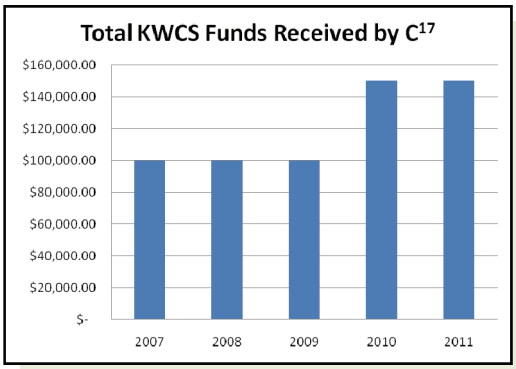
Children's Cancer & Blood Disorders

Kids with Cancer Society Report

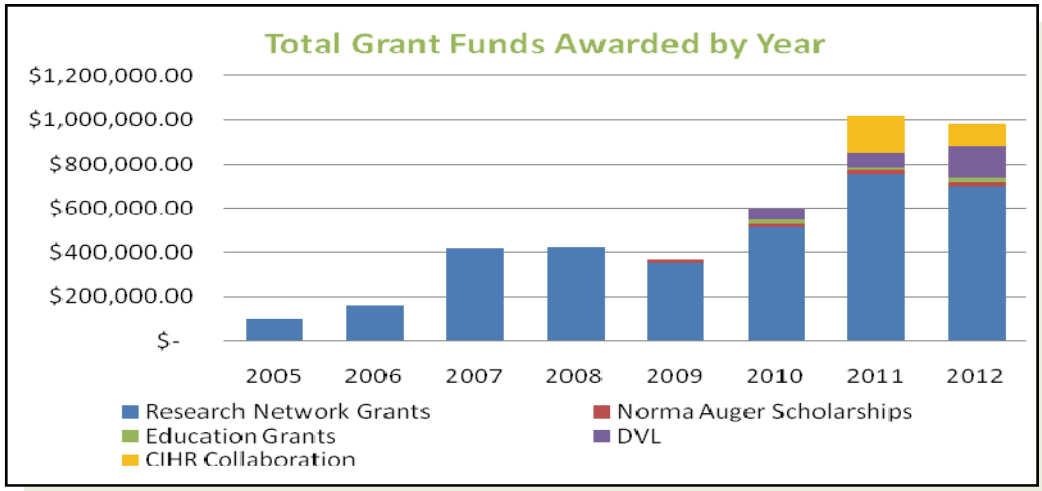
Message From the Executive Director

Since 2007, the Kids With Cancer Society has been a steady and significant supporter of the C17 Council's research grants program. Each year, the funds have been matched with funds from national supporters such as the Childhood Cancer Canada and Coast to Coast Against Cancer Foundations to provide funding to scientifically sound, peer-reviewed grants handed out by our C17 Research Network. Last year, we committed to just under $1 million in research and education grant funding! A huge leap from the $100,000 we handed out in 2005.



The other important aspect of this support is what takes place after the money is sent out and spent. What happens to the results, what the researchers do next? In this report, we highlight some of the publications and "knowledge translation" activities that have been undertaken by our funded researchers. They are publishing and presenting their work, and taking the time to teach it to others. Some, such as Dr. Klassen, are on their second grant from C17. Some have gathered and analyzed tumours, tissue and treatment information with this funding, and are now trying to determine better treatments. Others, such as Dr. Mabbott are members of larger CIHR Teams that were awarded over $12.5 million to study late effects in childhood cancer survivors.

We hope that you enjoy reading about these success stories. If you have any questions please contact us or visit our website www.c17.ca for more information. Thank you for being an important part of our success!



kids with cancer society

Inside This Report

C17 strives to improve health outcomes and quality of life for children and adolescents in Canada with cancer and blood disorders, and to eliminate disparities in care and outcomes wherever they occur

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Neuro-imaging of White Matter and Neuro-cognitive Outcome Following Cranial Radiation for Pediatric Brain Tumors

Principal Investigator: Dr. Donald Mabbott

$95,000

Results of Completed Study

This multi-centre study targeted the biological origins of cognitive morbidity associated with cranial radiation treatment for pediatric brain tumors. Our goals were to (a) determine the effects of brain and spine radiation dose on white matter in the brain and (b) test working memory, information processing speed and attention, in linking white matter injury and intellectual outcome.

