

Department of Pediatrics Research Report

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View the online version of the Research Report!



The Pediatric Diabetes and Endocrinology Team members. Dr. Mark Inman (standing 3rd from left) and Dr. Munier Nour (standing 4th from left) are the Pediatric Endocrinologists leading Pediatric Diabetes research, locally.

Local Research in Pediatric Diabetes

Dr. Mark Inman and Dr. Munier Nour

The Pediatric Diabetes Program in Saskatoon has seen significant change over the past three years, including a greater presence in current and future research in pediatric type 1 and type 2 care. With over 500 children with type 1 or 2 diabetes currently being followed by our clinic (and with many more children and adolescents with diabetes followed elsewhere in the province), there is ample opportunity to engage in research with this population.

In January 2014, Dr. Munier Nour joined the Department of Pediatrics as a Pediatric Endocrinologist and took over the care of children and adolescents with diabetes and endocrine disorders, working as the sole endocrinologist following the retirement of Dr. Tom Best in June 2014. In August 2015, Dr. Mark Inman joined the Department as the second Pediatric Endocrinologist. With the growth of the Division of Endocrinology, which also included increases in nursing, dietetic, and administrative support, Drs. Nour and Inman have been able to increase the output of clinical and translation research with several projects relating to pediatric diabetes.

Dr. Nour is the provincial lead for TRIALNET – an international network of researchers involved in various research initiatives seeking to predict and prevent or delay the onset of type 1 diabetes (<https://www.diabetestrialnet.org/>).

This project was recently approved and is now ready to begin recruitment of participants (local research nurse is Joan Dietz). In addition, Dr. Nour is the primary site investigator (and Dr. Inman as a co-investigator) for an international, multisite, randomized controlled trial that will be enrolling patients to examine the effect of novel therapeutics (GLP-1 agonist) in the management of adolescents with type 2 diabetes. Dr. Nour, working together with Dr. Saija Kontulainen (Faculty of Kinesiology), also plans to initiate a mixed-longitudinal cohort study examining bone micro-architectural development in children with type 1 diabetes in coming years.

Dr. Inman has recently published research that has assessed the impact of the social determinants of health on cardiovascular risk factors in children with type 1 diabetes. This research demonstrated the significant impact of social factors on early accumulation of risk factors for poorer cardiovascular health in this population. Currently, Dr. Inman – with Dr. Nour as co-investigator and in collaboration with individuals across the department – is working on the implementation and evaluation of a pediatric diabetic ketoacidosis (DKA) protocol. This quality

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Image of Interest

Michael Prodanuk (Medical student, Year 3, University of Saskatchewan) and Supervisor Dr. Tanya Holt (Director of Pediatric Critical Care and Pediatric Inter-facility Transport, University of Saskatchewan) presented their work, “Remote presence robotic technology reduces need for pediatric inter-facility transportation from a northern First Nations community” (see pg 2 for full article) at the American Academy of Pediatrics National Conference and Exhibition in San Francisco, California in October 2016. The authors received the C. Robert Chambliss Best MD Paper Award from the Section on Transport Medicine.

Co-investigators on the study include: Nazmi Sari PhD, Rachel Johnson RN(NP), Veronica McKinney MD, Matthew Bradshaw MD, Erin Prosser-Loose PhD, Alan M. Rosenberg MD, Luis Bustamante MASc, and Ivar Mendez MD PhD.

Remote presence robotic technology reduces need for pediatric inter-facility transportation from a northern First Nations community

Michael Prodanuk

Providing timely and accessible pediatric acute care in Saskatchewan is challenging given the province's geographical vastness and rurality. As 36% of Saskatchewan's children live in communities of less than 1,000 people, there is a high rate of medical transport from the periphery to tertiary care. Indigenous children are particularly vulnerable, as many live on remote reserves with limited access to health services. To add to this challenge, pediatric critical care and specialized transport were centralized to Royal University Hospital in 2014, resulting in a 70% increase in transport volumes over 2013. Thus, a solution was needed that facilitated early intervention at referring centres, triaged need for transport, and assisted in redistributing patients to regional hospitals.

A partnership between the College of Medicine and the community of Pelican Narrows allowed remote presence robotic technology (RPRT) to be investigated as a potential solution. RPRT is a form of telemedicine that creates the sense that the physician is at the patient's side despite being distantly located. It enables remote visualization,

examination, and diagnosis of the patient, as well as communication with local healthcare professionals and family members. Pelican Narrows, an isolated First Nations community in northeastern Saskatchewan, identified pediatric acute care as an urgent unmet need as 48% of the community's population is under the age of 17.

