women & children's health research institute

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Research Day 2024

Keynote Speaker | Program | Abstract relevance criteria | Info & Guidelines | Abstracts | Registration

Join us for WCHRI Research Day 2024

WCHRI Research Day brings our members and partners together to share common interests and research outputs on women's and children's health. It is an excellent venue for our trainees to communicate their recent work, discuss their research and network with colleagues. Presentations for Research Day will be combined into themed sessions.

WCHRI Research Day 2024 will be on **November 6, 2024**. We are pleased to host our Research Day in person at The Westin Edmonton and hope you will join us!

Important dates:

Registration and abstract submission opens	**July 5**
Learning Session: How to prepare your abstract for WCHRI Research Day	**Recap video**
Abstract submission closed	**September 4 (at 4 p.m.)**
Learning Session: How to prepare your presentation for WCHRI Research Day	**October 2 (11:30 a.m. – 1 p.m.**
Registration closed on	**October 30 (at 4 p.m.)**

WCHRI Research Day is an open event where photographs of presenters and attendees are taken.

Questions? Contact wcgrants@ualberta.ca.

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Thank YOU for attending WCHRI Research Day 2024!

WCHRI is pleased to have hosted our 17th Annual Research Day on November 6, 2024. WCHRI Research Day offers a highly engaged learning and networking environment that showcases trainee research accomplishments in children's and/or women's health research.

Thank you again to our founding partners, the University of Alberta, Alberta Health Services, the Stollery Children's Hospital Foundation and the Alberta Women's Health Foundation, for making WCHRI and this day possible. We're grateful for your support and commitment to women's and children's health research.

Thank you to this year's keynote speaker, Dr. Christine Chambers. She shared her insights and experiences in advancing children's health research, demonstrating the transformative impact of research on improving the lives of children and youth worldwide.

Thank you to our 139 members who volunteered to support Research Day as reviewers or session chairs!

Finally, thank you so much to our trainees for presenting their research!

We are pleased to announce this year's Research Day winners!

Congratulations to all presenters this year!

WCHRI does not provide feedback for this opportunity.

Thanks for attending Research Day 2024!

WCHRI Research Day is an open event where photographs of presenters and attendees were taken.

Questions? Contact wcgrants@ualberta.ca.

Keynote Speaker

Every year, WCHRI hosts a keynote presentation at Research Day featuring a researcher doing incredible work to advance the lives of women and children.

We're thrilled to announce our keynote speaker for this year, **Dr. Christine Chambers**.

Dr. Chambers is an international leader in children's health research, known for her work in pain management and her role with Solutions for Kids in Pain (SKIP), as well as her position as the Scientific Director of the Institute of Human Development, Child and Youth Health (IHDCYH) at the Canadian Institutes of Health Research (CIHR).

Her talk, titled **"Better Beginnings, Vibrant Childhoods, Empowered Youth: Research that Makes a Difference,"** will blend insights from her role at CIHR-IHDCYH and her groundbreaking work in children's pain management.

Dr. Chambers' accolades include being named one of Canada's Top 100 Most Powerful Women by the Women's Executive Network, highlighting her significant contributions to the field. With over 200 articles published in peer-reviewed scientific journals, her impact and influence in children's health research are undeniable.

As a Professor and Tier 1 Canada Research Chair in Children's Pain at Dalhousie University, Dr. Chambers has led award-winning projects, including #ItDoesntHaveToHurt, which has garnered widespread recognition for its advocacy and awareness efforts in children's pain management.

Through her leadership of SKIP, Dr. Chambers has facilitated collaborations among researchers, healthcare professionals, and policymakers to implement evidence-based solutions for children's pain.

Attendees can anticipate an engaging presentation from Dr. Christine Chambers, as she shares her insights and experiences in advancing children's health research. Her keynote promises to be a highlight of the event, demonstrating the transformative impact of research in improving the lives of children and youth worldwide.

Contact

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11405 87 Avenue NW Edmonton, AB T6G 1C9

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Program

Wednesday, November 6
7 a.m. to 5:45 p.m.

AM Oral Presentations | PM Oral Presentations

View as a PDF

The Westin Edmonton

7–7:45 a.m.	Registration and poster setup – ***Foyer***				
7:45 a.m.–8:15 a.m.	Welcome – Opening Remarks & Indigenous Welcome Ceremony – ***Ballroom***				
8:15–10:15 a.m.	Poster viewing 1 – *Ballroom*				
10:15–10:25 a.m.	*BREAK*				
10:25 a.m.–12:25 p.m.	Oral # 1 Turner Valley Room Pregnancy and developmental trajectories	Oral # 2 Leduc Room Children's health and wellbeing: Mental health	Oral # 3 Consulate Room Children's health and wellbeing: Nutrition	Oral # 4 Chancellor Room Indigenous health and wellbeing	Oral # 5 Chairman Room Lifelong women's health and wellbeing
12:25–1 p.m.	*LUNCH* – ***Ballroom***				
1–2:15 p.m.	Welcome from our partners Keynote – ***Ballroom***				
2:15–3:15 p.m.	Poster viewing 2 – ***Ballroom***				
3:15–5:15 p.m.	Oral # 1 Turner Valley Room Pregnancy and developmental trajectories	Oral # 2 Leduc Room Children's health and well-being: Cardiac health	Oral # 3 Consulate Room Children's health and well-being: Musculoskeletal health	Oral # 4 Chancellor Room Children's health and wellbeing: Neurodevelopment	Oral # 5 Chairman Room Lifelong women's health
5:15–5:45 p.m.	Awards, wrap up and thank you – ***Ballroom***				

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Abstract relevance criteria

All abstracts to WCHRI Research Day must align with the following relevance criteria to be eligible for posting on our website and presentation at Research Day.

To establish relevance, all abstracts must clearly address the following:

- The research question must specifically target improving outcomes for women and/or children through health research*.
- The primary research question must address the unique and distinct health needs of women and/or children. For example:
  - Stating that a particular disease or risk factor is higher in women or in children is not sufficient rationale; the study must explore why prevalence is higher in women or children.
  - If a study is exploring sex/gender comparisons, the comparison must be embedded as the primary research question, not as a secondary outcome.
- Methodology must clearly demonstrate direct applicability to women and/or children's health outcomes. The applicant must provide rationale for their chosen research model, including factors such as sex and age.

The above items are some common considerations; alternative or additional factors may need to be included.

