

Prescription Psychoactive Medication Use in Adolescent Survivors of Childhood Cancer and its Impact on Outcomes at Adulthood

A Report from the Childhood Cancer Survivor Study (CCSS)

Yin Ting Cheung¹, Wei Liu², Tara M. Brinkman², Deokumar Srivastava², Wendy M. Leisenring³, Rebecca M. Howell⁴, Nicole J. Ullrich⁵, Karen M. Lommel⁶, Pim Brouwers⁷, Todd M. Gibson², Leslie L. Robison², Gregory Armstrong², Kevin R. Krull²

1. School of Pharmacy, Faculty of Medicine, The Chinese University of Hong Kong

2. St. Jude Children's Research Hospital, USA

3. Fred Hutchinson Cancer Research Center, USA

4. The University of Texas MD Anderson Cancer Center, USA

5. Boston Children's Hospital, USA

6. University of Kentucky College of Medicine, USA

7. National Institute of Mental Health, USA

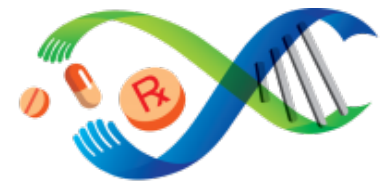
Email: yinting.cheung@cuhk.edu.hk



香港中文大學醫學院

Faculty of Medicine

The Chinese University of Hong Kong



School of Pharmacy CUHK

Psychoactive Medication Use in Survivors

- Survivors of childhood cancer suffer from cancer- and treatment-related late effects:
 - Sleep disturbances, fatigue, cognitive deficits and chronic pain ^{1,2}
- Pharmacological treatments may be used to address these symptoms/conditions ³
- Psychoactive medications use early in life may impact long-term functional outcomes in adolescent survivors of childhood cancer

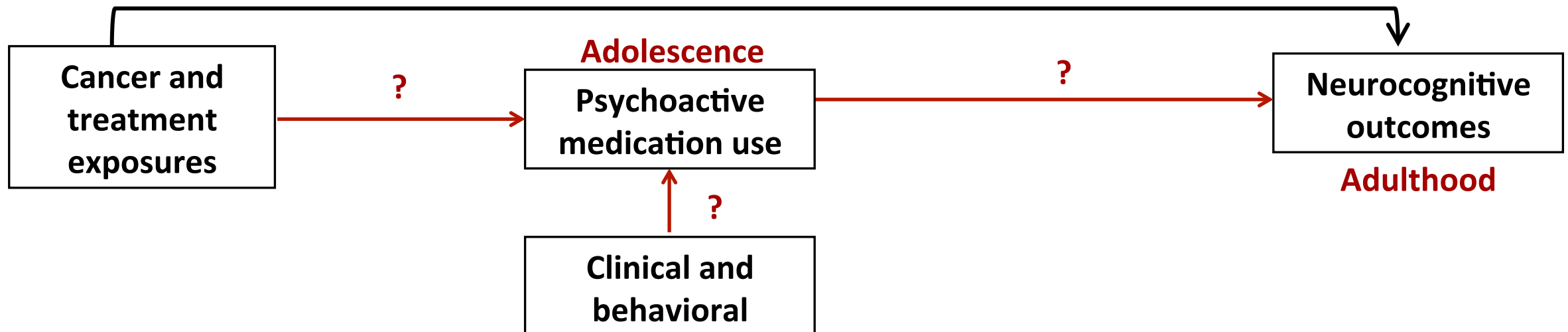
1. Cheung YT et al. Cancer 2017;123:3410-19

