.37–2.08)
≥20	0.65 (0.35–1.20)	1.37 (0.79–2.38)	1.27 (0.86–1.87)	1.60 (1.10–2.34)	1.66 (1.14–2.43)	1.97 (1.55–2.49)
Intravenous methotrexate (g/m²)†						
None	1	1	1	1	1	1
<4.3	1.21 (0.82–1.79)	1.31 (0.94–1.84)	1.04 (0.76–1.43)	1.25 (0.95–1.64)	1.31 (1.01–1.71)	1.07 (0.87–1.31)
≥4.3	1.07 (0.69–1.66)	1.36 (0.92–2.03)	1.28 (0.93–1.76)	1.53 (1.13–2.08)	1.24 (0.90–1.70)	1.22 (0.95–1.55)
Intrathecal methotrexate (mg)†						
<230	1	1	1	1	1	1
>230	0.86 (0.59–1.26)	0.86 (0.62–1.18)	0.82 (0.62–1.09)	1.02 (0.80–1.32)	0.95 (0.74–1.22)	1.21 (1.00–1.47)

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Huang IC, Brinkman TM, Armstrong GT, Leisenring W, Robison LL, Krull KR. Emotional distress impacts quality of life evaluation: A report from the Childhood Cancer Survivor Study. *J Cancer Surviv*. 2017 Jun;11(3):309-319.

Recently Completed Analyses

Completed Analyses

- Sabine Mueller (UCSF) – Neurocognitive and QOL outcomes after stroke.

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- Fiona Schulte (U Calgary) – Social function in adolescent survivors of CNS tumors.

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- Daniel Zheng (Yale) – Cognitive and behavioral outcomes in adolescent survivors of neuroblastoma.
- Fiona Schulte (U Calgary) – Social function in adolescent survivors of CNS tumors.
- Lauren Daniel (CHOP/Rutgers) – Sleep behavior, patterns and associations with health outcomes.

Concepts in Progress

Ongoing Analyses

- Stefanie Vuotto (SJCRH) – Psychological distress, functional dependence and neurologic morbidity among adult survivors of CNS-directed therapies.

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- Yin Ting Cheung (SJCRH) – Prevalence and patterns of prescription psychoactive medication use in adolescent survivors.

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- Yin Ting Cheung (SJCRH) – Prevalence and patterns of prescription psychoactive medication use in adolescent survivors.
- Cindy Karlson (U Mississippi) – Prevalence of pain and pain related disability.

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- Stefanie Vuotto (SJCRH) – Psychological distress, functional dependence and neurologic morbidity among adult survivors of CNS-directed therapies.
- Yin Ting Cheung (SJCRH) – Prevalence and patterns of prescription psychoactive medication use in adolescent survivors.
- Cindy Karlson (U Mississippi) – Prevalence of pain and pain related disability.
- Kristen Stefanski (Cincinnati Children's) – Emotional and behavioral outcomes in AML survivors.

Approved Concept Proposals

- Nina Kadan-Lottick (Yale) – Neurocognitive function in survivors of osteosarcoma.
- Pete de Blank (Rainbow Babies) – Effect of NF1 status on late outcomes in adult survivors.
- Emily Crochet (FIT) – Posttraumatic stress, health outcomes and healthcare utilization.

Approved AOs

Approved AOI's

- Jin-Shei Lai (Northwestern) – Fatigue and its relationship to health outcomes.
- Dave Buchbinder (UC-Irvine) – Psychological concerns among siblings.
- Alicia Kunin-Batson (U Minnesota) – Cognitive/behavior problems in adolescent survivors of CNS tumors.
- Ameera Fayad (U Buffalo) – Loneliness predictors and outcomes.
- Lisa Bashore (Cook Children's) – Special education services and educational attainment.
- Lisa Jacola (SJCRH) – Impact of preexisting conditions on long-term psychosocial outcomes.
- Jennifer Yeh (Boston Children's) – Trend in utility-based health-related quality of life.
- Kevin Krull (SJCRH) – Cognitive aging in adult survivors.

Approved AOI's

- Kim Edelstein (Princess Margaret) – Physical activity as a predictor of neurocognitive outcomes.
- Tara Brinkman (SJCRH) – Longitudinal changes in functional independence in CNS tumors.
- Ibrahim Qaddoumi (SJCRH) – Suicide, homicide and accidental death.
- I-Chan Huang (SJCRH) – Determinants of change in HRQOL.
- Tara Brinkman (SJCRH) – Changes in CRT and neurocognitive, social and QOL outcomes in CNS tumors.
- Caroline Hesko (U Chicago) – Neurocognitive outcomes in adult survivors of neuroblastoma.
- Nicole Alberts (SJCRH) – Daily and chronic pain experiences.
- Stephanie Dixon (SJCRH) – Racial and ethnic differences in neurocognitive and psychological outcomes.

