



women & children's
health research institute

2013/2014 Annual Report



WCHRI Overview

THE WOMEN AND CHILDREN'S HEALTH RESEARCH INSTITUTE (WCHRI) was founded in 2006 as the shared vision of the University of Alberta (U of A) and Alberta Health Services (AHS), with core funding from the Stollery Children's Hospital Foundation (SCHF) and the Royal Alexandra Hospital Foundation (RAHF). Through the generous contributions of both Foundations, WCHRI has been able to support the research excellence of our members who come from a wide range of clinical and academic disciplines, all focusing their efforts on improving health outcomes for women and children.

WCHRI supports groundbreaking multidisciplinary and transdisciplinary research through grant competitions, ongoing research funding, professional development and expert resources. Our academic membership is comprised of approximately 350 leading researchers, clinician-scientists, academics, health care professionals and service providers from academic and community settings.



Vision

Improved outcomes for women and children through health research

Mission

To effect meaningful health outcomes through cutting-edge transdisciplinary research

Goals

- To facilitate basic and applied health research activities focused on women and children's health
- To encourage collaborative and translational research within the university and outside (community, industry, national/international institutions)
- To promote training in health research with a focus on women and children
- To provide a unified team approach for facilitating communication and establishing representation to the public, granting agencies and authorities
- To ultimately translate this knowledge for the purpose of providing the best clinical practice



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MESSAGE FROM

The Director

It is with great excitement that I present to you this year's Annual Report. This is an opportunity for us to reflect on and share WCHRI's impact in 2013 and get a glimpse of where we are headed in the next year.

THE THEMES FOR THIS YEAR'S REPORT are "innovation and discovery" and "investing in highly skilled healthcare professionals." Our members continue to deliver innovative and novel ideas, which form the foundation for advancement in health care in our province. In this document, you will find evidence of the research excellence of WCHRI members. We will also introduce you to three influential researchers who have been recently recruited to the University of Alberta and to WCHRI.

WCHRI members conduct research that spans the continuum of bench to bedside to community and back again. Through supportive research grant programs, research infrastructure and strategic partnerships, WCHRI is able to:

- **Catalyze** – collaborative, innovative research for a local, provincial, national and global impact
- **Facilitate** – research activities and communication
- **Translate** – knowledge for the purpose of providing the best health outcomes
- **Ensure Accountability** – performance (research impact / outcomes) and financial
- **Communicate** – research outcomes to our members, patients, government and the community

During the past year, we have expanded our philosophy on how we assess and direct our research investment. We refer to this approach as Concept to Completion. The following message from Dr. Lawrence Richer, Associate Director at WCHRI, will elucidate how this philosophy will ensure that the investment in research can best meet the needs of our patients, community and the health care system.

It is vital for me to mention that the research at WCHRI, and our commitment to improving women and children's health, could not happen without the continued partnership of the University of Alberta and Alberta Health Services and the very generous support of the Stollery Children's Hospital Foundation and the Royal Alexandra Hospital Foundation. In addition, we receive guidance and support from the members of our Oversight Board, Steering Committee and Scientific Advisory Committee. All of our governing body members have generously shared their time, knowledge and skills to advance WCHRI. Furthermore, I wish to express my gratitude to WCHRI members who continue to contribute their time, expertise and opinions to our grant review committees and Research Day.

I am proud to be a part of the WCHRI team and to present to you the accomplishments we have seen over the past year. This annual report is a clear indication of our innovation and success in women and children's health research. WCHRI will continue to support new initiatives leading to better health outcomes. We are committed to supporting research leading to excellence in healthcare and improved outcomes for women and children.

Dr. Sandy Davidge

Director

Women and Children's Health Research Institute

Clinical and Health Outcomes Research Program



WCHRI IS A UNIQUE AND EVOLVING ORGANIZATION dedicated to improving the health of women and children, through innovative programs and strategically directed research. An integrated and coordinated approach to supporting research excellence is

envisioned and encompassed in the philosophy of “Concept to Completion.” By aligning our expertise and resources with the needs and ideas of our membership, stakeholders and funders, advances in improving health outcomes for women and children will be made.

Concept to Completion aims to re-organize some WCHRI operations into coordinated Clinical and Health Outcomes Research Programs with a goal to facilitate and incent clinical research excellence. The program will focus initially on an issue of national priority and of direct clinical relevance to our children, “Medicines for Children.” Up to 70 per cent of medicines used in the treatment of childhood health problems have not been adequately studied for their efficacy and safety. The paucity of research in childhood therapeutics exposes children to levels of risk and uncertainty that can no longer be tolerated.

The United Kingdom and the United States have implemented legislation mandating changes requiring new and existing therapies used in children to be properly evaluated. A national acknowledgement of the problem is now developing in Canada and in partnership with the Maternal Infant Child and Youth Research Network (MICYRN); WCHRI will be positioned as a leader to generate changes in practice. The program will develop innovative strategies to maximize the opportunities for our children to participate in research studies.

New and existing WCHRI resources such as research coordination, informatics and biostatistics will seek to maximize support for clinical research and ensure the highest standards and safety. Gaps in research support, like data access and cutting-edge research methods, will be alleviated through the development of new resources and in concert with provincial initiatives. Initiatives include the Maternal, Newborn, Child and Youth Health Strategic Clinical Network (SCN) and the Alberta Strategy for Patient Oriented Research (SPOR).

While research capacity, excellence and outcomes are an important benchmark for these initiatives, ultimately the true measure of success will be improved health outcomes for women and children. WCHRI is proud to have participated in the many accomplishments of our membership over the years and these new initiatives will help realize an even healthier future.

Dr. Lawrence Richer
Associate Director
Women and Children’s Health Research Institute



Building on a Foundation of Evidence-Based Practice



WE AT THE STOLLERY CHILDREN'S HOSPITAL FOUNDATION ARE DREAMERS. We continually look to the future to ensure that the best medical advancements are available in order to realize the potential that lies within every

child, no matter how sick or distressed.

The same can be said about researchers at the Women and Children's Health Research Institute. The skilled professionals that continually test and push the limits of modern science are the ones who help to improve the daily outcomes of some of the sickest kids in our community. It's because of this expert care by the many talented researchers who work at WCHRI that the Stollery Children's Hospital excels in pediatric care on a global scale.

We believe that excellence in innovative pediatric care, research and teaching rests on a foundation of evidence-based practice, and it's with tremendous pride that we continue to support WCHRI.

The Foundation's continued investment in WCHRI in the amount of \$3 million annually over 10 years is one of the fundamental reasons that excellence exists at the Stollery Children's Hospital. In fact, "innovation and discovery" is one of five pillars of excellence funded by the Foundation to ensure that society's most vulnerable patients—its children—receive access to the best possible pediatric care in Western Canada.