During the 13-month study, 38 acutely ill children presented to the clinic in Pelican Narrows and were remotely assessed, managed, and triaged by a pediatric intensivist in Saskatoon through the RP-7i remote presence device. Only 42.9% of participants required transport, whereas all controls were transported. Participants who remained at the clinic stayed less than 24 hours, while controls stayed almost 5 days in tertiary care. 44.4% of transported participants were regionalized to Prince Albert Victoria Hospital, whereas no controls were regionalized. These results suggest that RPRT is a potentially transformative strategy to mitigate barriers to healthcare access in rural/remote Saskatchewan. By prioritizing early goal-directed interventions in the periphery, RPRT dramatically decreased the

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Featured Child Health Researcher

Dr. Christopher Eskiw

Dr. Christopher Eskiw joined the University of Saskatchewan College of Agriculture and Bioresources in the Department of Food and Bioproduct Sciences in 2013. Originally from Fort McMurray Alberta, Dr. Eskiw obtained his BSc degree from the University of Alberta before completing his MSc (University of Saskatchewan) and PhD (University of Toronto) degrees. Dr. Eskiw completed 6 years of post-doctoral training at Oxford University and the University of Cambridge, followed by a 3-year lectureship at Brunel University in west London, UK. Dr. Eskiw's research interests center around the genetic mechanisms that control the aging process and how these can be modified by nutrients from diet or through pharmaceutical intervention.



One of the primary focuses of the Eskiw laboratory is Hutchinson Gilford Progeria Syndrome (HGPS). This is a rare genetic disorder that affects approximately 1 in 4 million live births. Although they do not begin to present symptoms until 2 years of age, children with HGPS age eight times faster than normal, developing age-related complications, such as alopecia, loss of subcutaneous fat and skeletal

hyperplasia. Children with HGPS usually succumb to heart attack or stroke at around 14 years of age.

What causes this devastating disease? Typical HGPS (~80% of cases) arises from a de novo mutation in a single gene encoding the Lamin A/C protein. Progerin, the mutant form of this protein, causes abnormal thickening of the nuclear membrane and disrupts these important cellular functions such as gene regulation and DNA repair, resulting in cells prematurely ageing. Interestingly, this protein is also found in the cells isolated from older normal individuals. Therefore, treatments for HGPS children may also be useful treatments for the elderly, increasing both health and quality of life in both populations.

Current HGPS treatments aim to prevent Progerin from accumulating in the nuclear membrane; however, the off-target effects and side effects from these drugs are severe and only increase lifespan by 2-3 years. The focus of the Eskiw laboratory is to develop novel strategies to convince cells to degrade Progerin through interfering with how cells sense nutrients at the molecular level. Under conditions of low cellular energy stress, cells are stimulated to activate autophagy (self-eating) where they degrade old cellular components for energy. Dr. Eskiw's research suggests that if autophagy can be activated in HGPS cells, they will degrade the toxic Progerin protein, which will re-establish essential cellular processes such as DNA repair, and lead to the restoration of normal cellular health and longevity. The

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Our Partners: Saskatchewan Health Research Foundation

The Saskatchewan Health Research Foundation (SHRF) has been a generous supporter of child health research. The activities of Saskatchewan's child health researchers continue to be supported by SHRF through its various funding programs. The continuing support of SHRF is acknowledged with appreciation. Further information about SHRF can be found at: shrf.ca



Clinical Investigator Program (CIP) for Residents

The CIP at the University of Saskatchewan is available to residents enrolled in a Royal College accredited residency program who have interest and potential for a career as a clinician investigator or clinician scientist. CIP offers two streams: A Graduate stream for participants enrolled in a graduate (M.Sc. or Ph.D.) program, and a Postdoctoral Stream for residents who already hold a Ph.D. and are interested in undertaking a structured research program. For further information about CIP, please contact Dr. Alan Rosenberg, alan.rosenberg@usask.ca.

Pediatric Diabetes Research

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improvement initiative seeks to improve the care of children and adolescents with DKA in the Saskatoon Health Region and eventually across the province.

Both Drs. Nour and Inman are continuing to look for opportunities to establish collaboration within the Department of Pediatrics and across other departments in the College of Medicine as pediatric diabetes (types 1 and 2) has overlap across numerous specialty areas. Both recognize the vast opportunities that exist to collaborate with minds across the university to further push the boundaries of not just diabetes research, but clinical research in general. Beyond the boundaries of the College, Drs. Nour and Inman have been sought to engage with diabetes researchers across the country with interest to collaborate in hopes of including Saskatchewan diabetes data in national research endeavors. Unique aspects of Saskatchewan diabetes, including the high prevalence of type 2 diabetes, the vast geography that renders access to care a major challenge, and the centralization of pediatric services serve to enhance further interest in better understanding this population and seeking ways to improve the quality and quantity of their care.

