

Department of Pediatrics Research Report

Inside This Issue

Childhood Asthma	P1
Image of Interest	P1
Treatment of PTU	P2
Featured Researcher	P2
Our Partners	P2
Recent Publications/Presentations	P3
Coming Events	P4
Research Opportunities	P4
Survey	P4
CHRTF	P4
Contact Us	P4

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Research Report!



A typical rural Saskatchewan setting where there may be exposures that impact childhood asthma

Geographical Variation in Childhood Asthma Prevalence

Dr. Joshua Lawson

Asthma is one of the most common childhood conditions with a prevalence of approximately 10% globally. In Canada, childhood asthma prevalence is around 13% and is a leading medical expense costing hundreds of millions of dollars. Internationally, childhood asthma is typically higher in Westernized nations, including Canada, compared to other regions. Within Canada, regional variation in asthma and related symptom prevalence has been reported. In addition to this, there has been some evidence that the prevalence of asthma and allergy are lower in rural or farming regions compared to urban or non-farming areas. Reasons for this geographic variation are unknown but may include environmental differences, accessing or labeling differences where children may not be accessing the health care system or physicians may be labeling a condition as something other than asthma, or differences in health behaviours.



asthma and allergy on farms is that most of the work was conducted in European centers where farming can be quite different than in Canada. Based on research from within Saskatchewan, we found that among rural dwelling children, there were no differences in asthma or wheeze prevalence between farm and non-farm dwelling children (Barry et al 2012, 2014). A limitation with this study, however, was a lack of variability in exposure between farm and non-farm children. Despite this, it was suggested that environmental and diagnosing patterns might help explain the previous reports of geographic variation.

When the issue of variability was addressed through the inclusion of a larger range of dwelling locations (i.e. large urban through rural farming), a gradient in asthma prevalence was observed nationally (Lawson et al, 2011). Few explanations for the differences in prevalence could be considered nationally as this was a survey where lung health was not the primary focus although conclusions from the study were that health behaviours were likely not explaining the differences but that access or labeling issues may play a role given that there was no difference along an urban-rural gradient in the prevalence of wheeze or health care utilization.

To expand on these results, a study is currently underway in Saskatchewan, which

continued on P3...

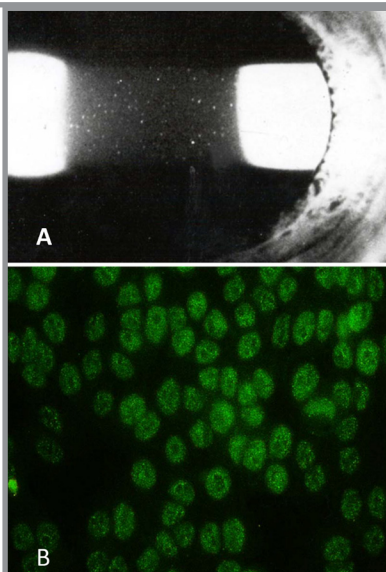


Image of Interest

Anterior uveitis associated with childhood arthritis is a distinct but enigmatic clinical entity. Panel A shows typical findings of anterior uveitis on slit lamp biomicroscopy including cells (bright white dots) and protein flare (the underlying haziness along the light beam). Most children with arthritis and associated uveitis are girls, have a young onset age, oligoarthritis and a positive test for antinuclear antibodies (ANA). The ANA typically displays a dense, finely speckled fluorescent pattern (B). A multi-centred, multi-disciplinary study being led by faculty at the University of Saskatchewan is expected to explain, for the first time, the biological basis and possible etiology of the juvenile arthritis-uveitis relationship and explain the characteristic young onset age, female predisposition, and antinuclear antibody positivity.

Within Saskatchewan, much of the research into the geographic variation of childhood asthma has focused on differences in asthma prevalence between farming and non-farming populations. A limitation with previous evidence suggesting lower rates of

Successful treatment of paroxysmal tonic upgaze with low dose dimenhydrinate (Gravol®)



Katherine Sawicka and Dr. Richard Huntsman

Paroxysmal Tonic Upgaze (PTU) of infancy is an uncommon benign syndrome of childhood and infancy characterized by sustained episodes of conjugate upward

deviation of the eyes. This is accompanied by neck flexion to compensate for abnormal eye positioning. The pathophysiology of PTU remains obscure. PTU often resolves spontaneously over several months, however episodes are extremely debilitating. While PTU is associated with normal neurodevelopmental outcomes in 50% of cases, it can be associated with protracted ataxia and cognitive deficits. Currently, treatments with levodopa have been tried with variable success. Via

its anticholinergic effects, we postulated that dimenhydrinate may be a novel and effective therapeutic option in children with paroxysmal movement disorders, such as PTU, with limited side effects.