By integrating innovation and discovery into patient care and observation, we are able to grow the Hospital's critical mass of experts and research-based practice. This is evident by the growing number of donors and supporters who rally behind the Foundation each year in order to fund priority projects, including research activities, at the Stollery.

We are so fortunate to have this level of care and expertise in our city and in our province. Research is all about seeking change today for a better tomorrow, and we know that by supporting research in all its forms, a better tomorrow is in sight.

Sincerely,

Mike House
President and CEO
Stollery Children's Hospital Foundation



The Stollery Children's Hospital Foundation is dedicated to raising funds for specialized equipment, sub-specialty medical education to train the best of the best, research to pave the way to the discovery of new treatments or cures for child health issues

and specialized programs that improve patient and family outcomes at the Stollery Children's Hospital.

The Foundation recognizes the tremendous impact that research has on disease prevention,

treatment and improved health outcomes, which is why it is providing \$30 million over 10 years (2006 to 2016) to support WCHRI's mission to support leading-edge research on children's and women's health.



Igniting Innovation

THE ROYAL ALEXANDRA HOSPITAL has a long history of research excellence which continues to advance patient care locally, nationally and internationally. When we opened the doors to the Lois Hole Hospital for Women in 2010, we knew we had a special opportunity to bring women's health research in particular to the forefront.

The Lois Hole Hospital for Women is proud to be the dedicated research home of the Women and Children's Health Research Institute. Here, we are aligning the brightest minds in clinical care with the brightest minds in research to create an ideal setting for inspired innovation, collaboration and discovery.

It's a winning combination.

And a winning team is comprised of the best people. The curious thinkers—the "what if", "why not" people whose passion and talent drive healthcare milestones.

People like Dr. Lynne Postovit—one of Canada's most promising scientists and newest research star set to make her mark in women's health.

As the newly appointed Sawin-Baldwin Chair in Ovarian Cancer Research, Dr. Postovit's recent recruitment marks the second of three Lois Hole Hospital for Women Endowed Research Chairs. Dr. Postovit's move to Edmonton represents a big win for our city and for women's health and cancer research in the province of Alberta.

And speaking of research stars...

As the Director of WCHRI, Dr. Sandra Davidge is among the pre-eminent researchers in North America and brings incredible knowledge to our city through her leadership and vision. Edmonton is fortunate to have an internationally renowned research leader and the Royal Alexandra Hospital Foundation is proud to help directly fund Dr. Davidge's work. She is a true champion of research.

In closing, congratulations to WCHRI on this, the 2013 Annual Report, a showcase of the outstanding achievements in research over this past year, many of which were obtained through philanthropy. The Royal Alexandra Hospital Foundation's support of WCHRI is a testament to the commitment and passion of our donors. A generous community is a healthy community and by investing in the best and brightest minds of today, we're ensuring a healthier future for women and their families for many years to come.

Andrew Otway
President and CEO
Royal Alexandra Hospital Foundation



The Royal Alexandra Hospital Foundation inspires community support for their health-care facilities. The Foundation empowers compassionate, leading-edge patient care through education, research, technology and facility enhancements. They provide support for the Lois Hole

Hospital for Women and a growing number of specialized centres of health care located at the Royal Alexandra Campus.

The Foundation places a strong focus on research and innovation and is committed to supporting

and promoting the ongoing work of researchers through WCHRI with a commitment of \$11 million over 10 years (2006 to 2016).



MESSAGE FROM

The University of Alberta



THE UNIVERSITY OF ALBERTA takes pride in its health research expertise and the widespread contribution it makes to public health. WCHRI researchers are directly involved in helping to advance public health knowledge and discovery as well as

improve outcomes. This productive partnership with the Government of Alberta continues to promote innovation and discovery, while investing in highly skilled health care professionals. The goals of WCHRI align perfectly with two longstanding areas of institutional strategic priority: 1) women's, maternal and children's health research where the prevention of *chronic disease, cancer, cardiovascular disease, growth and development problems, perinatal stress, diabetes and neuropathies* were named as areas of focus; and 2) the promotion of translational clinical research, where the University has a strong commitment to fostering *multidisciplinary and interdisciplinary research*. I am pleased to represent the Office of the Vice-President (Research) on the WCHRI Steering Committee.

Glen Baker
Associate Vice-President (Research)
University of Alberta



THE UNIVERSITY OF ALBERTA has a reputation for excellence in both translational and discovery-driven research. It is our goal to maximize the benefits of the research that is being done at the University of Alberta so that it improves the

quality of life of those locally, provincially and nationally. Ultimately, this will help place Canada at the global forefront of groundbreaking research and innovations.

The Women and Children's Health Research Institute (WCHRI) is an outstanding example of what a successful research institute can achieve. It links committed partners together, from the hospital foundations, Alberta Health Services and multiple faculties of the University of Alberta. It connects the researchers together to address important health issues for women and children, supporting research beyond the capacity of individuals working independently. And finally, it translates the research into practice for the benefit of the community. On behalf of the University of Alberta, congratulations to all supporters of WCHRI, and especially to Director, Dr. Sandy Davidge, on an outstanding year of accomplishment. Your success is an example for all of us of the power of combining our efforts to address important needs. Well done.

Dr. Murray Gray
Vice-Provost (Academic)
University of Alberta



MESSAGE FROM

Alberta Health Services



AT THE STOLLERY CHILDREN'S HOSPITAL, in conjunction with the Stollery Children's Hospital Foundation, we have recently approved five themes of excellence to guide our work and measure success. These include: the journey of the complex

child towards optimum health, innovation and discovery, family centered care, investing in highly skilled child health care professionals and quality outcomes through quality care.

The Women and Children's Health Research Institute has impacted all five of these themes. Here at the Stollery Children's Hospital we see firsthand the critical work of WCHRI-supported researchers through changes and improvements to health care and health outcomes to our patients.

This Annual Report showcases two of the five themes of excellence come to life through WCHRI's research progress and evidence. There are currently over 50 WCHRI supported research studies underway in the Stollery Children's Hospital. The examples in this Annual Report highlight innovation and discovery and investing in highly skilled child health care professionals, both areas that WCHRI sustains and values.

Through our relationship with WCHRI, we can provide an environment for innovation and develop a culture of research within the Stollery Children's Hospital, where WCHRI members and research coordinators can access patients and equipment to gather the data they need to advance children's healthcare.

The past year has been filled with success. I look forward to continue working with WCHRI researchers and clinicians as they help improve the lives of Stollery children and their families.