2. Cheung YT et al. JNCI 2018; 110: 411-19

3. Jonas BS et al. NCHS Data Brief 2013;135:1-8

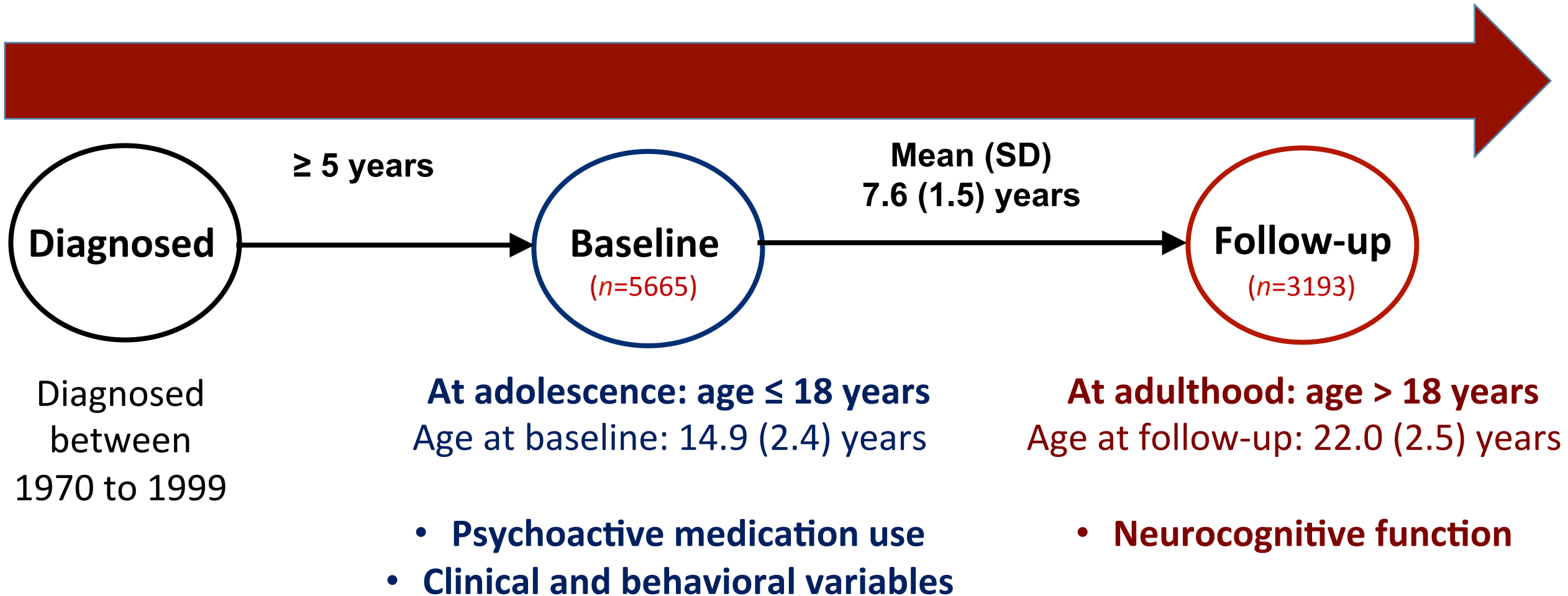
Objectives

- To evaluate the prevalence and factors associated with psychoactive medication use in adolescent survivors of childhood cancer
- To evaluate the associations between psychoactive medication use and survivors' neurocognitive outcomes during adulthood



Childhood Cancer Survivor Study (CCSS)

- Funded by the National Cancer Institute (NCI) in 1994
- 31 contributing centers in the United States
- Retrospective cohort, diagnosed 1970 to 1999
- 5-year survivors and sibling controls
- Leukemia, Lymphoma, CNS Malignancies, Wilms Tumor, Neuroblastoma, Soft Tissue and Bone Sarcoma
- Detailed treatment data
- Wide range of patient-reported outcomes over multiple time-points



Psychoactive Medication Use (Adolescence)

- Proxy-reported at baseline
- **Prescription drugs** taken consistently for more than a month, or ≥ 30 days in one year during the previous 2 year period
- Classified based on the American Hospital Formulary Service Drug Information database (AHFS)
 1. Antidepressants
 2. Anxiolytics/sedatives/hypnotics
 3. Anticonvulsants
 4. Non-opioid analgesics
 5. Opioids
 6. Muscle relaxants
 7. Neuroleptics
 8. Stimulants