**We use a broad and inclusive definition of women's health research, incorporating both sex as a biological variable and gender as a social variable, across the life course. We include people assigned female at birth, all people who identify as women (cis and trans inclusive), as well as gender diverse individuals who do not identify as women but who share health challenges in common with women. (from CIHR IGH, 2024)*

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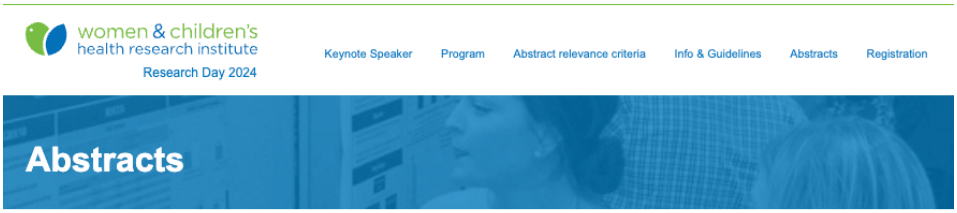

Abstracts that have been accepted for presentation at WCHRI Research Day are posted below.

Presenters | Supervisors

Presentation theme | Outcome | Keyword

A B C D E F G H J K L M N O P Q R S T V W Y Z

- Abolghasemi Taree, Nazanin +
- Ahmed, Shahzaib +
- Al-Rimawi, Dania +
- Alam, Sarjana +
- Allen, Randall +
- Almeida de Oliveira, Amanda +
- Alzaid, Dalal +
- Ambrose, Anastasia +
- Applin, Nicole +
- Arjomand Fard, Nazanin +
- Armbruster, Marie +
- Armour, Evelyn +
- Aynalem, Yared Asmare +
- Babale, Ismail +
- Badhan, Navdeep +
- Barber, Mikayla +

Registration

We are pleased to host our Research Day in person at The Westin Edmonton and hope you will join us on November 6!

The deadline for abstract submission was **September 4 at 4 p.m.**

The deadline for registration was **October 30 at 4 p.m.**

You must have registered by October 30 to attend.

Participation at the event is free of charge, but due to the significant costs involved — with funds provided by our generous partners, the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation — registration is required.

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Information & guidelines

Promote and network your research with us in-person!

WCHRI Research Day offers trainees under the supervision of WCHRI academic members the opportunity to showcase their research progress. This year, we look forward to interacting with our academic members, their trainees and our funders, the Stollery Children's Hospital Foundation and the Alberta Women's Health Foundation in person!

We are pleased to host our Research Day in person at The Westin Edmonton. Participation is free of charge, due to the significant costs involved — with funds provided by our generous funders the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation — registration is required if you are going to attend!

Academic members will be reminded to register. The deadline to register was October 30. In-person registration is not available.

Click on the section headers below to access information on how to present your research.

- Program opportunity +
- Abstract preparation outline +
- Abstract submission +
- Abstract allocation +
- Research Day presentation formats +
- Learning Sessions +
- Deadlines +
- Acknowledgement +
- Access the abstract submission and registration form +

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Program opportunity

Abstracts and presentations are scientific and should be accessible to a broad audience.

- Abstract submissions will be allocated to one of the following presentation formats:
  - 5-minute poster presentation, or
  - 10-minute oral presentation.
- Only abstracts that evidence alignment with WCHRI Research Day abstract relevance criteria are eligible for publication and presentation.
- Presentations are representative of WCHRI's three research themes:
  - children's health and well-being
  - pregnancy and developmental trajectories and
  - lifelong women's health.
- Presentation formats are assigned by the presenter's in-training category, WCHRI research theme, and commiserate with the presenter's engagement in research.

Submission of an abstract to WCHRI constitutes confirmation of the in-training member's availability to present at WCHRI Research Day on November 6.

Abstract preparation outline

Before you start your abstract submission, review the submission and completion requirements. Most trainees develop their abstract in a Word document and copy and paste the abstract into the abstract submission form.

The purpose of your abstract is to:

- condense a large amount into a brief and concise summary.
- engage and promote your work with a broad audience.

Why it's important:

- This will determine the format you are invited to present on Research Day.
- Abstracts will be posted on our website, so it will be a chance to build your professional portfolio.

Structure

For the abstract itself, key components include:

- a title
- an introduction
- methods
- results
- conclusion

Abstracts must also include the:

- authors
- acknowledgements and funding sources.

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Abstract submission

- Presentations are delivered by the trainee invited to present.
  - Abstracts must be submitted to WCHRI on or before **September 4 (4 p.m.).**
    - Late submissions are not accepted.
  - Abstract submission is open to in-training members (undergraduate, graduate, fellows and residents) under the direct supervision of a current WCHRI academic member.
    - Submission is not accepted from trainees that hold or are on leave from a faculty position.
  - One abstract submission per trainee maximum.
    - Where the presenter submits more than one abstract, the abstract submitted closest to the deadline date will be accepted.
  - Submitted information is final and not subject to amendment.

Trainees are to download the abstract details (PDF document) from the submission confirmation page. This download must be retained by the trainee as confirmation of abstract submission.

Abstract allocation

All submitted abstracts are:

- Reviewed for relevance.
- Relevant abstracts are allocated to one of the following presentation types:
  - 5-minute poster presentation, or
  - 10-minute oral presentation.
- Relevant abstracts will be published on our website on **September 20.**

WCHRI will provide notification to all trainees of the outcome of their abstract submission on **October 1.**

Feedback is not provided for this opportunity.

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Research Day presentation formats

WCHRI Research Day presentation formats offer trainees the opportunity to promote and network their research.

Presentations are attended by a broad audience composed of trainees, academic faculty, research staff and our funding partners and their donors.

5-minute poster presentation

Each trainee will be assigned to a poster session and posterboard. WCHRI will provide tacks for presenters to pin their poster to the posterboard. Further instruction and posterboard access timelines will be provided in presenter invitations. Trainees have five minutes to present their research followed by up to five minutes of questions from poster reviewers. Poster reviewers may be WCHRI postdoctoral fellows or academic members.

Representatives from Stollery Children's Hospital Foundation and/or Alberta Women's Health Foundation may engage in discussion with poster presenters.

10-minute oral presentation

Each trainee will be assigned to an oral presentation room with up to five other presenters. Presentation slide decks may include dynamic slides. Presenters must load their presentation slide deck onto the presentation room laptop. Instruction and presentation room access timelines will be provided in presenter invitations. Trainees have 10 minutes to present their research followed by five minutes of questions from presentation participants (reviewers, moderators and/or audience members, including Stollery Children's Hospital Foundation and/or Alberta Women's Health Foundation representatives). Oral presentation session chairs and reviewers are WCHRI academic members.