Tracy MacDonald
Executive Director
Stollery Children's Hospital



ALBERTA HEALTH SERVICES' Lois Hole Hospital for Women values our partnership with the Women and Children's Health Research Institute (WCHRI). Active research on site at the Lois Hole Hospital for Women supports collaboration between research and

clinical staff, which facilitates richer research and translation of the research into clinical care. This supports leading edge and evidence based care for our patients.

The Practice Readiness Centre for Simulation at the Lois Hole Hospital for Women is on target to be completed in 2014/2015 through the generous support of the Royal Alexandra Hospital Foundation. This simulation centre will provide new avenues for collaborative research with WCHRI, ensuring our clinical team is optimally prepared to provide the best care possible for our patients. We look forward to the development of dedicated clinical research space through potential sponsorship via a WCHRI Canada Foundation for Innovation (CFI) grant – to enhance the capacity for diverse women's health research within the Lois Hole Hospital for Women.

Research is an imperative part of the academic mission of the Lois Hole Hospital for Women, home to the Department of Obstetrics and Gynecology in the Faculty of Medicine and Dentistry at the University of Alberta. This year, over 40 research studies are underway. We look forward to the continued growth of research and the associated translational learning as our partnership with WCHRI flourishes. It is a privilege to be in this dynamic partnership and to support innovative clinical care, research and education.

Joanna Pawlyshyn
Vice President
Royal Alexandra Hospital campus,
including the Lois Hole Hospital for Women

> Our Impact



“Tests helped show that humans with high sugar intake during pregnancy have lower intake of key nutrients such as calcium and vitamin E, suggesting that the quality of women’s diets is lower when high amounts of added sugars are consumed. In addition, results showed that the increased sugar intake is due to many different factors that change when women are pregnant.”

— DR. RHONDA BELL

Sweet Moms

Exploring the Effects of Sugar Intake During Pregnancy

DR. RHONDA BELL

WE ARE EATING MORE SUGAR THAN EVER BEFORE. Among 19-39 year olds, almost 25 per cent of their calories come from sugar. Research has shown that consuming a diet with a lot of added sugars (such as table sugar and high fructose corn syrup) can lead to signs of diabetes, high blood lipids (such as cholesterol), high blood pressure and putting fat on around the waist.

Dr. Rhonda Bell and her team, called the "Sweet Moms," used the Women and Children's Health Research Institute (WCHRI) Emerging Team grant to learn how a high sugar diet affects pregnant women and their infants. Their goal was to understand whether a woman who eats a lot of sugar in her diet before, during and after pregnancy, is more likely to have high blood pressure, put on more weight while she is pregnant or have trouble losing that weight after her baby is born.

With the WCHRI grant, the team was able to first test high dietary fructose intake. From this, they gathered data that shows high sugar diets can lead to increased maternal fat deposition, alterations in placental structure and increased gut permeability during

pregnancy. In addition, they displayed impaired maternal glucose and lipid metabolism, which can interfere with metabolic processes in female offspring when they are pregnant.

Next, the team partnered with the Alberta Pregnancy Outcomes and Nutrition (APrON) study to gather records of dietary intake of approximately 2,000 pregnant women. They analyzed data collected in these studies to investigate the relationship between the amount of sugar women have in their diets while pregnant and the development of gestational diabetes, high blood pressure and extra weight gain while pregnant.

What the team found was that weight gain during pregnancy can increase discomfort, seriously complicate labour and make it difficult to lose weight after giving birth. It can also increase women's risk of developing hypertension and cardiovascular disease later in life. The mother's weight gain can impact the child's health as well. Extra weight can impair brain development and increase the child's risk of obesity.

"The data and tests helped show that humans with high sugar intake during pregnancy

have lower intake of key nutrients such as calcium and vitamin E, suggesting that the quality of women's diets is lower when high amounts of added sugars are consumed. In addition, results showed that the increased sugar intake is due to many different factors that change when women are pregnant," says Dr. Bell. Data from this study was published in the Journal of Nutrition Education and Behavior and is titled, "Making Compromises: A qualitative study of sugar consumption behavior during pregnancy."

The Sweet Moms team was awarded an Alberta Innovates—Health Solutions (AIHS) Collaborative Research and Innovation Opportunities (CRIO) grant in April 2013.

They will use the CRIO grant of \$2.5 million over the next five years to determine strategies that will help women achieve healthy weights and healthy diets during and after pregnancy. They intend to share the information they discover with health care providers working with pregnant women and directly with the women themselves. The research team is currently recruiting women within one year of giving birth for several other studies, with follow up analysis throughout the first year.

Improving the Odds in Pediatric Heart Transplantation

DR. LORI WEST

HEART TRANSPLANTATION has saved the lives of many children. Unfortunately, to prevent the immune system from attacking the donor heart, recipients of transplants need to take immunosuppressive drugs for life. The risk of rejection is lessened when the donor heart and recipient have the same ABO blood groups, but this limits the availability of organs that can be transplanted.

A member of the Women and Children's Health Research Institute (WCHRI) who is working closely on research that is increasing the viability of organ transplants is Dr. Lori West. Dr. West is a Professor of Pediatrics, Surgery and Immunology, Director of Cardiac Transplantation Research, a Senior Scholar for Alberta Innovates – Health Solutions and she holds a Tier 1 Canada Research Chair in Cardiac Transplantation.

Dr. West and her group pioneered research showing that ABO-incompatible heart transplantation can be performed safely during infancy due to the immaturity of the infant immune system. This means that babies will not reject unrelated organs, which is what happens in older children and adults

after the immune system is more fully developed. This finding has had a global impact on the practice of pediatric transplantation. WCHRI has supported Dr. West in this, and other important transplantation research with direct operating funding as well as the provision of expert technical and clinical nursing staff.

There is a new national research program called the Canadian National Transplant Research Program (CNTRP) that is being led by Dr. West at the Alberta Transplant Institute and co-led by Dr. Marie-Josée Hébert at the Université de Montréal. It is intended to increase the odds of transplant compatibility by linking over 100 investigators and collaborators from 21 centres and universities across the country.

The CNTRP was created to increase organ and tissue donation in Canada and to improve the survival and quality of life of Canadians who receive transplants. This \$23 million initiative is a coalition that connects and encourages collaboration between investigators nationwide. Funding for the program is through the Canadian Institutes of Health Research (CIHR) in partnership with Canadian

Blood Services, Canadian Liver Foundation, Cystic Fibrosis Canada, Fonds de Recherche du Québec-Santé, Genome BC, and the Kidney Foundation of Canada.