Clinical and Behavioral Correlates (Adolescence)

- Neurologic variables:
 - Headache, bodily pain, and history of seizure
- Behavior Problem Index (BPI):
 - Depression/anxiety
 - Headstrong
 - Attention deficit
 - Peer conflict/social withdrawal
 - Antisocial
- Placement in learning disabled or special education program

Self-reported Functional Outcomes (Adulthood)

Outcomes

Tools

Neurocognitive function

CCSS- Neurocognitive Questionnaire

- Task efficiency
- Emotional regulation
- Organization
- Memory

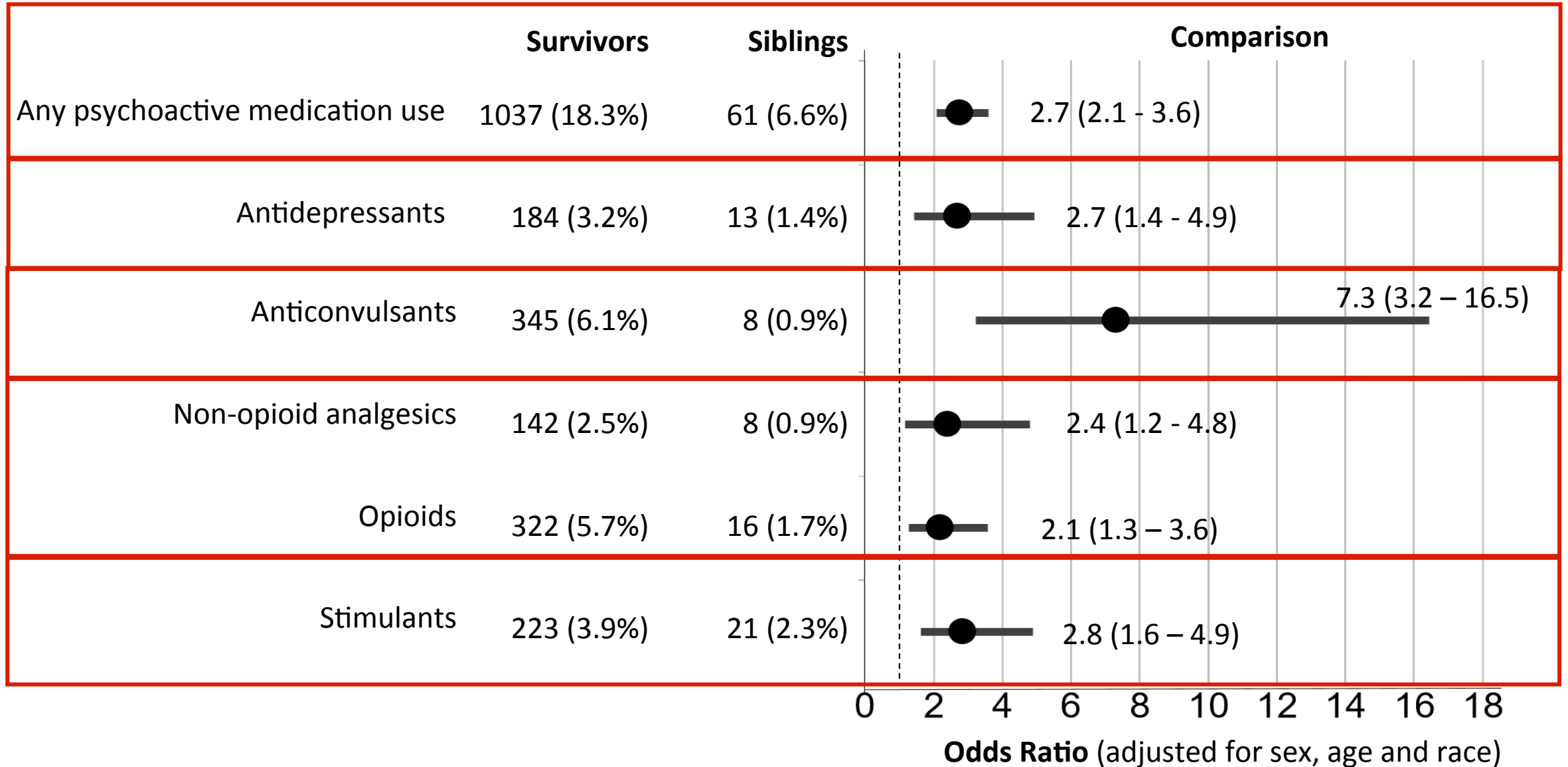
- **Multivariable log-binomial models** to:
 - Compare psychoactive medication use between survivors and siblings at baseline
 - Identify clinical and treatment factors associated with psychoactive medication use
 - Evaluate association between psychoactive medication use and functional outcomes at adulthood