Katherine Sawicka, a medical student, in association with Dr. Richard Huntsman presented their unique observation of the efficacy of dimenhydrinate for treating PTU at the Canadian Neurological Sciences Federation Congress in Toronto in June, 2015. The investigators have established a collaboration with colleagues at the University of Alberta to further investigate the clinical efficacy of using low dose dimenhydrinate to treat PTU.

Katherine Sawicka is a Phase C medical student in the College of Medicine, University of Saskatchewan. Dr. Richard Huntsman is an Associate Professor in the Department of Pediatrics, College of Medicine, University of Saskatchewan

Featured Child Health Researcher

Dr. Roona Sinha

Dr. Roona Sinha is a pediatric hematologist oncologist who joined the University of Saskatchewan faculty in January 2012. She completed her undergraduate and medical school studies at the University of Ottawa. This was followed by a pediatrics residency at the University of Alberta and then fellowship training in pediatric hematology oncology at the University of British Columbia.



Dr. Sinha is the local principal investigator for several national trials in the area of pediatric hematology. These include treatment studies in hemophilia, surveillance of treatment effects in bleeding disorders, examining the genetic basis of bone marrow failure disorders, and looking at next generation sequencing to identify genetic predispositions that affect treatment in aplastic anemia and myelodysplastic syndromes. In the area of pediatric oncology, she is an active member of the Children's Oncology Group which is an international clinical trials group that examines the biology of cancer, new treatments, and supportive care in pediatric oncology patients. Through her work on the executive of the C17, which is the national hematology oncology organization, she is also looking at ways to increase access to clinical trials for pediatric hematology oncology patients in Canada.

One of Dr. Sinha's latest research initiatives involves working with a group of local clinicians as well as laboratory collaborators

on a project looking at feasibility and efficacy of using point of care coagulation testing devices in the pediatric inpatient setting. The goal of this study is to validate point of care machines for the inpatient setting as these machines require much lower blood volumes for the coagulation testing.

Dr. Sinha is also a qualitative researcher. Past qualitative studies have included looking at health related quality of life in pediatric oncology patients as well as examining the efficacy of using written hematology patient education materials to enhance the clinic visit experience. Her qualitative research interests combined with her interests in medical education led her to recently complete a Masters of Health Professions Education through Maastricht University in the Netherlands. In her thesis research project, she examined the challenges faced by physicians at the time of transition to practice and why these challenges exist. Novel findings were observed with respect to the culture of medical training and practice in Canada as well as implications to help ease the process of transition to practice for future physicians. Stemming from this project she is now collaborating on an international study looking at cultural differences during the transition to practice period for physicians in different countries.

Dr. Sinha is interested in clinical research using both qualitative and quantitative methodology that brings together collaborators from different fields to explore new ideas that can further the health of children. She can be contacted at roona.sinha@usask.ca.

Dr. Roona Sinha is an Associate Professor in the Department of Pediatrics, College of Medicine, University of Saskatchewan

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

includes children aged 5-14 years living along a rural-urban gradient. While preliminary, the results indicate that there is a rural-urban gradient in asthma prevalence with less asthma in more rural areas but that there is not a similar trend in the prevalence of asthma-like symptoms and that rural dwelling and farming activities was associated with higher lung health morbidity. We also found that despite having a lower asthma prevalence compared to urban centers, the prevalence of asthma is still quite high in these rural centers (approximately 14%) and should be a health priority. The results suggest that the environment plays a role in the presence and severity of asthma but that other factors such as accessing health care may also play a role.