"People across the country have been incredibly enthusiastic," says Dr. West. "The transplant research communities are very excited at the potential to create an enduring legacy that transforms transplantation in Canada."

WCHRI is very proud to contribute to the CNTRP by supporting the training portion of the program. These funds aid graduate students whose supervisors are WCHRI members with research projects focusing on child health.





Helping Kids and Their Kidneys

DR. TODD ALEXANDER

“Kidney stones in children are very painful and can cause them to miss a lot of school. Currently, there are no good quality treatments that can help prevent kidney stones,” says Dr. Alexander. For this reason, Dr. Alexander’s research focuses on what causes kidney stones in children and his team is working to develop therapies that can potentially prevent them.

In 2013, Dr. Alexander identified a protein that blocks calcium from being reabsorbed by the kidney and recently identified mutations in the DNA encoding of the protein that causes kidney stones in some of his patients. This search started with a Genome-Wide Association Study (GWAS). This study identified the protein, claudin-14, and indicated that it was somehow associated with kidney stone formation. Dr. Alexander went on to determine how claudin-14, under regular circumstances, causes the body to excrete calcium when too much is ingested. Later, he expanded on this research and found that some patients with kidney stones have a mutation in the claudin-14 gene that increases the amount of claudin-14 protein in their kidney which then inhibits calcium absorption. With an increased amount of calcium in urine excretion, kidney stones are more prevalent.

Dr. Alexander is very excited about these results and believes that “with this finding, we can now work towards treatments that can prevent kidney stones from forming in children. It can be as simple as prescribing a medication that can increase calcium absorption, decreasing the probability of developing kidney stones.”

Throughout his research, Dr. Alexander has not only identified one of the causes of kidney stones but has been able to show a correlation between kidney stones and other diseases including cardiovascular disease. The importance of treating kidney stones at a young age is even more vital now knowing that it can lead to more serious diseases later in life.

WCHRI’s Innovation Grant was awarded to Dr. Alexander in 2011, and has provided him with resources to conduct this research. In addition, Dr. Alexander has recently been awarded WCHRI Bridge Funding to continue his research with this project. WCHRI’s mission is to support members like Dr. Alexander in conducting ground-breaking research that impacts children’s overall health and healthcare practices.

WHAT DOES A PEDIATRIC NEPHROLOGIST, A NURSE, A DIETITIAN AND A SOCIAL WORKER HAVE IN COMMON? The answer is kidneys. This team of healthcare professionals can be found working together at the pediatric renal clinic in Edmonton, located at the Stollery Children’s Hospital. Dr. Todd Alexander, pediatric nephrologist, started this clinic that is currently helping approximately 65 children suffering from kidney stones.

A young girl with her hair in a bun, wearing a white hospital gown with a colorful polka-dot pattern, is sitting and holding a brown teddy bear. The background is a light-colored wall with a subtle grid pattern. The bottom of the page has a green gradient overlay.

“WCHRI believes in our project and helps us by providing funds to build on our current research so we can later apply for grants from bigger organizations and helps to continue our current research. This is a very important step for research projects.”

— DR. SHAIRAZ BAKSH

Breaking the Barriers in Pediatric Cancer Research

DR. SHAIRAZ BAKSH

LEUKEMIA IS CANCER OF THE BLOOD AND IS THE MAJOR CAUSE OF CANCER IN THE PEDIATRIC POPULATION. If diagnosed in children who are less than a year old, treatments are very difficult due to lack of understanding of the genetic changes that have occurred.

For this reason, Dr. Shairaz Baksh, who studies the link between inflammation and cancer, has an interest in researching how to characterize genetic changes in patients with childhood leukemia and is searching for a therapy that would promote normal cell death in patients with leukemia. To assist Dr. Baksh, the Women and Children's Health Research Institute (WCHRI) awarded him an Innovation Grant to further his research in pediatric leukemia.

Dr. Baksh and his group have demonstrated that two genes work together to promote the killing of abnormal cells in healthy individuals. With the WCHRI Innovation Grant, they discovered that one of these genes does not undergo genetic changes in leukemia but rather a modification. This modification limits the ability of the cells containing this modified gene to die when they should. When a child has leukemia, excessive cell growth is present, because the bad cells don't die off as they normally would in a



healthy patient. This modified gene allows the cancer cells to promote their own survival. Upon finding this evidence, Dr. Baksh started working on a therapeutic treatment that targets the gene in leukemia cells in order to trick the cell into promoting their own death.

Interestingly, Dr. Baksh also found that the gene plays an important role in the development of colitis. Loss of the gene triggers an inflammatory response, which leads to persistent inflammation in the bowel. The team used a leukemia drug called imatinib and found that the treatment reversed the effects of colitis. Preventing colitis could lead to a reduction in the risk of patients with ulcerative colitis developing colorectal cancer later in life.

With these observations, Dr. Baksh was able to receive Alberta Health Services approval to confirm his research findings by utilizing more than 200 banked blood samples from leukemia patients received in the past 20 years. This will be a source to monitor how these proteins are modified and aid in the testing of potential therapeutic treatments.

"WCHRI believes in our project and helps us by providing funds to build on our current research so we can later apply for grants from bigger organizations and helps to continue our current research. This is a very important step for research projects," says Dr. Baksh.

Searching for the Triggers of Crohn's Disease in Children

DR. HIEN HUYNH

INFLAMMATORY BOWEL DISEASE (IBD) is a group of disorders that cause portions of the gastrointestinal tract to become inflamed and ulcerated. Under the IBD umbrella are Crohn's disease and ulcerative colitis. It is estimated that 15-20 per cent of children with Crohn's will develop complications that require surgery within the first three years of diagnosis.

Dr. Hien Huynh, Divisional Director at the Department of Pediatrics' Gastroenterology and Nutrition division, located at the Stollery Children's Hospital, is conducting several studies on Crohn's and ulcerative colitis relating to pediatrics.

One of the studies Dr. Huynh is working on specific to Crohn's disease is a national initiative called the GEM Project. GEM stands for Genetics, Environmental and Microbial, which are all ways an individual could develop Crohn's. The GEM Project will attempt to find possible causes for Crohn's.

"We are trying to find triggers of the disease and eventually reveal how it can be prevented at a young age," says Dr. Huynh. This is done by following healthy individuals who have siblings and/or parents with Crohn's to see if they develop the disease. Ultimately, this will help to explain why some people develop the disease and others do not.

Dr. Huynh has been supported by WCHRI's core facilities for over five years for various research projects related to Crohn's and ulcerative colitis. A major resource Dr. Huynh uses for the GEM Project is WCHRI's Clinical Research Coordination core.