Learning Sessions

WCHRI will host two learning sessions to help trainees navigate requirements and expectations for Research Day. The first session is to help you prepare your abstract and the second session offers specific details about the components required to deliver an effective presentation. These sessions are chaired by an academic member and presentations are offered by WCHRI Postdoctoral Fellows.

Video: How to prepare your abstract for WCHRI Research Day

- Event date: **July 19, 11:30 a.m. –1 p.m.**

How to prepare your presentation for WCHRI Research Day

- Event date: **October 2, 11:30 a.m.–1 p.m.**
- Presentation slides will be posted on October 4 for both the:
  - 5-minute poster presentation, and
  - 10-minute oral presentation.

Please refer to our events page for further information and to register.

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Deadlines

- Abstract submission for WCHRI Research Day closes **September 4 at 4 p.m.**
- Registration for WCHRI Research Day closed on **October 30 at 4 p.m.**

Applications must be submitted to WCHRI using the WCHRI 2024 Research Day Abstract Submission/Registration Form. Late submissions are not accepted.

Acknowledgement

WCHRI is supported by the Stollery Children's Hospital Foundation and the Alberta Women's Health Foundation. Without their generous support, our institute would be unable to continue to support the research done by you and your colleagues.

You are required to acknowledge the funding sources that contributed to your research. All research is supported in some way by a financial commitment. If you are unsure of the funding source(s) for your project, please ask your supervisor. All research projects funded by or receiving subsidized research services from WCHRI must acknowledge the support of WCHRI and the appropriate Foundation, including using logo(s) on your presentation slides.

Information on acknowledgement requirements and logo files can be found on our Acknowledgements and logos webpage.

Access the abstract submission and registration form

Access the WCHRI 2024 Research Day Abstract Submission/Registration Form.

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Participant #: 9
Presenter: Danica Chang
Supervisor: Hyakutake, Momoe
Title: Microbiome of the neovagina: a feasibility study
Authors: Danica H. Chang, Cathy Flood, Ben Willing, Momoe Hyakutake

Theme: Lifelong women's health

Introduction The microbiome plays an important role in the health of organisms. Disruption of the microbiome can lead to increased inflammation and growth of pathogenic microorganisms leading to various symptoms. The vaginal microbiome of cis women has been extensively studied and its composition is well-established. However, studies are lacking for trans women with a neovagina. Despite trans women complaining of vaginal discharge, malodour, and/or pruritus, there is little established literature on how these women should be treated, while application of treatments aimed at cis women have produced mixed results. There is clearly a need for further research in this population of marginalized women to establish the "ideal" neovaginal microbiome, determine how to achieve and maintain this microenvironment, and appropriately treat disruptions of this microenvironment to treat and prevent bothersome vaginal symptoms and improve quality of life. Therefore, we will conduct a feasibility study of the neovaginal microbiome using culture and metagenomic techniques. Methods This cross-sectional study consists of collection of vaginal secretions followed by culture of vaginal swabs. Inclusion criteria consisted of patients ≥18 years who have undergone a penile inversion vaginoplasty receiving care at the Gender Clinic (Lois Hole Hospital for Women). Patients will be identified and approached during their regularly scheduled appointment to indicate their interest in potentially participating in this study, aiming for a sample size of 10. During their next scheduled appointment, patients will be given the chance to understand the purpose of the study, risks and benefits, and consent to participation verbally and in writing. Once informed consent has been obtained, patients will be seen for their medical appointment, followed by the research component of their appointment. Patients will then verbally complete a survey capturing demographic information (i.e., date of vaginoplasty, medication use, douching practices, other operations on the vagina, vaginal discharge, antibiotic use). Self-reported demographic data will be collected and managed using REDCap, hosted and supported by the Women and Children's Health Research Institute. Vaginal secretions will be collected and analyzed through culture of total aerobes, anaerobes and fungi, and through molecular characterization using high throughput sequencing and real-time quantitative PCR of DNA extracted from these samples. 16S rRNA and ITS gene amplicon sequencing will be performed on the Illumina Miseq platform for characterization of the bacterial and fungal communities, respectively. The culture work, as well as the quantitative PCR will provide important information on the microbial load, whereas the amplicon sequencing will inform the structure of the community. If the microbial load is sufficient, it will also be possible to perform metagenomic sequencing to provide greater insight into functional capacity of the neovaginal microbial community. If this is not viable due to low microbial load and DNA contamination from host cells, whole genome sequencing of the cultured microbes will be performed on the Oxford Nanopore platform.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 20
Presenter: Laura Beaveridge
Supervisor: Parent, Eric
Title: Understanding Alternative Methods to Radiographs to Assess Side Bending Spine Flexibility: Moderate to strong correlation exists between spinal stiffness measured with spinal indentation and side bending flexibility measured with 3D ultrasound
Authors: Laura Beaveridge, Vincent McRorie, Eric Parent, Greg Kawchuk,

Theme: Children's health and wellbeing

Introduction Planning treatments for scoliosis requires assessing spine flexibility using potentially harmful x-rays. Radiation-free 3D ultrasound imaging and robotic indentation can assess spinal flexibility and vertebral level stiffness, respectively. Data from healthy participants can help interpret these measurements. If a strong relationship exists, a single method could be used or spinal indentation may complement ultrasound imaging by identifying levels responsible for flexibility limitations. This study aimed to determine the correlation between spinal stiffness obtained using spinal indentation and side bending (SB) flexibility measured using 3D ultrasound imaging in healthy young adults. Methods Thirty healthy participants aged 18-30 were recruited using email and poster ads. Participants were healthy, non-pregnant individuals with no back pain or open back wounds. A clinical exam recorded age, height and weight. SB flexibility was obtained using 3D ultrasound imaging recording the difference between maximal right and left prone SB angles. Spinal stiffness was measured using a smoothed force-displacement curve from robotic indentation which progressively applied 100N at T4, T6, T8, T10, T12, L2 and L4 (3 trials each). Pearson correlations and multiple regressions were used to determine if spine SB flexibility could be predicted from a combination of patient characteristics and indenter measurements. Results Thirty participants were recruited with a mean age of 23.7 years (SD: 3.2), height of 173.5cm (SD: 9.3) and weight of 72.3kg (SD: 14.3). Three participants were excluded as they did not tolerate full indentation pressure. Two outliers were excluded. Stiffness measurements at all thoracic vertebrae correlated significantly with thoracic SB flexibility (range: r=-0.41 to -0.67). Stiffness measurements at lumbar vertebrae did not significantly correlate with lumbar SB flexibility (r=-0.29, -0.39). The stiffness measurements of all tested vertebral levels except T4 correlated significantly with the full spine SB flexibility. (range: r=-0.38 to -0.67). Stiffness averaged over all tested levels was significantly correlated with full spine SB flexibility (r=-0.63). Minimum and maximum stiffness measurements over all spine levels significantly correlated with the full spine SB flexibility (r=-0.46, -0.74 respectively). Fifty-six percent of the variance in full spine SB flexibility was predicted by the average stiffness over all levels when controlling for age and height. Full spine SB flexibility(degrees) = 101.00-0.98age+0.44height-16.99stiffness_max. Conclusion Moderate to strong correlations exist between spinal stiffness and SB flexibility both over the full spine and per level. The larger correlations observed in the thoracic spine and with maximum stiffness values relating to lower SB flexibility illustrate that the stiffest regions of the spine may be the key limiting factors in SB flexibility. However, other factors need to be considered as only about half of the variance in the spine SB flexibility was explained by the indenter measurements.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 28
Presenter: Safia Marani
Supervisor: Poirier, Annick
Title: Patient and Healthcare Provider Experiences and Perspectives of a Hypnosis- based Program within a Multidisciplinary Care Model for Chronic Pelvic Pain
Authors: Safia Marani, Mira Ahmad, Bethan Kingsley, Laura Marcella Reyes, Annick Poirier