Ancillary Studies

Symptom Progression

- Symptom progress and adverse health outcomes in adult survivors of childhood cancer
 - I-Chan Huang, Kevin Krull (St. Jude Children's Research Hospital)
 - R21 NCI funded 2015/12/01 – 2017/11/30
- Presence of individual symptoms (sensory, motor, cardiac, pulmonary, pain, anxiety, depression, and somatization) and symptom clusters across multiple time points.
- To investigate the prognostic value of individual symptoms and symptom clusters for developing chronic conditions and all-cause mortality in adult survivors of childhood cancers.

eHealth Insomnia Intervention

- Neurocognitive and cardiovascular outcomes following cognitive behavioral therapy for insomnia
 - Kathy Ruble (Johns Hopkins), Lee Ritterband (U Virginia), Kevin Krull (St. Jude)
 - R01 NCI resubmission August 2017
 - To assess the impact of insomnia treatment on neurocognitive function in survivors who have comorbid insomnia and neurocognitive impairment.
 - To assess the impact of insomnia treatment on quality of life.
 - To assess the impact of insomnia treatment on biomarkers of cardiovascular health.

Working Group Priorities

Long-Term Priorities

- Exploit the expanded cohort data (1970-99)

Long-Term Priorities

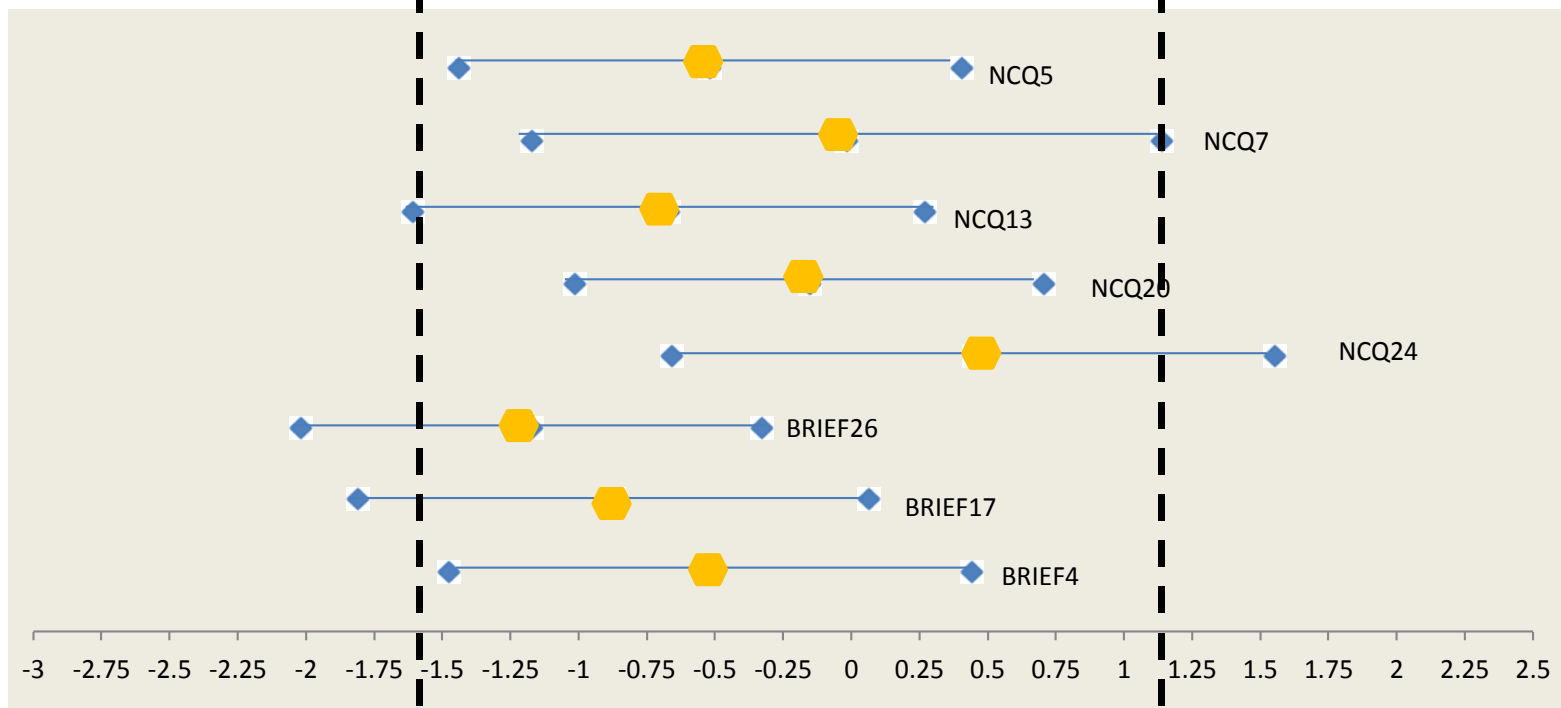
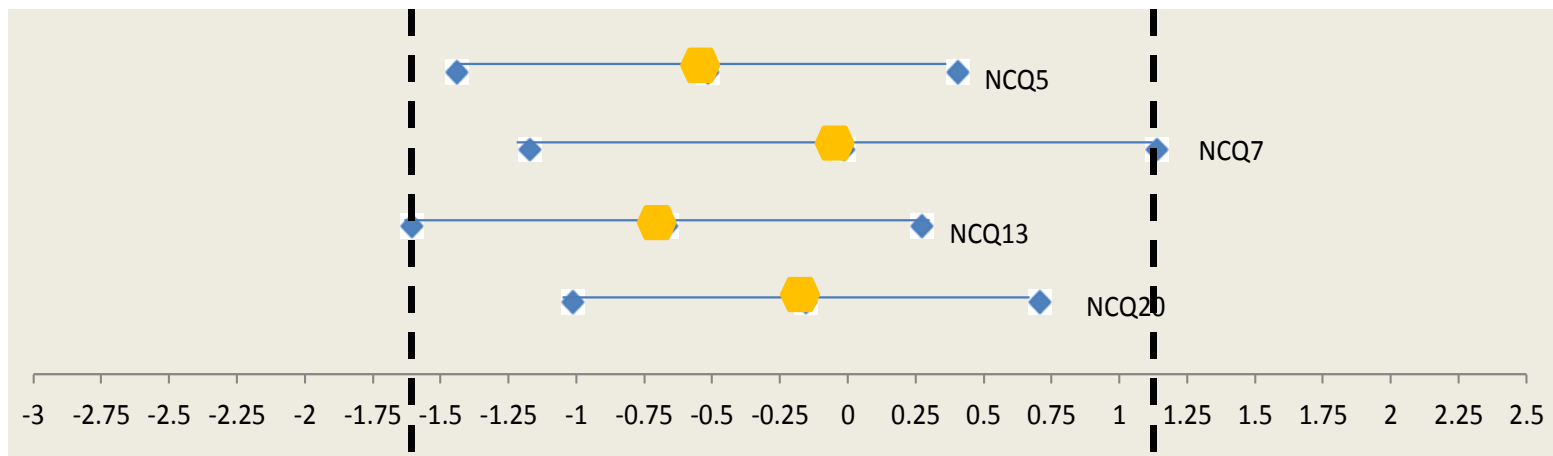
- Exploit the expanded cohort data (1970-99)
 - Comorbid emotional distress/neurocognitive impairment and chronic health conditions