"They work with the patients and their families, collecting dietary and environmental information as well as biospecimens such as stool, urine and blood. These subjects are followed over a number of years. Information and

biospecimens will be collected again when some of these subjects develop Crohn's disease. Over the course of the study, they hope to identify environmental triggers for this condition. This will

provide strategies in preventing the disease from developing," says Dr. Huynh.

Faye Murdoch is one of WCHRI's research coordinators who works closely with Dr. Huynh on multiple studies. She is an expert in the principles of clinical research and takes a lead role ensuring the study team is following protocol, collaborating with the Research Ethics Boards and the sponsor. Faye is a Registered Nurse and provides nursing care to the study participants.

Dr. Huynh's GEM Project site is one of the top recruiting sites in Canada and their research has recently been extended for an additional three years. Currently, out of about 2,800 individuals recruited, 26 participants have developed Crohn's. Although these findings are contributing to the progress of the study, the sample group is still too small to determine how the disease can be prevented. With the extension, the project will recruit an additional 2,200 participants within the next 18 months. Dr. Huynh will be working with the WCHRI research coordinators to double the efforts in recruiting subjects for this landmark study.





A Heart that Serves Two Functions

DR. LISA HORNBERGER

IMAGINE A MACHINE that can look at the distinct functions of an organ that is the size of an olive...or smaller, a lentil. This is the incredible work done by fetal echocardiography. The images produced by fetal echocardiography are able to provide insight into the fetus's heart function and development very early in pregnancy, only a short time after the mother knows she is pregnant. Dr. Lisa Hornberger, who specializes in pediatric cardiology, uses fetal echocardiography in many aspects of her research and this sophisticated imaging has led her to a new discovery.

While performing routine early fetal echocardiograms, Dr. Hornberger found that at less than 11 weeks gestation, the fetus's heart functions differently, it is much more dependent on the squeeze of the upper chambers of the heart. Typically, the atria bring blood from the body or the lungs into the heart. The lower chambers receive blood from the atria and pump through the great arteries to the body and

lungs. Dr. Hornberger found that at less than 11 weeks gestation in particular, the atria play a critical role in both filling the ventricles, and in directly contributing to the heart output during the period of squeeze or contraction. This is a unique functional finding that has never been reported before and likely relates to the very stiff nature of the early fetal heart muscle.

This discovery was made inadvertently while Dr. Hornberger was performing pediatric cardiology research investigating the role of first trimester fetal echocardiography. This was made possible through a Women and Children's Health Research Institute (WCHRI) Innovation Grant.

"Without WCHRI's Innovation Grant that funded my original project, I wouldn't have come across this amazing discovery. The Innovation Grant did more than just help with this discovery. We have had fellows working on our projects who are

now fetal and pediatric cardiology faculty, some even running their own fetal cardiology programs outside of Alberta. WCHRI is not only helping those in Edmonton, but also contributing to the training and development of clinician investigators who are themselves evolving both clinical and research programs. Their reach is a lot farther than they may realize," says Dr. Hornberger.

Dr. Hornberger conducted echocardiography on 457 pregnant mothers. Her research shows that at less than 11 weeks gestation, the contribution of the atrial "kick" to the output may be as high as 30 to 40 per cent whereas later in fetal life it provides less, particularly as the ventricles become less stiff and are able to fill and eject more efficiently.

This discovery provides more insight into fetal heart development and function. It will also enable Dr. Hornberger to build on these results to identify pathologies in the early stages of development and predict pregnancy outcomes in some situations.

Women, Violence and Trust

A Preclinical Study of Oxytocin

DR. KATHY HEGADOREN

TRUST IS THE FOUNDATION FOR HUMAN INTERACTION

and is necessary for physical and mental health. The consequences of violent experiences can include mood and anxiety symptoms and a sense of betrayal and mistrust in others.

Oxytocin is a brain chemical that has been associated in trust and stress responses. Studies have explored oxytocin in relation to its affiliation with stress and found significant gender differences in biological and behavioural responses. It has been shown that oxytocin levels are higher in women, that trust has different meanings for women compared with men and that oxytocin participates in the regulation of the hypothalamic-pituitary-adrenal axis (a major stress response system) in women. Women are also twice as likely to develop stress-related disorders after a serious stressor.

To help address these gaps, Dr. Kathy Hegadoren and her team are examining the relationship between oxytocin and trust in women who have

had violent experiences. "Oxytocin is beginning to be used as a treatment for mental disorders, without taking into consideration gender differences and clear evidence of its efficacy. The goal of our team of researchers is to examine whether oxytocin has potential as a therapeutic intervention for mood and anxiety problems and relationship difficulties related to violent experiences," says Dr. Hegadoren.

WCHRI assisted Dr. Hegadoren to gain more extensive preliminary data for this study. With WCHRI's Bridge Funding, the team was able to collect data on 80 female participants using a demographic interview, questionnaire and blood and saliva samples.

Preliminary data show that cortisol levels are increased in response to violence in these women but further investigation is needed to determine the relationship between oxytocin levels and trust. From these

data, new and targeted clinical uses can be developed. It is likely that no single intervention would address the full impact of violence on women's mental health, but oxytocin may show promise as an addition to the repertoire of interventions.

"This is a valuable study that can potentially find clinical application for stress-related symptoms," says Dr. Hegadoren. "It will allow us to further understand the relationships between oxytocin, trust and women's biological and behavioural responses to violent experiences."

Dr. Hegadoren was able to successfully leverage WCHRI's Bridge Funding and has recently been awarded the Canadian Institutes of Health Research (CIHR) funding to work towards completing this study. She is now able to recruit an additional 320 women to increase the size of her sample group in order to confirm and extend these results.



“Oxytocin is beginning to be used as a treatment for mental disorders, without taking into consideration gender differences and clear evidence of its efficacy. The goal of our team of researchers is to examine whether oxytocin has potential as a therapeutic intervention for mood and anxiety problems and relationship difficulties related to violent experiences.”

— DR. KATHY HEGADOREN

Investing in Highly Skilled Healthcare Professionals

The Women and Children's Health Research Institute (WCHRI) supports groundbreaking research by leveraging research funding to complement funds provided by AHS and/or the U of A faculties. This is intended to recruit and retain renowned researchers and clinician scientists. WCHRI doesn't just invest in research, we invest in the researcher. Here are three outstanding professionals we are supporting in their work towards WCHRI's vision of improving outcomes for women and children through health research.