We have completed the study, and published two manuscripts based on our findings (Law et al., Neuroimage. 2011 Jun 15;56(4):2238-48), and (Law et al., Neuro Oncol. 2012 Oct;14(10):1294-303). In one publication, we evaluated the role of the cerebral-cerebellar pathways in mediating working memory in posterior fossa brain tumour patients. Our finding that working memory function may be related to the integrity of cerebello-thalamo-cortical connections is a novel contribution to the understanding of brain communication. In our other publication, we looked at the relation between pre-surgical and clinical variables, cerebello-thalamo-cerebral (C-T-C) white matter pathway integrity, and cerebellar mutism syndrome (CMS) occurrence in our patients. Our findings are relevant for surgical planning and speech-language therapy to mitigate the symptoms of CMS. Using the database developed from this study we are now examining the impact of radiation dose and field on white matter and cognitive outcome. It is exciting to think that the cognitive morbidity for children treated for brain tumours may not be written in stone; that by understanding the relations between white matter and neuro-cognitive outcomes we can devise methods that result in better outcomes.

Evaluation of Biomarkers in Relation to Recurrence Rate in Childhood Ependymoma

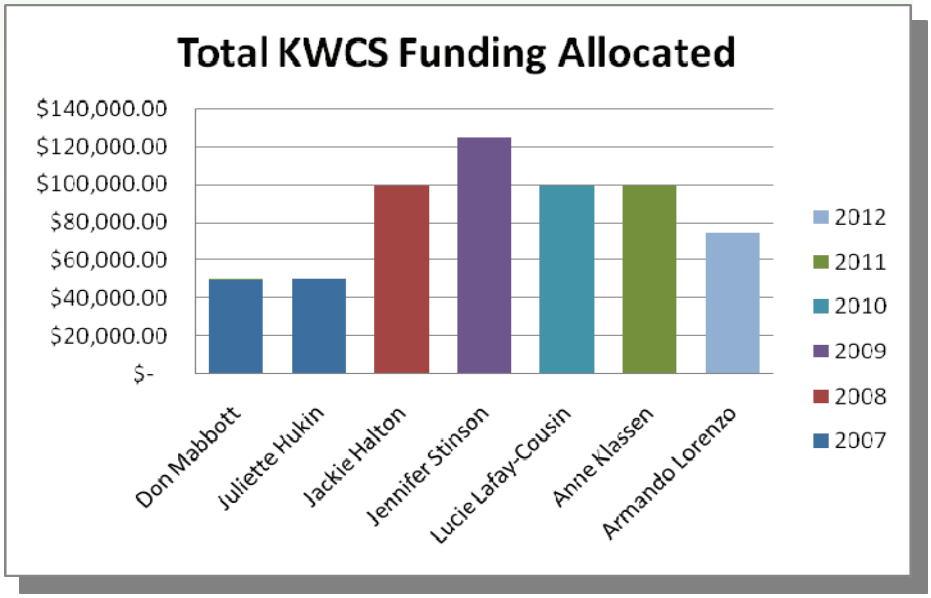
Principal Investigator: Dr. Juliette Hukin

$120,000

Results of Completed Study

Ependymomas represent 10% of childhood brain tumors and 30% of those in children less than three years of age; approximately 35 new cases are diagnosed each year in Canada. Childhood ependymomas have very high morbidity and mortality rates, and there are currently no effective tools for prognosis or risk assessment. We developed a unique resource for this rare and serious tumour; developing a Canadian clinical database and tissue microarray (TMA) bank. Neuro-oncologists at 12 C^{17} Research Network pediatric oncology centres participated. The pathological and immune-stain data was linked to the clinical data and compiled into the main database and was analyzed in January 2008. Results show that the majority of recurrences occur within the first 5 years; the incidence of late recurrence was only 4%. The late recurrences occurred despite initial aggressive resection and radiotherapy, highlighting the need for long term surveillance for all patients. The findings were presented in abstracts, invited talks and conference proceedings at several national and international neuro-oncology conferences between 2008-2012.