Long-Term Priorities

- Exploit the expanded cohort data (1970-99)
 - Comorbid emotional distress/neurocognitive impairment and chronic health conditions
 - Impact of less intense therapeutic exposures in survivors (e.g. revised CCSS-NCQ)

CCSS-NCQ Revised

- Original CCSS-NCQ
 - 25 items
 - 4 factors:
 - Task Efficiency (9)
 - Memory (4)
 - Organization (3)
 - Emotion Regulation (3)
 - Narrow item difficulty
- Revised CCSS-NCQ
 - 33 items
 - 4 factors:
 - Task Efficiency (8+1)
 - Memory (8)
 - Organization (8)
 - Emotion Regulation (8)
 - Expanded item difficulty



Long-Term Priorities

- Exploit the expanded cohort data (1970-99)
 - Comorbid emotional distress/neurocognitive impairment and chronic health conditions
 - Impact of less intense therapeutic exposures in survivors using our revised CCSS-NCQ
- GWAS resource for genetic investigation

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 - CNS stroke following cranial irradiation

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 - Moderation/mediation of neurocognitive and psychosocial outcomes

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 - Moderation/mediation of neurocognitive and psychosocial outcomes
- eHealth and mHealth interventions
 - Cognitive behavioral therapy to improve insomnia-related cognition

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 - CNS stroke following cranial irradiation
 - Moderation/mediation of neurocognitive and psychosocial outcomes
- eHealth and mHealth interventions
 - Cognitive behavioral therapy to improve insomnia-related cognition
 - Eureka app-based platform (pain, fatigue, sleep, cognition, stress, self-efficacy)

Childhood Cancer Survivor Study

- The Childhood Cancer Survivor Study is an NCI-funded resource (U24 CA55727) to promote and facilitate research among long-term survivors of cancer diagnosed during childhood and adolescence.
- Investigators interested in potential uses of this resource are encouraged to visit:

<http://ccss.stjude.org>