Dr. Paul Kantor



DR. PAUL KANTOR started his research journey in Edmonton where he investigated the cardiac metabolism of heart failure under Dr. Gary Lopaschuck at the University of Alberta's Heritage Medical Research

Centre. He was subsequently appointed as the Head of Pediatric Cardiology at McMaster University and was the founder and head of the Cardiomyopathy and Heart Function Program at the Hospital for Sick Children. Almost two decades later, Dr. Kantor is back in Edmonton as the Division Head of Pediatric Cardiology at the Stollery Children's Hospital.

His major research interests relate to heart failure management in children with congenital heart diseases and with cardiomyopathy. Currently, he is the Director of the Canadian Children's Heart Failure Study Group, and has developed National Canadian Cardiovascular Society sponsored Guidelines for Heart Failure Management in Children. Dr. Kantor participates in numerous research, administrative and educational organizations related to heart failure, transplantation, education and patient advocacy.

WCHRI is supporting Dr. Kantor's research with partnered start-up funding with the Department of Pediatrics at the University of Alberta within the Faculty of Medicine and Dentistry.

Dr. Lynne Postovit



DR. LYNNE POSTOVIT is an internationally recognized researcher. She received the Peter Lougheed, Canadian Institutes of Health Research Premier New Investigator award. This award is given annually to

Canada's top-ranked new investigator.

Dr. Postovit is the Sawin-Baldwin Chair in Ovarian Cancer Research, generously supported by the Royal Alexandra Hospital Foundation (RAHF) through WCHRI. She is an associate professor in the Department of Oncology at the University of Alberta.

Dr. Postovit's goal is to identify better biomarkers for ovarian cancer and to increase our understanding of how advanced ovarian cancers are able to resist therapy or treatment. She has assembled a team from a variety of fields, including surgery, pathology and biochemistry, to assist in this objective.

Most recently, Dr. Postovit received an Alberta Innovates-Health Solutions Translational Health Chair in Cancer Epigenetics for her expertise in the area of the cellular microenvironment and the epigenetic regulation of cell fate. Her work has produced three patents; one of which progressed into clinical trials.



Dr. Michael Hawkes



DR. MICHAEL HAWKES is a pediatrician and infectious diseases sub-specialist. He completed his clinical training in pediatrics at the University of Alberta and his Infectious Diseases Fellowship at the Hospital for Sick Children in Toronto. He went on to complete a

PhD and post-doctoral fellowship at the University of Toronto, where he focused on malaria and tuberculosis. His research involved understanding disease pathogenesis for these global threats. Dr. Hawkes also carried out a field trial of a novel adjunctive treatment for severe malaria in Uganda, where he spent two years. He has recently joined the University of Alberta as an assistant professor and is a pediatrician at the Stollery Children's Hospital. His goal is to build a program of translational research focusing on globally important pediatric infectious diseases here in Alberta. In 2013, Dr. Hawkes was awarded the Grand Challenges Canada: Stars in Global Health for his project on solar powered oxygen delivery to provide oxygen for pneumonia patients in remote resource settings.

WCHRI in conjunction with the Department of Pediatrics provided the start-up funds that allowed Dr. Hawkes to be recruited to the University of Alberta. These funds will enable him to set up a laboratory for this critical infectious diseases research.

**WCHRI doesn't just
invest in research, we
invest in the researcher.**



> Snapshot of 2013/2014

Income Statement for Year End March 31, 2014

Revenue

Stollery Children's Hospital Foundation*	\$3,717,193
Royal Alexandra Hospital Foundation*	1,087,166
Faculty of Medicine & Dentistry, U of A	203,284
Cost Recovery	534,331

Total Revenue **\$5,541,974**

Expenditures

Research Grants	\$1,601,780
Research Support	1,597,383
Investigative Core Resources	1,606,249
Administrative Support	579,724

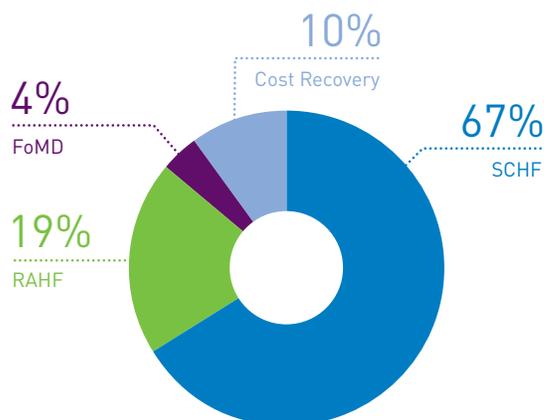
Total Expenditures **\$5,385,136**

Surplus (carry-forward to next fiscal year) \$156,838

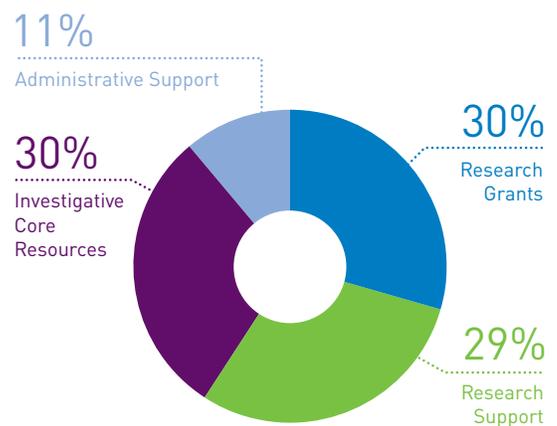
*Includes surplus carry-forward from prior year, transfers from closed projects and other donations

Revenue

The revenue percentages reflect the ratio of researchers who align with child health compared to women's health, which is approximately 4:1.



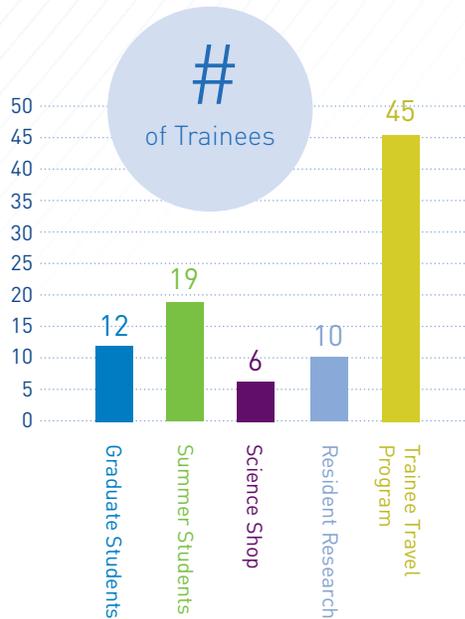
Expenditure



Capacity Building

WCHRI HAS NUMEROUS TRAINEE MEMBERS who have been supported by WCHRI funding and educational programs. These trainees include undergraduate and graduate students, postdoctoral fellows and residents, many of whom have completed their training and are now working in academic and other roles supporting women and children's research around the world.