Theme: Lifelong women's health

Patient and Healthcare Provider Experiences and Perspectives of a Hypnosis- based Program within a Multidisciplinary Care Model for Chronic Pelvic Pain Introduction: Chronic pelvic pain (CPP) is a complex condition that disproportionately affects females. Management is complex and requires an interdisciplinary, multimodal approach. Patients with CPP often seek complementary treatments, such as hypnotherapy; however, data on formalized hypnotherapy programs for CPP treatment is limited. The purpose of this study is to explore patient and healthcare provider (HCP) experiences, and identify outcomes, and potential benefits and limitations of a formalized clinical hypnotherapy program offered at a local CPP clinic serving female-identifying patients. Methods: A qualitative, inductive thematic analysis was undertaken. Patients and HCP involved with a formalized hypnotherapy for CPP program were recruited from a CPP Clinic. A total of 14 participants (9 patients currently attending the clinic, 5 HCP) were interviewed. Virtual or in-person (Dale Sheard Centre for Solutions in Women's Health) semi-structured interviews were conducted, audiotaped, and transcribed using an online transcription service. Transcripts were analyzed via inductive thematic analysis by co-investigators using NVivo software. Results: Both HCP and patients perceive a gap within the healthcare system that is addressed by a clinical hypnotherapy program which provides biopsychosocial CPP treatment and mental health supports. Despite previous negative experiences, females with CPP report psychological safety which aids their ability to build a therapeutic relationship with HCPs. This in turn results in improved outcomes for patients and HCP including new coping strategies and decreased time spent on psychological manifestations of CPP during appointments. Conclusion: CPP management is complex and may require adjunctive therapies, such as hypnotherapy. Formalized programs supported by interdisciplinary CPP clinics may improve patient outcomes, improve therapeutic relationships, decrease healthcare visits, and improve overall access to treatment for CPP.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 30
Presenter: Amy Callaghan
Supervisor: Isaac, Andre
Title: Predictors and Outcomes of Vocal Cord Paralysis after Pediatric Cardiac Surgery
Authors: Callaghan Amy, Nguyen Minh, Isaac Daniela, Adsett Amanda, El-Hakim Hamdy, Isaac Andre

Theme: Children's health and wellbeing

Introduction: Iatrogenic unilateral vocal cord paralysis (UVCP) is an increasingly recognized problem after cardiac surgery, thought to be a result of aortic arch and mediastinal dissection near the left recurrent laryngeal nerve. The true prevalence, symptom burden, and factors associated with UVCP are poorly understood. The primary objective of this study was to determine the prevalence and independent predictors of UVCP after cardiac surgery at the Stollery. The secondary objective was to determine the symptom burden and natural history of the condition. Methods: This was a retrospective cohort study of consecutive patients who underwent cardiac surgery that included aortic arch manipulation at the Stollery Children's Hospital between 2013 and 2023. Patients with UVCP were diagnosed by a pediatric otolaryngologist by flexible fiberoptic awake laryngoscopy. Patients with other diagnoses affecting laryngeal mobility, pre-existing vocal cord paralysis, major synchronous airway lesions, and neurological syndromes were excluded. Patient demographics, comorbidities, cardiac surgery procedure information, dysphonia and dysphagia symptom burden, clinical and instrumental swallow data, and time to symptom resolution were collected. Factors associated with UVCP were analyzed with chi-squared or fisher's exact tests for categorical data, and t-tests for continuous data. A binary logistic regression was used to determine independent predictors of UVCP. Results: 445 patients met criteria and were included in the analysis. The mean gestational age was 36.8 weeks and 58% were males. The most common procedures were PDA ligation (83 in isolation, 147 combined with other procedures) and aortic coarctation repair (43 in isolation, 37 combined with other procedures). 119 (27%) were diagnosed with UVCP. The most common symptoms were dysphonia (97; 82%) and dysphagia (75; 63%). Of the 62 instrumental swallow assessments performed, 47% were abnormal. 31 (26%) of the UVCP patients had documentation of parent reported symptom resolution, with 5 patients having endoscopic evidence. Of the patients who had symptom resolution, 12 (39%) took longer than 12 months to resolve. On univariate analysis, PDA ligation as a single procedure was found to be significantly associated with UVCP (p=0.024). Aortic coarctation alone or combined with other cardiac procedures (p=0.006), Norwood procedures alone (p<0.001), interrupted aortic arch repair/reconstruction alone (p=0.024), and having multiple cardiac surgeries (p=0.006) were found to be associated with UVCP. Binary logistic regression showed extreme prematurity (OR=2.36, CI=1.043-5.304, p=0.039), multiple cardiac surgeries (OR=1.65, CI=1.022-2.677, p=<0.041), Norwood procedure (OR=4.31, CI=1.998-9.294, p<0.001) and aortic arch reconstruction (OR=6.17, CI-1.412-26.942, p=0.016) to be significant predictors of UVCP. Conclusion: UVCP is a relatively prevalent complication after cardiac surgery, with a large proportion having symptoms that can be prolonged for more than one year. Patients with extreme prematurity and certain procedures such as Norwood and aortic arch reconstruction are predictors of UVCP. Longitudinal prospective data is needed to determine the true natural history and best approach to management.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 72
Presenter: Henry Li
Supervisor: Ali, Samina
Title: We are not the cause: emergency department opioid prescribing and opioid use disorder in Albertan adolescents
Authors: Henry Li, MD Jake Hayward, MD, MPH Jessalyn K Holodinsky, PhD Grant Innes, MD Samina Ali, MD