Adjusting for covariates (sex, age at evaluation, treatment variables, health insurance status, and household income at baseline)

Study Population Characteristics

	Survivors (N=5665)	Siblings (N=921)
	Mean (SD)	Mean (SD)
Age at cancer diagnosis (years)	3.1 (2.3)	
Age at baseline evaluation (years)	14.9 (2.4)	14.5 (2.9)
	N (%)	N (%)
Sex (male)	3047 (53.8)	488 (53.0)
Diagnosis		
Leukemia	2276 (40.2)	
CNS Tumor	930 (16.4)	
Neuroblastoma	906 (16.0)	
Wilms tumor	838 (14.8)	
Soft tissue sarcoma/ Osteosarcoma	425 (7.5)	
Hodgkin Disease/Non-Hodgkin Lymphoma	290 (5.1)	

Survivors vs Siblings



Factors Associated with Overall Medication Use

		Medication Use	
		OR	95% CI
Diagnosis	CNS tumor (vs leukemia)	1.36	1.2 - 1.6
	Others (vs leukemia)	1.05	0.9 - 1.2
Seizures	Yes (vs none)	3.62	3.2 - 4.1
Headache/migraine	Yes (vs none)	1.48	1.3 - 1.7
Bodily pain (none)	Mild (vs none)	1.38	1.1 - 1.7
	Moderate (vs none)	1.92	1.6 - 2.4
	Severe (vs none)	2.31	1.7 - 3.1
Cranial Radiation	CRT <20 Gy (vs none)	0.95	0.8 - 1.2
	CRT 20 - 35 Gy (vs none)	0.88	0.6 - 1.2
	CRT >35 Gy (vs none)	1.28	1.1 - 1.5