In the years to come, Drs. Nour and Inman are keen to continue to develop the pediatric diabetes (and endocrine) research platforms to gain more provincial and national exposure. While both are front-loaded with clinical and educational responsibilities that limit time to push the barriers of their clinical research, it is their hope that further development and streamlining of their diabetes and endocrine programs, in addition to collaboration with other members within and outside of the Department, will facilitate a growing network of research in this area. Drs. Nour and Inman certainly welcome your discussion regarding potential projects in the future that may involve pediatric diabetes or endocrine-related disorders.

Dr. Munier Nour (MSc, MD, FRCPC) and Dr. Mark Inman (MD, FRCPC) are Clinical Assistant Professors in the Division of Pediatric Endocrinology (Department of Pediatrics) at the University of Saskatchewan. Along with Dr. Dan Au-Yeung (Pediatrics), they are the three physicians who manage the pediatric diabetes care program in Saskatoon in close collaboration with several nurses, dietitians, a social worker, and administrative staff support.

Coming Events

FEB
TBA
Dr. Ram Natarajan
THU
Pediatric Grand Rounds
2
11am-12pm
East Lecture Theatre RUH

FEB
Child Advocate
Cory O-Soup
THU
Pediatric Grand Rounds
9
11am-12pm
East Lecture Theatre RUH

FEB
Saskatchewan Prevention Institute
Noreen Agrey
THU
Pediatric Grand Rounds
16
11am-12pm
East Lecture Theatre RUH

FEB
TBA
THU
Pediatric Grand Rounds
23
11am-12pm
East Lecture Theatre RUH

MAR
TBA
Dr. Harvey-Blankenship
THU
Pediatric Grand Rounds
2
11am-12pm
East Lecture Theatre RUH

MAR
TBA
Jill Bally and Meredith Burles
THU
Pediatric Grand Rounds
9
11am-12pm
East Lecture Theatre RUH

MAR
TBA
Dr. Angela Law
THU
Pediatric Grand Rounds
16
11am-12pm
East Lecture Theatre RUH

MAR
Child Health Research Trainee Day
Details TBA
THU
23

MAR
TBA
Dr. Sibasis Daspal
THU
Pediatric Grand Rounds
30
11am-12pm
East Lecture Theatre RUH

Recent Publications & Presentations from U of S Child Health Researchers

- Adams SJ, Wong M, Haji T, Sohail S, Almubarak S. Case Report. Pediatric absence status epilepticus: Prolonged altered mental status in an 8-year-old boy. *Case Reports in Neurological Medicine*. 2016. Epub.
- Ali Z, Lyon M, Inman M, Nour MA. Disharmonious thyroid function test results-a case of thyroid hormone resistance. *The Canadian Society of Endocrinology and Metabolism Annual Conference*. Poster Presentation. Ottawa, ON, October 22-26, 2016.
- Ang Cui, Gerald Quon, Alan M. Rosenberg, Rae S.M. Yeung, Quaid Morris. Gene expression deconvolution for uncovering molecular signatures in response to therapy in juvenile idiopathic arthritis. *Plos One*. 2016;11:e0156055.
- Hinks A, Bowes J, Cobb J, Thomson W, Ainsworth HC, Marion MC, Comeau ME, Han B, Becker ML, Bohnsack JF, de Bakker PIW, Haas JP, Hazen M, Lovell DJ, Nigrovic PA, Nordal E, Punnaro M, Rosenberg AM, et al. Fine-mapping the MHC locus in juvenile idiopathic arthritis (JIA) reveals genetic heterogeneity corresponding to distinct adult inflammatory arthritic diseases. *Annals of the Rheumatic Diseases* (in press).
- Nour MA, Luca P, Stephure D, Wei X-C, Khan A. Anterior hypopituitarism and treatment response in Hunter Syndrome: A comparison of two patients. *Case Reports in Pediatrics*. 2016;28:e4328492.
- Ombrello MJ, Arthura VL, Remmers EF, Hinks A, Grom A, Föll D, Martini A, Gattorno M, Ozen S, Prahalad S, Zeft A, Bohnsack JF, Ilowite N, Russo R, Mellins ED, Len CA, Hilário MOE, Oliveira S, Yeung RSM, Rosenberg A. Genetic architecture of systemic juvenile idiopathic arthritis distinguishes it from oligoarticular and polyarticular forms of juvenile idiopathic arthritis. *Washington, November 2016 Abstract #2410*.
- Ombrello MJ, Arthura VL, Remmers EF, Hinks A, Tachmazidou I, Grome A, Foell D, Martin A, Gattorno M, Özen S, Prahalad S, Zeft AS, Bohnsack JF, Ilowite NT, Mellins ED, Russo R, Len C, Hilario MOE, Oliveira S, Yeung RSM, Rosenberg A, et al. Genetic architecture distinguishes systemic juvenile idiopathic arthritis from other forms of juvenile idiopathic arthritis: Clinical and therapeutic implications. *Annals of the Rheumatic Diseases* (in Press).
- Rumsey DG, Guzman J, Rosenberg A, Huber A, Scuccimarrì R, Eurich D. Entesitis in juvenile idiopathic arthritis (JIA). *American College of Rheumatology Annual Meeting*. Washington, D.C., November 2016. Abstract #399