The clinical data and TMA bank will become a valuable resource for future studies that address mechanisms, therapies and outcomes of childhood ependymoma. Data from the study will provide several benefits, including: better understanding of the biology of ependymoma; the basis for a new risk stratification system for childhood ependymoma; and building blocks for prospective Canadian biological and clinical trials on ependymoma. We anticipate that our work will eventually lead to the development of Canadian guidelines for therapy of this childhood cancer.



KWCS Supported Grants: Summaries and Results

Osteonecrosis in Children with Acute Lymphoblastic Leukemia
Principal Investigator: Dr. Jacqueline Halton

$133, 591 **Study to be completed January 2013**

Acute Lymphoblastic Leukemia is the most common form of childhood cancer with current treatment survival rates approaching 80%. Improved outcomes show an increased number of survivors at risk for long-term treatment related side effects including osteonecrosis. Osteonecrosis, or bone death, is caused by blood supply loss to the bone, causing pain and poor quality of life. The hips, shoulders, knees and ankles may be affected. Pain is the usual presenting symptom and may become severe requiring surgical decompression or replacement of the affected joint. Long term effects including arthritis and progressive joint difficulties will not be known for decades. This study aims to determine the risk factors for developing osteonecrosis through MRIs of patients treated for leukemia that will lead to information for earlier detection and prevention. The study will be the basis for future intervention and prevention trials.

Development and Testing of a Multidimensional Electronic Pain Diary for Youths with Cancer
Principal Investigator: Dr. Jennifer Stinson

$199,929 **Study to be completed January 2013**

Original plans to modify the existing eOuch pain diary, were not feasible due to the outdated technological nature of the eOuch pain diary. A competitive procurement process was initiated in order to identify an iPhone application developer to modify and create the cancer pain diary. The selected vendor was Cundari Group Ltd. Over a 5-month period, the "Pain Squad" iPhone application was developed via an in-kind donation of services. The application consists of a 24-item cancer pain survey, evaluating the sensory, affective, and evaluative dimensions of pain using interactive features such as sliding 5cm visual analog scales, body maps, video clips and open text fields.

The "Pain Squad" application is based on a police detective theme which is embedded throughout the application along with an internal rewards system (e.g., achieving higher rankings – rookie to chief of police) to enhance compliance. Included video clips have also been designed to enhance compliance through messages of support from actors of CTV's police drama "Flashpoint" and Global TV's "Rookie Blue".

Identification of prognostic factors and therapeutic targets in childhood CNS atypical teratoid rhabdoid tumours (ATRT)
Principal Investigator: Dr. Lucie Lafay-Cousin

$201,658 **Study to be completed September 2013**

Atypical teratoid rhabdoid tumours (ATRT) are highly aggressive malignant brain tumours arising in very young children. As ATRT are uncommon, only small numbers of patients/tumours have been studied to date, therefore factors that influence survival and the best treatments for ATRT remain unknown. To address these limitations, we conducted a Canada-wide study on central nervous system ATRT to define factors that influence survival. Significantly, our results suggested that, in the cohort studied, a proportion of children with ATRT could be cured with more aggressive strategies involving intensive chemotherapy and/or radiation. In this study, we are trying to confirm these exciting findings by reviewing treatment and outcome information on a larger number of children treated in Canadian centres. We will establish and use a national tumour bank to investigate the ATRT tumour genome with powerful new genetic tools to uncover novel therapeutic targets for this challenging tumour. The tumour samples that we have now received will be developed into a tissue microarray for further testing in November 2012.