Behavior and Psychoactive Medication Use

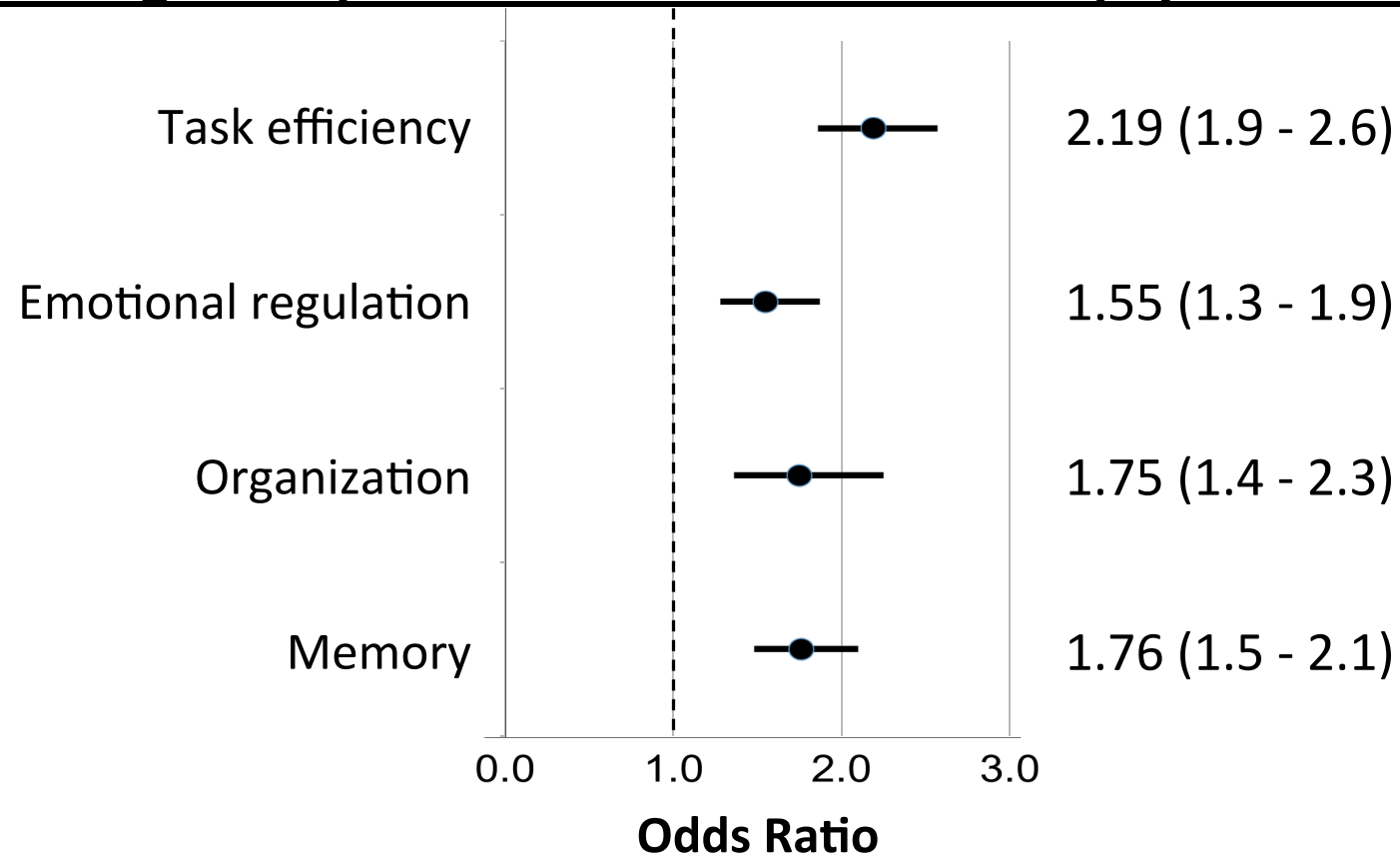
	Medications (overall)	
	OR	95% CI
Depression/Anxiety	2.22	2.0 - 2.5
Headstrong Behavior	2.02	1.8 - 2.3
Attention Deficit	2.80	2.5 - 3.2
Peer Conflict/Social Withdrawal	2.19	1.9 - 2.5
Antisocial	1.79	1.6 - 2.1
Placement in special education	2.39	2.1 - 2.7

Psychoactive medication use at adolescence is associated with parent-reported behavior problems and placement in special education.

Adjusted for age, sex, race, treatment variables and household income

Association with Adult Neurocognitive Function

Risk of neurocognitive problems at adulthood with psychoactive medication use



Psychoactive medication use during adolescence was associated with neurocognitive problems at adulthood.

Adjusted for age, sex, race, treatment variables and household income

Limitations

- Relied exclusively on proxy-reported psychoactive medication use
- Temporal relationship between onset of medication use and functional outcomes cannot be established

Summary and Implications

- Higher rates of psychoactive medication use in subgroups of adolescent survivors
 - Closer monitoring of adverse cognitive effects and functional impairments
- Psychoactive medication use during adolescence associated with long-term functional impairments
 - Non-pharmacological interventions to address distress and behavioral symptoms

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 use of this resource are encouraged to visit:

<http://ccss.stjude.org>

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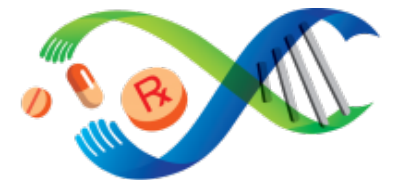
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