Robotics technology

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use of our transport service and tertiary care centre. This innovative technology also facilitated culturally safe care by minimizing displacement of indigenous children from their home community.

Following the success of this pilot project, the provincial government invested \$500,000 to expand remote presence infrastructure in rural Saskatchewan.

Our study was presented at the American Academy of Pediatrics National Conference and Exhibition in San Francisco, California in October 2016, where the authors received the C. Robert Chambliss Best MD Paper Award from the Section on Transport Medicine.

Supervisor: Tanya Holt MD-Director of Pediatric Critical Care and Pediatric Inter-facility Transport

Student Researcher: Michael Prodanuk-Medical Student, Year 3

Co-investigators: Nazmi Sari PhD, Rachel Johnson RN(NP),

Veronica McKinney MD, Matthew Bradshaw MD, Erin

Prosser-Loose PhD, Alan M. Rosenberg MD, Luis Bustamante

MASc, Ivar Mendez MD PhD

Michael Prodanuk was the recipient of a 2016 Dean's Summer Research Project funding through The College of Medicine, with Dr. Tanya Holt as his supervisor. The program is intended to foster a spark and ignite a passion for research in our medical students, facilitating an understanding of the vital role research plays in today's health care.

YOUR OPINION PLEASE!

We would appreciate your opinion about the Department of Pediatrics Research Report and suggestions for future editions.

Please complete a brief survey at:
<https://www.surveymonkey.com/s/NQVV6SB>.

Thank you!

contact us

For more information about The Department of Pediatrics Research, SPRING, or to contribute content to The Department of Pediatrics Research Report, please contact:

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Next submission deadline is March 10th, 2017!

Online version of the newsletter:
www.medicine.usask.ca/pediatrics/research/newsletter



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INNOVATION GROUP

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Dr. Eskiw

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approach could be as simple as restricting the amount of essential amino acids, such as leucine, for short periods of time. Furthermore, commonly used drugs, such as metformin (currently used to treat type-2 diabetes), which stimulates autophagy and already has been shown to have anti-aging and health span-promoting properties, could be repurposed as HGPS treatments. Dr. Eskiw is also interested in identifying naturally occurring compounds from dietary sources that mimic these effects. Although in the preliminary stages, early data looks very positive. It is a long way from the bench-side to the bed-side, however, it is hoped that these new strategies will have significant impact on the lives of HGPS children in the near future.

Dr. Chris Eskiw is an Assistant Professor in the Department of Food and Bioproduct Sciences, in the College of Agriculture and Bioresources.

Dr. Eskiw's HGPS research is funded by grants from the Saskatchewan Health Research Foundation (SHRF) and the Natural Sciences and Engineering Research Council of Canada (NSERC)

Research Project Opportunities

"Relationship of ESR and CRP with inflammatory cytokine biomarkers"

Study format: Database analysis

Contact: Dr. Alan Rosenberg, alan.rosenberg@usask.ca

Canadian Paediatric Surveillance Program (CPSP)
\$3000 Research Grant for Pediatric Residents to enable a one-time CPSP survey.

Deadline March 1, 2017

Contact: Erin Prosser-Loose, erin.loose@usask.ca

SAVE
THE DATE!

THURSDAY, MARCH 23, 2017

Department of Pediatrics
Child Health Research
Trainee Day!
More info TBA.

The Children's Health Research Trust Fund (CHRTF) was established in 1983 to help raise funds to support child health research at the University of Saskatchewan. As all donated funds are endowed, the CHRTF has continued to grow to become an important partner in helping advance research in the Department of Pediatrics. For further information about the CHRTF: <http://www.medicine.usask.ca/pediatrics/research/CHRTF>. To **Donate** to the CHRTF: <http://give.usask.ca/online/chrtf.php>