Similar findings of a lower prevalence but higher morbidity have been found previously out of Saskatchewan. Recent work investigating the environment in relation to asthma and related conditions in a rural area included the examination of the effects of endotoxin and tobacco smoke exposure, both independently and jointly on the presence and severity of asthma and wheeze among children. It was a comprehensive assessment that examined multiple outcomes including the presence of asthma or wheeze, lung function, and health-related quality of life, as well as a two-week monitoring component for cases that included diurnal peak flow variation and symptom report. Endotoxin is a ubiquitous exposure found at higher levels on farms, around livestock, and in rural settings. Although pro-inflammatory, endotoxin is thought to play a role in the development of the immune system early in life shifting the immune response from a Th2 to a Th1 response, thus potentially protecting against allergy and asthma. We found that endotoxin can be protective of the presence of disease but aggravate the severity of disease among those with asthma or wheeze. However, these associations were dependent on personal (age and sex) and environmental characteristics (tobacco

smoke exposure). This suggests that interactions must be considered when assessing associations with the environment (eg. endotoxin) and that the association between endotoxin and respiratory outcomes is complex and may differ by outcome. Currently, these research directions are being expanded through more thorough clinical and environmental assessments with children living along an urban rural gradient. This includes assessment of atopy through skin prick testing and lung function testing by spirometry.

While the environment is an important consideration in the explanation of the geographic variation of asthma prevalence, globally, diagnostic labeling and contextual factors must also be considered. There are clear geographic differences in asthma prevalence internationally. However, the reasons for these may extend beyond environmental reasons. Through collaboration between the University of Saskatchewan and centers in Poland, Belarus, Ukraine, Republic of Macedonia, and Republic of Georgia, we have observed that labeling patterns may influence asthma prevalence where local labels such as spastic bronchitis may be used in place of asthma. This could have implications on treatment and subsequent well being of children with lung conditions.

There are clearly differences in asthma prevalence geographically. As the reasons for these variations become understood it will aid in our knowledge of the etiology of the disease as well as our ability to manage the disease appropriately. In turn, this should help improve the quality of life for those afflicted with the disease.

Barry et al. *Pediatr Pulmonol.* 2014;49:842-51

Barry et al. *Ann Allergy Asthma Immunol.* 2012;109:255-9.

Lawson et al. *Ann Allergy Asthma Immunol.* 2011;107:220-8.

Dr. Joshua Lawson is an Associate Professor with the Canadian Centre for Health and Safety in Agriculture, University of Saskatchewan

Recent Child Health Publications from U of S Faculty

- **Adamko DJ**, Nair P, Mayers I, Tsuyuki RT, Regush S, Rowe BH. Metabolomic profiling of asthma and chronic obstructive pulmonary disease: A pilot study differentiating diseases. *J Allergy Clin Immunol.* 2015 [Epub ahead of print].
- Brozek G1, Shpakou A, **Lawson J**, Zejda J. Rural Dwelling and Temporal Trends in Relation to Childhood Asthma and Related Conditions in Belarus: A Repeated Cross-sectional Survey. *J Agromedicine.* 2015;20:332-40.
- Cada M, Segbefia CI, Klaassen R, Fernandez CV, Yanofsky RA, Wu J, Pastore Y, Silva M, Lipton JH, Brossard J, Michon B, Abish S, Steele M, **Sinha R**, Belletrutti M, Breakey V, Jardine L, Goodyear L, Sung L, Shago M, Beyene J, Sharma P, Zlateska B, Dror Y. The impact of category, cytopathology and cytogenetics on development and progression of clonal and malignant myeloid transformation in inherited bone marrow failure syndromes. *Haematologica.* 2015;100:633-42.
- **Chaves R**, **Baxter-Jones A**, Gomes T, Souza M, Pereira S, Maia J. Effects of Individual and School-Level Characteristics on a Child's Gross Motor Coordination Development. *Int J Environ Res Public Health.* 2015;12:8883-96.
- Froehlich Chow A, Leis A, **Humbert ML**, **Engler-Stringer R**, **Muhajarine N**. Supporting Healthy Eating Among Rural Early Years Children: A Pulse Crop Pilot Intervention Study. *J Agromedicine.* 2015;20:386-9.
- Guzman J, Oen K, Huber AM, Watanabe Duffy K, Boire G, **Shiff N**, Berard RA, Levy DM, Stringer E, Scuccimarri R, Morishita K, Johnson N, Cabral DA, **Rosenberg AM**, et al for the ReACCh-Out investigators. The risk and nature of flares in juvenile idiopathic arthritis: results from the ReACCh-Out cohort. *Ann Rheum Dis.* 2015 [Epub ahead of print].
- **Huntsman R**, **Lemire E**, **Norton J**, Dzus A, **Blakley P**, **Hasal S**. The differential diagnosis of spastic diplegia. *Arch Dis Child.* 2015;100:500-4.
- Lyon ME, **Baerg KL**, Olson TN, Agnew BL, Smith-Fehr JC, Lyon AW. The clinical impact of implementing the Roche® bilirubin total Gen.3 method on neonate phototherapy. *L Clin Biochem.* 2015 [Epub ahead of print].
- Nazemi SM, Amini M, **Kontulainen SA**, Milner JS, Holdsworth DW, Masri BA, Wilson DR, Johnston JD. Prediction of local proximal tibial subchondral bone structural stiffness using subject-specific finite element modeling: Effect of selected density-modulus relationship. *Clin Biomech* 2015;30:703-12.
- **Nour MA**, Pacaud D. Height augmentation in 11β-hydroxylase deficiency congenital adrenal hyperplasia. *Int J Pediatr Endocrinol.* 2015 [Epub ahead of print].
- You JJ, Downar J, Fowler RA, Lamontagne F, Ma IW, Jayaraman D, **Kryworuchko J**, Strachan PH, Ilan R, Nijjar AP, Neary J, Shik J, Brazil K, Patel A, Wiebe K, Albert M, Palepu A, Nouvet E, des Ordon AR, Sharma N, Abdul-Razzak A, Jiang X, Day A, Heyland DK; Canadian Researchers at the End of Life Network. Barriers to goals of care discussions with seriously ill hospitalized patients and their families: a multicenter survey of clinicians. *JAMA Intern Med.* 2015;175:549-56.