Theme: Children's health and wellbeing

Introduction Opioid overdoses are responsible for over 20% of all adolescent deaths in Alberta. Emergency department (ED) opioid prescribing is often seen as a major contributor to opioid use disorder (OUD) and has been targeted for deprescribing. However, the impacts of these efforts and the direct effects of ED prescribing on adolescent OUD are not yet known. We sought to examine how rates of ED opioid prescribing and OUD have changed over time, as well as quantify the contribution of ED prescribing to OUD in adolescents. Methods We used linked administrative data to identify adolescents who were discharged from any Alberta ED from 2010-2020. We excluded those with pre-existing OUD, long-term opioid use (LTU), cancer, or palliative care status. Opioid prescription fills within 3 days post-ED visit were included. The primary outcome, OUD, was a 1-year composite of opioid-related ED visit, opioid-related hospitalization, and opioid agonist therapy prescription. Joinpoint regression was used to identify changes to trends in prescribing and OUD within 1 year, reported as average annual percent change (AAPC). We then used propensity score matching to create a control group at similar risk to opioid-exposed patients and double-adjusted for covariates using multivariable logistic regression to determine the incremental impact of ED opioid prescriptions on OUD. Results Out of 1,197,829 included visits, opioids were prescribed to 2.4% of all patients. Mean age for the full cohort was 14.7 (SD 1.7) years and 50.9% were female. Differences in baseline characteristics between exposed and unexposed groups were resolved after propensity score matching. ED opioid prescriptions decreased from 3.3% of all visits in 2010 to 1.2% in 2020 (AAPC -10.0, 95%CI -12.1 to -8.0). In contrast, rates of OUD within 1 year increased from 0.1% to 0.3% (AAPC 7.7, 95%CI 5.6 to 10.2). When examining 22,876 exposed patients with matched controls, filling an ED opioid prescription increased the odds of developing OUD (aOR 1.8, 95%CI 1.3 to 2.6). However, the absolute risk increase was only 0.2% with a number needed to harm of 466. Overall, ED opioid prescriptions were associated with an additional 49 OUD cases (out of 2970 total cases) during the 10-year study period; 98.4% of OUD cases were NOT linked to ED opioid prescriptions. Conclusion Despite a large decline in ED opioid prescribing over the past decade, rates of OUD amongst adolescents have increased significantly, calling into question the effectiveness of ED deprescribing measures on OUD reduction efforts. While ED opioid prescriptions increase the odds of developing OUD, their relative contribution to the rising rates of OUD in the province is limited. Given the high prevalence and long-term consequences of undertreated pain in the pediatric population, this highlights the need to focus efforts on alternative harm reduction interventions to combat the opioid epidemic.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 73
Presenter: Evelyn Armour
Supervisor: van Manen, Michael
Title: Liveborn children with trisomy 18: A retrospective review
Authors: Evelyn Armour, Melissa J. MacPherson, Cheryl Mack, Maryna Yaskina, Michael van Manen

Theme: Children's health and wellbeing

Introduction: Historically, children born alive with trisomy 18 were considered to have a lethal genetic condition such that no medical interventions were provided. While survival is now recognized to be possible, these children's lives are complicated by technological dependency, medical complexity, and significant neurodevelopmental disabilities. There remains a relative paucity of Canadian literature describing children born alive with trisomy 18, resulting in challenges for healthcare professionals and patient-families as they navigate the complexities of diagnosis, prognosis, and medical management for this population. The primary aim of this study was to describe the outcomes of a contemporary Canadian cohort of child born alive with trisomy 18. Methods: A retrospective study was conducted to review the records of children born alive with trisomy 18 from January 2012 to December 2023 in Central/Northern Alberta. Demographic and clinical information were abstracted, including features reported in the literature associated with morbidity and mortality. Outcomes were described, including technological dependency, time spent in hospital, and survival. Results: In total, 37 liveborn infants with complete trisomy 18 were identified. While most died in hospital following medical-surgical interventions and/or comfort-care palliation, 9 were discharged home. All of these children had been born at term with a birthweight ≥1750 grams. While they relied on medical technologies such as home oxygen and feeding tubes at the time of discharge, most were able to spend a considerable amount of time at home rather than being re-hospitalized. At the time of this review, four remain alive varying in age from 6 to 9 years. Conclusion: This study provides a much-needed report of Canadian children born alive with trisomy 18. This is not a homogeneous clinical condition, but one that varies in physical ability, clinical presentation, and survival. While many children die early in the neonatal period while hospitalized, some children may have their life extended to be discharged home and spend a significant portion of their life with their families.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 81
Presenter: Si Ning Liu
Supervisor: Bourque, Stephane
Title: Reduced circulating ketones is observed in response to neonatal late-onset sepsis
Authors: Si Ning Liu, Ben Magalnick, Jad-Julian Rachid, Danny Shimatu, Helene Lemieux, Kimberly Macala, Stephane Bourque.