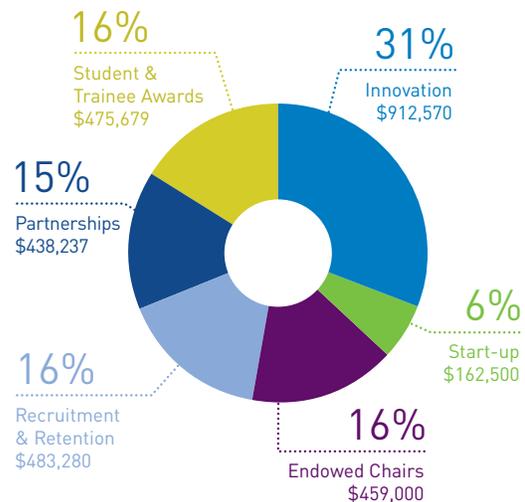
In 2013/2014, WCHRI grant programs supported 25 summer and Science Shop students, 12 graduate students and 10 resident researchers. In addition, our Trainee Travel program award enabled 45 of our trainees to attend national and international conferences in order to present their original research results.



WCHRI Grants Awarded

ONE OF THE KEY WAYS that WCHRI supports research excellence is through competitive grant funding. Our programs include: operating grants, bridge funding, resident trainee research projects, graduate studentships, summer and science shop studentships, trainee travel funds and Scientific Knowledge Exchange Programs (SKEP). All of these programs are competitive with only excellent research proposals receiving funding.

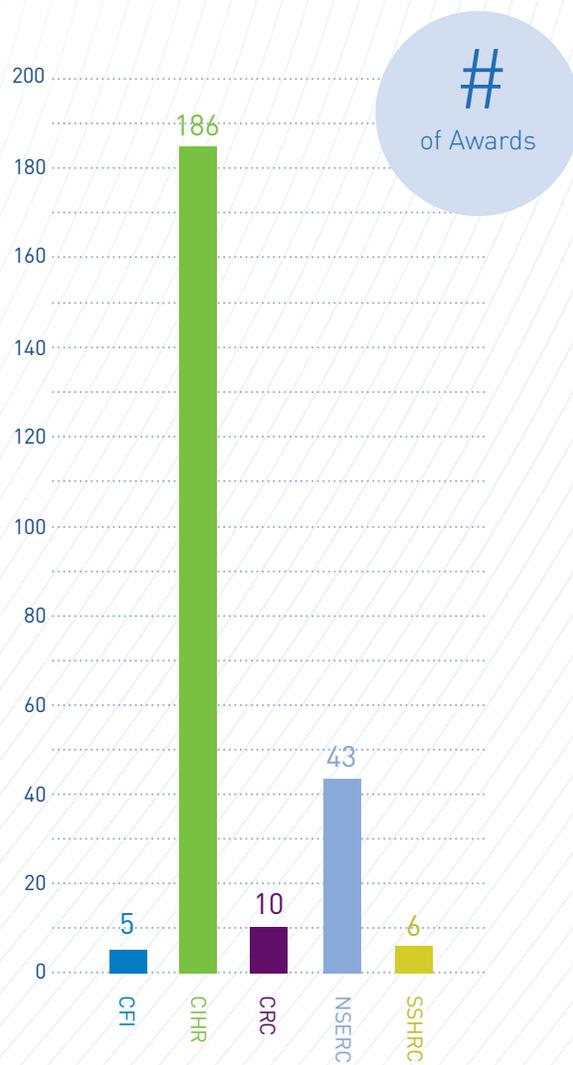
While some of the WCHRI Innovation and other operating grants support projects that have the potential to target a challenging clinical health problem, others generate preliminary data for applications to larger funding institutions. Our competitive grant programs and partnership strategies facilitate the use of our resources in a way that maximizes impact and leverages funds from other partners and agencies.



External Funding

A COMMONLY USED INDICATOR of excellence in research is the amount of external grant funding that researchers successfully compete for, both in terms of number of grants and total dollars. For WCHRI, external funding that our researchers receive can be viewed as leveraging our operating grants and other support that we provide to our membership. Based on available data, WCHRI researchers were awarded over \$26 million in external funding last year, with some

of these grants awarded for multiple years. Key national external funders included the Canadian Institutes of Health Research (CIHR), National Sciences and Engineering Research Council (NSERC), the Canadian Foundation for Innovation (CFI), Social Sciences and Humanities Research Council (SSHRC) and Canadian Research Chairs (CRC). WCHRI members also received external grants from the Government of Alberta and many disease-specific foundations.



*Data were obtained from the respective funding agencies and were computed by Science-Matrix.
 Note: CFI amounts are recorded in the year the money is granted and are not allocated over the course of the grant. All other grants (\$ and numbers) are allocated over the period of the grant.

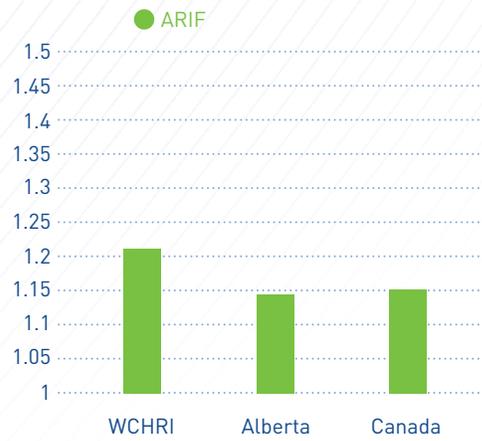
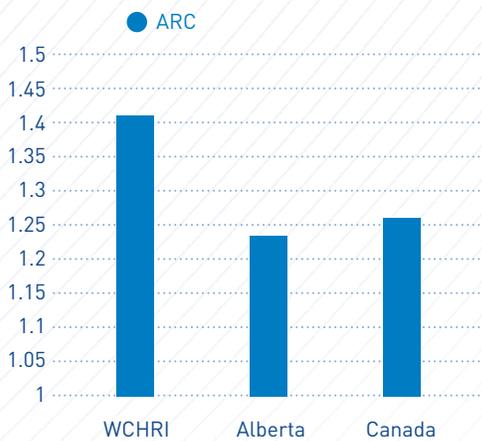
Publications

WE ARE VERY PROUD of the achievements of our members and the impact that their research has had on women and children's health. Peer-reviewed publications are one marker of excellence in research. This is an important means of communicating significant research findings to the rest of the academic world. Based on available data, our academic members' publication output – over 800 papers published in 2013 – has been truly impressive as can be seen from the chart below.