What Factors Do Children With Cancer And Childhood Cancer Survivors Say Are Important To Understanding Their Quality Of Life? A Qualitative Study
Principal Investigator: Dr. Anne Klassen

$156,093 **Study to be completed August 2014**

Research Ethics Board and grant agreements are now in place for 4 C[17] centres: McMaster University, Children's Hospital of Eastern Ontario, Sick Kids and BC Children's Hospital. Data collection has commenced and a total of 20 interviews with pediatric cancer patients and survivors have been conducted at McMaster and CHEO. The interviews have been transcribed verbatim and data analysis is presently underway, with data managed within computer software (N'Vivo). Knowledge translation and dissemination efforts include: S.H.A.R.E. - Survivors' Health: Advocating for Resources and Education for Childhood Cancer Survivors 4th Conference in Ottawa, October 2011 – Invited Speakers;

International Society of Paediatric Oncology, 44th Congress, London, October 2012 – 'Factors important to understanding quality of life according to children with cancer and childhood cancer survivors' - Submitted Abstract;

International Society of Quality of Life, 19th International Conference, Budapest, October 2012 – 'Refining a Conceptual Framework of HR-QOL within Pediatric Oncology' – Abstract accepted for Child Health Symposium.

Parent, provider, and survivor perspectives of investigational fertility preservation interventions for pre-pubertal boys with cancer: Exploring the factors influencing decisions and measuring preferences
Principal Investigator: Dr. Armando Lorenzo

$79,054 **Study received funding August 2012**

Many cancer treatments can damage a boy's reproductive organs, making him unable to have a baby later in life. For adolescents who have gone through puberty, freezing sperm is a standard way to maintain their future ability to have a baby. Unfortunately, for boys who have not gone through puberty, there are no similar options. This is because young boys cannot produce sperm to be frozen. Recent research has shown that it is possible to grow sperm from tissue that is from an immature mouse testicle to father baby mice. It is likely that similar technology will be available for humans. Dr. Lorenzo and Dr. Gupta would like to offer testicle tissue freezing to young boys with cancer so that when technology to grow sperm is available; boys will have the possibility to father their own children. However, before this is offered, these doctors will complete a study to gather information from parents, healthcare workers, and adolescent cancer survivors about desires and obstacles to starting tissue freezing. This research will help Dr. Lorenzo and Dr. Gupta develop a fertility program for boys across Canada that will provide survivors hope of fathering their own children and ultimately improve quality of life.

OVERVIEW

May 2006 Grant Competition
Neuro-imaging of White Matter and Neuro-cognitive Outcome Following Cranial Radiation for Pediatric Brain Tumors
Dr. Donald Mabbott, The Hospital for Sick Children

Nov 2006 Grant Competition
Evaluation of Biomarkers in Relation to Recurrence Rate in Childhood Ependymoma
Dr. Juliette Hukin, BC Children's Hospital

May 2007 Grant Competition
Osteonecrosis In Children With Acute Lymphoblastic Leukemia
Dr. Jacqueline Halton, Children's Hospital of Eastern Ontario (CHEO)

Nov 2009 Grant Competition
Development and Testing of a Multidimensional Electronic Pain Diary for Youths with Cancer.
Dr. Jennifer Stinson, The Hospital for Sick Children

Nov 2010 Grant Competition
What Factors Do Children With Cancer And Childhood Cancer Survivors Say Are Important To Understanding Their Quality Of Life? A Qualitative Study
Dr. Anne Klassen and Dr. Samantha Anthony, McMaster University

Sep 2011 Grant Competition
Identification of prognostic factors and therapeutic targets in childhood CNS atypical teratoid rhabdoid tumours (ATRT)
Dr. Lucie Lafay-Cousin, Alberta Children's Hospital

May 2012 Grant Competition
Parent, provider, and survivor perspectives of investigational fertility preservation interventions for pre-pubertal boys with cancer: Exploring the factors influencing decisions and measuring preferences
Dr. Armando Lorenzo, The Hospital for Sick Children