Theme: Children's health and wellbeing

Background: Neonatal sepsis is a dysregulated host response to infection. In addition to pathogen clearance, the liver coordinates energy homeostasis during sepsis, including regulating ketone production. Ketogenesis in neonates occurs at a rate 5-40-fold higher than in adults and supplies 25% of the basal energy needed during this period of life. Ketones are alternative sources of fuel that are typically mobilized during periods of starvation. During sepsis, the neonate is depleted of its energy stores and has to rely on alternative sources of fuel. Given the importance of ketone production and utilization in the neonatal stage, we sought to determine how the neonatal liver modulates ketone production in response to sepsis. Methods: Sepsis was induced in three-day-old Sprague Dawley pups by injecting fecal slurry (FS, 1.0mg/g body weight) intraperitoneally; controls received vehicle (5% dextrose). Fluids and antibiotics were administered at 4h and 16h post-FS. At 8h and 24h after sepsis induction, sub-groups of pups were euthanized for blood and tissue collection. In this model, the 8h time point precedes sepsis-related mortality, and no pups succumb after 24h. Circulating ketone levels were determined using a blood ketone monitor. RT-qPCR and Western blots were used to quantify the gene and protein expression of regulators of ketogenesis. Metabolomics was performed using 8h and 24h frozen liver samples. Results: FS injection caused 29% mortality (P=0.02) and ~5% growth restriction (P<0.0001) in surviving pups by 24h. Despite downregulation of ketogenic genes (Hmgcs2, Bhd1, and Mct1) in the liver at 8h, no change in HMGCS2 or MCT1 protein expression was observed in FS pups. However, the level of circulating ketones were reduced at 8h in FS pups, suggesting an increase in ketone uptake and potentially greater utilization by other organs. By 24h, circulating ketones were normalized to control levels, consistent with increased hepatic acetoacetate levels. Hepatic ketogenic genes (Hmgcs2, Bhd1, and Mct1) remained decreased at 24h without changes in their protein expression. Sex differences were not observed at any time point investigated. Conclusion: Although hepatic ketogenesis is not affected by sepsis, the reduction in circulating ketones at 8h after sepsis-induction suggests increased ketone uptake by other organs, and that ketones may be an important source of energy when sepsis severity is the highest. In contrast, circulating ketone levels normalize at 24h in sepsis survivors.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 98
Presenter: Noah Martin
Supervisor: Schulz, Jane
Title: The Impacts of Sex and Gender on Prevalence and Development of Musculoskeletal Disorders in Female Surgical Professionals: A Scoping Review
Authors: Noah Martin, Esther Clark, MSN, RN, Laura Reyes Martinez, MD, PhD, Jane Schulz, MD,

Theme: Lifelong women's health

Introduction: Surgeons and surgical nurses are prone to work-related musculoskeletal disorders, with prevalence varying by sex and gender. Understanding these differences can address health inequities among surgical staff. This scoping review maps the literature on musculoskeletal disorders in female surgical staff to identify key concepts, available evidence, and research gaps, aiming to inform future studies. Methods: A search of databases (MEDLINE, Embase, CINAHL, Web of Science, Scopus) and hand search identified qualitative, quantitative, and mixed-methods articles on musculoskeletal disorders in female surgical staff, focusing on gender and sex influences. Results: 40 articles met the inclusion criteria from the 204 identified. predominantly surveys (n = 34) and primarily focusing on gynecological surgery (n = 11). Female surgical staff are at higher risk for work-related musculoskeletal disorders (WMSD) than males, with more pain in the neck, shoulders, and upper back. Shorter height, smaller hand size, and ergonomic challenges with instruments exacerbate these issues. Pregnancy increases WMSD risk and severity. Female surgeons also face higher rates of psychosocial disorders, affecting their overall well-being. Conclusion: Female surgical staff face unique ergonomic challenges. As more women are drawn to working within the surgical field, it is important to direct focus to the needs of all sexes and genders in order not to disadvantage certain individuals.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 104
Presenter: Jessica Haight
Supervisor: Tremblay, Melissa
Title: Childhood immunization access and uptake in a First Nations community: Learning from the Early Years Program
Authors: Haight, Jessica; Wood, Lakota; Tremblay, Melissa

Theme: Children's health and wellbeing

Background: First Nations children living on-reserve have lower immunization coverage in comparison to the general Canadian population; however, there is limited research exploring barriers to childhood immunizations and strategies that support access in First Nations communities. The aim of our project is to understand barriers and facilitators to childhood immunizations for First Nations children through an exploration grounded in Early Years (EY), a home visiting program supporting parents in the First Nations community of Maskwacis, in central Alberta. Methods: A community-based participatory research approach was taken, which engaged EY community partners in the research process. Data were collected with (1) parents who are in the EY program, through interviews (n=23); (2) home visitors who provide support to parents in the program, through a review of case note entries (n=851 entries), a survey (n=7 participants), and focus groups (n=18 participants); and (3) health staff who administer immunizations, through a survey (n=5 participants) and interviews (n=4 participants). Data were integrated and analyzed using qualitative content analysis. Results: According to parents, home visitors, and health staff, barriers to childhood immunizations for First Nations families include resource challenges for getting to appointments, a need for more information about immunizations, misinformation about immunization safety, preferences due to sociocultural values, a fear of baby receiving an injection, negative past healthcare experiences, and challenges with the pandemic. The theme underlaying these barriers is a logical distrust of healthcare systems and a desire amongst parents to protect their child. In turn, supports delivered through the EY program play a key role in facilitating childhood immunizations by providing parents with information about immunizations and how to get them, helping families attend appointments, and supporting parents through trusting relationships. The theme underlying these facilitators was a reassurance experienced by parents that getting immunizations was optimal for their child's health. Conclusion: This study provides key insights into barriers to childhood immunizations in the Maskwacis community and the role of EY, an innovative home visiting program, in removing these barriers and supporting families' access to and uptake of immunizations. Practical recommendations are shared for supporting immunization uptake in a First Nations community.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 106
Presenter: Sarjana Alam
Supervisor: Dijke, Esme
Title: Defining optimal cryopreservation conditions to improve regulatory T cell recovery for tolerogenic cell therapy in transplantation
Authors: Sarjana Alam, Rebecca Mercier, Lavinia Ionescu, Lori West, Jason P. Acker, Esme Dijke

Theme: Children's health and wellbeing

Introduction Transplantation is a life-saving procedure for children with end-stage organ failure, but after receiving the transplanted organ, they must undergo life-long immunosuppressive treatment to avoid transplant rejection. Regulatory T cells, or Tregs, are currently of great interest in the transplant field for their natural suppressive function, which can be exploited for tolerogenic cell therapy. Clinical implementation of therapeutic Tregs would highly benefit from cell storage by cryopreservation, a freezing process, so cells are readily available when needed. Current cryopreservation protocols are not optimized for Tregs and result in poor recovery and function after thawing. In this project, we investigated toxicity and cryoprotective ability of various cryoprotectant agents (CPA), which protect cells from freezing-induced damage. Methods Tregs were isolated from pediatric thymus tissue obtained during cardiac surgery requiring a sternotomy (n=4) or peripheral blood of healthy adult volunteers (n=3), and expanded in culture by our previously established isolation and expansion protocols. Cells were then harvested and exposed to: 1) Base solution (no CPA control), 2) 10% dimethyl sulfoxide (DMSO) (current standard protocol), 3) 5% DMSO, 4) 5% DMSO + ice recrystallization inhibitor (IRI), or 5) 5% DMSO + 5% Dextran for 0 - 4 hours. In addition, aliquots of each cell suspension were cryopreserved in liquid nitrogen and thawed. At various stages of the experiment, cells were counted, evaluated for viability, and assessed for phenotypic expression via flow cytometry. Results >87% of isolated cells had the CD4+CD25+FOXP3+ Treg phenotype, which was maintained throughout expansion and post-cryopreservation. The 10% DMSO was more toxic to Tregs compared to the other CPA conditions when kept at 37 °C (median recovery 10 % DMSO: 27 % at 2 h and 3 % at 4 h versus other CPA conditions >74% at 2 h and >50% at 4 h; $p<0.05$). When kept at 4 °C or 22 °C for up to 4 h, Treg recovery was not significantly different between the conditions. Preliminary results showed that Treg recovery was higher when cryopreserved in 5% DMSO+5% dextran (median: 92%) compared to other conditions (10% DMSO: 77% versus 5% DMSO: 70% versus 5% DMSO+IRI: 61%).
Conclusion Reducing DMSO concentration resulted in lower Treg toxicity. Cryopreservation in 5% DMSO+5% dextran may improve post-thaw recovery. Identifying the optimal CPA condition will significantly advance development of an optimal cryopreservation protocol for therapeutic Tregs.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 115
Presenter: Wendy Duan
Supervisor: Riddell, Meghan
Title: Apical microvilli on placental cytotrophoblasts are necessary for fusion and differentiation
Authors: Wendy Duan, Sumaiyah Shaha, Juan Garcia Rivas, Ivan Kris Domingo, & Meghan Riddell