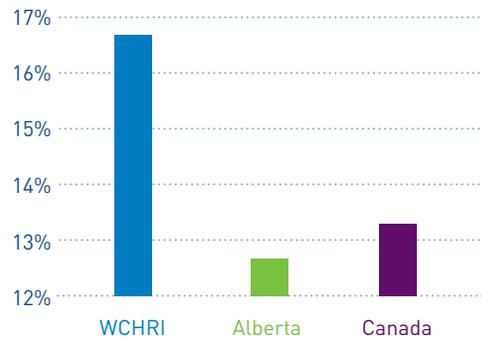
ARC – Average of Relative Citations: This is an indicator of the scientific impact of the publications in a particular field produced relative to the world average. When the ARC is above 1, it means that an entity / region scores better than the world average.

ARIF – Average of Relative Impact Factors: This is a measure of the expected scientific impact of publications produced, based on the impact factors of the journals in which they were published. When the ARIF is above 1, it means that the entity scores better than the world average.

This chart compares WCHRI member ARC and ARIF to the averages of Alberta and Canada.



THE PUBLICATION OF A PAPER in the highest tier of scientific journals is another measure of research excellence. This chart shows the percentage of WCHRI member papers which were published in the top 10 per cent most cited scientific journals, as compared to Alberta and Canada.



*Compiled by Science-Metrix from the Web of Science (Thomson Reuters)

Governance

Oversight Board Members

Glen Baker	Vice-President (Research), U of A (Delegate)
Sandra Davidge	Institute Director (non-voting)
David Evans	Vice-Dean of Research, FoMD, U of A
Murray Gray	Provost and Vice-President (Academic), U of A (Designate)
Bob Haennel	Health Services Council Representative
Mike House	President/CEO, SCHF
Tracy MacDonald	Executive Director, Stollery Children's Hospital, AHS
D. Douglas Miller	Dean, FoMD, U of A
Andrew Otway	President/CEO, RAHF
Joanna Pawlyshyn	Vice-President, Royal Alexandra Hospital, AHS
Kathryn Todd	Senior Vice-President Research, AHS
Michael Walter	Head of School, Human Development, U of A

Steering Committee Members

Glen Baker	Associate Vice-President (Research), U of A
Sandra Davidge	Institute Director (non-voting)
Karen Faulkner	Vice-President, SCHF
Susan Gilmour	Department Chair, Pediatrics, U of A
Tom Hobman	Vice-Dean of Research, FoMD, U of A (Designate)
Selikke Janes-Kelley	Executive Director, Women's Health, Royal Alexandra Hospital, AHS
Brian Rowe	Associate Dean, Clinical Research, FoMD, U of A
Sharlene Rutherford	Vice-President, RAHF
Margaret Sagle	Department Chair, Obstetrics and Gynecology, U of A
Christine Westerlund	Director, Critical Care and Operative Services, Stollery Children's Hospital, AHS

Scientific Advisory Committee Members (all U of A staff)

Sandra Davidge	Institute Director
David Eisenstat	Division Director, Pediatric Hematology/Oncology/Palliative Care
John Greer	Professor, Physiology
Kathleen Hegadoren	Professor, Nursing
Kaysi Kushner	Associate Dean/Associate Professor, Nursing
Gary Lopuschuk	Professor, Pediatrics and Pharmacology
Maria Mayan	Assistant Director, Community-University Partnership
Lawrence Richer	Institute Associate Director, Associate Professor, Pediatric Neurology
Sue Ross	Cavarzan Chair, Professor, Obstetrics and Gynecology



More than 400 researchers, students and community members filled the second floor of the Westin Hotel eager to present, learn and network. WCHRI calculated a 40 per cent increase in attendance from 2011. Clearly there is growing interest in women and children's health research in Alberta and WCHRI is proud of the impact it is making.

2013 Research Day had WCHRI Seeing Double

The 2013 Research Day was an outstanding tribute to WCHRI's success. WCHRI has seen growing numbers each year at Research Day, but the increase in participation noted in just a two year time period has been outstanding. There was a significant increase in attendance, poster submissions and oral presentations, nearly doubling in all areas when comparing the 2013 Research Day numbers to those recorded in 2011. We are excited to share with you what made the 2013 Research Day a success.

THE DAY WAS UNDERWAY

after a welcome message from WCHRI's Director Dr. Sandy Davidge. A full day of workshops, networking, oral presentations and poster viewing sessions followed.

Over 400 researchers, students and community members filled the second floor of the Westin Hotel eager to present, learn and network. WCHRI calculated a 40 per cent increase in attendance from 2011. Clearly there is growing interest in women and children's health research in Alberta and WCHRI is proud of the impact it is making.

Workshop speakers included Dr. Jon McGavock, Dr. Anita Kozyrskyj and Dr. Lawrence

Richer with topics spanning how to prepare a successful grant proposal, to effective interdisciplinary team building and an introduction to WCHRI's Concept to Completion strategy.

Throughout the day, WCHRI highlighted trainees' progress in women and children's health research through oral presentations and poster viewing sessions. Fifty-five oral presentations gave our students the opportunity to share their original research outcomes to overflowing audiences. In addition, 125 posters showcased other innovative research being conducted by undergraduate and graduate students, post-doctoral fellows, professors, residents and subspecialty

residents. WCHRI is delighted to see the increase in participation and believe this is a true indicator of our success in 2013.

For the first time, several of our hospital Foundation representatives 'shadowed' the poster judges. They unanimously expressed their great admiration and appreciation for the hard work and dedication of these trainees, who were thrilled to be given the chance to explain their research directly to the people who fundraise to support their research.

At the end of our very enlightening and informative day, keynote speaker Dr. Jonathan McGavock from the Manitoba Institute of Child Health educated the crowd with a talk on "The Prevention and Treatment of Type 2 Diabetes in Youth: the Role of Exercise and Lipotoxicity." Shortly after that, awards were given out to seven deserving oral and poster presenters. WCHRI is looking forward to another successful Research Day on November 12, 2014.



> Thank You



www.wchri.org

The Women and Children's Health Research Institute greatly appreciates the contributions of our members, reviewers, contributors, committee members and staff in making WCHRI's vision to improve the health of women and children a reality.

We would also like to thank the Stollery Children's Hospital Foundation, the Royal Alexandra Hospital Foundation, Alberta Health Services and the University of Alberta's Faculty of Medicine and Dentistry for their continued support. If not for the contributions of these partners, the work we do would not be possible.





www.wchri.org

WCHRI is a partnership between the University of Alberta and Alberta Health Services, with generous support from the Stollery Children's Hospital Foundation and the Royal Alexandra Hospital Foundation.

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