Coming Events

OCT

THU
1

Pediatric Acute Onset
Neuropsychiatric Syndromes (PANS)
Drs. Cooperstock, Crowley, Murphy,
& Swedo
Pediatric Grand Rounds
11am-12pm
SASKTEL THEATRE, RUH

OCT

THU-FRI
1-2

Pediatric Acute-onset
Neuropsychiatric Syndromes (PANS):
A Saskatchewan-led International
Transdisciplinary Conference for
Development of Early Detection,
Targeted Treatment, and Prevention
Protocols. SaskTel Theatre, RUH
REGISTRATION FULL

OCT

THU
8

Autoimmune Encephalitis
Dr. Richard Huntsman
Pediatric Grand Rounds
11am-12pm
East Lecture Theatre (G763), RUH

OCT

THU
15

Protecting the World's Children
Through Innovative Approaches to
Vaccination
Dr. Volker Gerdts
Pediatric Grand Rounds
11am-12pm
East Lecture Theatre (G763), RUH

OCT

THU
22

Malaria Update
Dr. Ben Tan
Pediatric Grand Rounds
11am-12pm
East Lecture Theatre (G763),
RUH

OCT

THU
29

Phoresis in the Pediatric Population
Dr. Caron Strahlendorf
Pediatric Grand Rounds
11am-12pm
East Lecture Theatre (G763), RUH

NOV

THU
5

TBA
Dr. Fergall Magee
Pediatric Grand Rounds
11am-12pm
East Lecture Theatre (G763), RUH

NOV

THU
19

Brain on Fire: Pediatric CNS
Vasculitis
Dr. Susanne Benseler
Pediatric Grand Rounds
11am-12pm
East Lecture Theatre (G763), RUH

NOV

THU
12

Morbidity and Mortality Rounds
Dr. Vicki Cattell
Pediatric Grand Rounds
11am-12pm
East Lecture Theatre (G763), RUH

NOV

THU
26

TBA
Dr. Kersten Gerhold
Pediatric Grand Rounds
11am-12pm
East Lecture Theatre (G763), RUH

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.](https://www.surveymonkey.com/s/NQVV6SB)

Thank you!

Research Project Opportunities

“Survey of Kawasaki Disease awareness among Saskatchewan physicians”

Study format: Survey

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

“Relationship of ESR and CRP with inflammatory cytokine biomarkers”

Study format: Database Analysis

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

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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**Deadline for submissions for the
next Research Report is November 9,
2015!**



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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:

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CHRTF](http://www.medicine.usask.ca/pediatrics/research/CHRTF)

To **Donate** to the CHRTF:

<http://give.usask.ca/online/chrtf.php>