Theme: Pregnancy and developmental trajectories

Introduction: The placenta is a temporary organ that develops during pregnancy to support fetal development. The syncytiotrophoblast (ST) is a multinucleated cell that makes up a majority of the maternal-fetal interface. This structure is vital for pregnancy, acting as a protective barrier, exchange interface, and an endocrine organ. Maintenance of the ST requires the continuous fusion and differentiation of underlying progenitor cells known as villous cytotrophoblasts (vCT). ST differentiation defects have been documented in pregnancy complications like intrauterine growth restriction and preeclampsia. It has been established in other fusing cell systems that changes in cell morphology and polarization are essential steps in the fusion process. Our lab has recently shown that trophoblasts adopt a more polarized phenotype and develop apical microvilli prior to ST development. Critically, this has been observed across multiple cell-types and species. The aim of this study was to identify functions for these microvilli in fusion-competent vCTs. We hypothesize that these microvilli allow for polarized intracellular trafficking and polarized accumulation of fusion-promoting proteins, leading to effective ST development. Methods: To enrich a fusion-competent vCT subpopulation and synchronize cell fusion we used an explant ST regeneration model. 9-12wk gestational age human placental tissues were cut into 2mm3 explants and control tissue was fixed at time of collection. Explants are trypsinized to stimulate ST denudation and cultured in floating explant culture for up to 72hrs when nascent ST has reformed. Explants were treated ± ezrin inhibitor at 24hrs when the ST is maximally stripped but prior to the extensive appearance of new ST. To target apical CD98, explants were treated ± 20µg/mL anti-CD98 at 24hrs. Tissue was fixed for staining or collected for RT-PCR. Endosome size was analyzed using a chi-squared test. Fusion was analyzed using an unpaired Kruskal-Wallis test. Relative mRNA expression was analyzed using a paired one-sample t-test. Results: Ezrin inhibitor impaired protrusive microvilli formation and polarized endocytotic trafficking. With ezrin inhibition, early endosomes were less restricted to the apical domain ($p=0.044$) and were significantly smaller compared to vehicle controls ($p<0.0001$). Disruption of apical microvilli via ezrin inhibitor dose-dependently blocked fusion ($p=0.003$), decreased expression of ST markers β-hCG and CGB ($p=0.005$) and GCM1 ($p=0.002$), and increased ERVFRD-1 ($p=0.030$) expression. CD98, a key fusion-promoting protein, was strongly accumulated in the apical microvillar domain. Disruption of apical CD98 via anti-CD98 crosslinking impaired fusion ($p=0.001$). Conclusion: Disruption of microvillar stability or apical accumulation of CD98 impaired fusion and ST differentiation. We propose that the polarized accumulation of apical microvilli is necessary for directing key signalling pathways that mediate ST development. By better understanding the mechanisms governing vCT fusion, we can elucidate mechanisms leading to aberrant ST differentiation in pregnancy complications, leading to the development of treatments for placental dysfunction in the future.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 117
Presenter: Haley Frerichs
Supervisor: Pin, Sophia
Title: Descriptive Analysis of Isolated Tumour Cells and Recurrence Risk in Endometrial Cancer Patients treated with Robotic Laparoscopic Surgery
Authors: Haley Frerichs, Jesse Batara, Ericka Wiebe, Cheng-Han Lee, Sophia Pin

Theme: Lifelong women's health

Introduction: Endometrial cancer is the most common gynecologic cancer in high-income countries. Standard treatment for localized disease involves hysterectomy, bilateral salpingo-oophorectomy, and sentinel lymph node (SLN) mapping. Most patients with early-stage disease are cured with surgery +/- adjuvant therapy, though some patients ultimately recur. Routine use of SLN sampling has increased the detection of isolated tumour cells (ITCs), clusters of cancer cells found in regional lymph nodes with a diameter of ≤0.2 mm. The impact of ITCs on recurrence and survival remains unclear, leading to debate on the most effective adjuvant treatment approach, especially for patients with low-risk factors. Our objective was to provide a descriptive analysis of the pathologic characteristics, treatment decisions, and recurrence patterns of patients with endometrial cancer and ITCs. Methods: Patients with ITCs were identified from a database of all endometrial cancer patients undergoing robotic surgery at the Royal Alexandra Hospital in Edmonton, Alberta from July 2015 to July 2024. Patients were included if they had endometrial cancer, underwent surgery including an SLN procedure or lymphadenectomy, and had confirmed ITCs. All cases were reviewed at multidisciplinary tumour board rounds to discuss treatment options. A chart review was conducted using electronic medical records. Data extracted included demographics, pathology, adjuvant therapy, recurrence, and survival. Descriptive statistics were used for analysis. Results: Overall, 44 patients met the inclusion criteria, with a mean age of 64.9 (SD=10.9) years. Thirty-nine (88%) had endometrioid histology, 28 (64%) had stage I disease, and 25 (57%) were FIGO grade 1. Molecular information was available for 38 patients. 24 had no specific molecular profile (NSMP), 11 were MMR-deficient (MMRd), 1 was POLE mutated, and two were p53 abnormal. Twenty-one patients had a microcystic, elongated and fragmented (MELF) pattern of invasion and 29/42 (69%) had lymphovascular space invasion (LVSI). Thirty patients (68%) were deemed high-intermediate or high-risk based on clinicopathological prognostic factors. Thirty-seven (84%) received adjuvant therapy, of which the most common modality was external beam radiation therapy (EBRT) +/- brachytherapy (24/44, 55%). Six patients received chemoradiation (14%), three received chemotherapy only (7%), and four received brachytherapy only (9%). Five (11.4%) patients experienced a recurrence with a median follow-up time of 23 (IQR 12-46) months and recurrence-free survival of 21.5 (IQR 8-43.5) months. All patients who recurred were in the high or high-intermediate risk group, with three NSMP and one MMRd molecular subtypes. Two patients (40%) had non-endometrioid histology. Three (60%) received up-front adjuvant therapy. One received chemoradiation, one received EBRT, and one received brachytherapy. Conclusion: Most patients with endometrial cancer and ITCs had early-stage disease and endometrioid histology but were deemed high-intermediate risk, most often due to LVSI. Future work will compare treatments and outcomes for patients with ITCs versus node-negative disease and nodal metastasis and further explore the molecular characteristics of endometrial cancer.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 123
Presenter: Alishba Humayun
Supervisor: Olson, David
Title: Developing a fetal Inflammatory response syndrome model to assess multi-organ injury in neonatal mice
Authors: Humayun A*, Fuwa K*, Alvarado C.S., Wang Y, McCleary C, Leimert K.B., Olson D.M. * Joint first authors

Theme: Pregnancy and developmental trajectories

Introduction Infectious agents, such as bacteria toxins, can travel from the vaginal/cervical area to the developing fetus, triggering chronic low-grade maternal inflammation. In utero inflammation can induce fetal inflammatory response syndrome (FIRS), characterized by an increase in pro-inflammatory cytokines in the neonate. FIRS can induce multi-organ injury in neonates. There is an urgent need to test therapeutics, such as rytvela, an allosteric IL-1 receptor antagonist, that can block the inflammatory cascade to provide better short-term outcomes for neonates and improve their long-term health trajectory. Our aim is to create a FIRS model by creating maternal inflammation using bacteria toxin lipopolysaccharide (LPS) to assess neonatal organ damage and test the therapeutic potential of rytvela. Methods Pregnant CD-1 dams received a saline (n=9) or LPS (n=20) (4µg) intraperitoneal injection at gestational day 16 and 17. At birth, the litter size was reduced to 6 pups and randomly divided into control (n=3) or rytvela (n=3) groups. On postnatal day (P) 3-5, pups were administered saline or rytvela (1 mg/kg) subcutaneous injection twice daily. Pups at P7 were euthanized and tissue was fixed with formalin and PFA 14%. Information on delivery timing, survival, litter size, and body/brain weight was collected. Gene expression of interleukin-1 beta (IL-1β) was quantified by RT-qPCR in the ileum and lungs. Lung and ileum morphology and data was analyzed using ImageJ and Graphpad Prism. Normality was assessed by the Shapiro Wilk test. Analysis for multiple comparisons was performed using two-way ANOVA and for treatment group comparisons, two-tailed t-test. Results deemed significant at $p < 0.05$. Results We created a FIRS model in pregnant CD-1 mice exposed to LPS to induce fetal organ damage and study its effects on the neonatal stage. LPS-treated dams had a 25% preterm birth rate and a smaller litter size vs saline-treated dams (4.67 vs 12.78). 35% of LPS pregnancies resulted in fetal death/ absorption but 65% of LPS litters had live pups. All saline dams had term pregnancies and delivered live pups. At P7, rytvela-treated pups from LPS dams did not show significant changes in the body weight or brain weight compared to pups from other treatment groups. Rytvela-treated pups from LPS dams did not show significant improvements in the villi length and width or the alveoli count and size. There were non-significant changes in gene expression of IL-1β in the organs studied. Conclusion Dams responded to LPS with either completely dead offspring at birth or offspring that survived suggesting a differential response. Live pups from LPS-treated dams did not show significant multi-organ injury, so the therapeutic potential effect of rytvela was undetermined. However, rytvela appears to be non-toxic to neonates as it did not cause adverse outcomes. We suggest replicating this model using IL-1β, an inflammatory cytokine, to create chronic low-grade maternal inflammation, which will provide a more consistent outcome with a larger sample litter size. We will then analyze organ damage and inflammatory cytokine/chemokine expression to confirm FIRS.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 132
Presenter: Keatton Tiernan
Supervisor: Storey, Kate
Title: Blazing the path from within: Understanding the impact of leadership experience on the educational attainment, employability, and holistic wellness of Indigenous youth mentors.
Authors: Keatton Tiernan, Genevieve Montemurro, Leah J. Ferguson, Tara-Leigh McHugh, & Kate Storey

Theme: Children's health and wellbeing

Background: The Indigenous Youth Mentorship Program (IYMP) is a youth-centred, community-based program that aims to foster holistic wellness and the concept of miyo-pimâtisiwin/mino-bimaadiziwin (living the good life) in Indigenous communities across Canada. The program operates in five provinces and employs a unique communal mentorship model, wherein Indigenous high school students facilitate healthy living programming for their elementary-aged peers. By offering a culturally relevant and supportive environment for leadership development, IYMP serves as a conduit for youth mentors to develop crucial life skills and positively impact their communities. Further, leadership experience in adolescence is known to have a lifelong influence on education, employment and holistic wellness. However, we are only beginning to appreciate the importance of youth mentors' culturally relevant leadership experience through IYMP. Therefore, this study harnessed youth voice to understand how youth mentors' leadership experience, through IYMP, impacts their education, employment, and holistic wellness. Methods: Focused ethnography was used as the guiding method. IYMP youth mentors (aged 14-19) from communities across Alberta and Saskatchewan were purposively sampled. Talking circles were used as the primary tool for data generation. A total of 21 youth mentors participated across three talking circles (n=5, n=10, n=6). Talking circles were held in person, audio-recorded, and transcribed. Unstructured participant observation and field notes were used to supplement and contextualize the data generated. Thematic analysis was used to identify patterns within the data. Iterative and inductive, this data analytic technique was congruent with the study's approach. Initial codes were developed after each talking circle through journaling. Transcripts were then uploaded to NVivo 14, where initial codes were refined and organized into categories, which were further analyzed into themes. Results: The leadership experience through IYMP was found to be highly interwoven and impactful in all facets of the youth mentors' lives. Five interrelated themes were identified: Participants highlighted leadership experience (1) significantly improved their confidence and communication skills, which in turn (2) made school more enjoyable and (3) increased their employability. The leadership experience also (4) positively affected their holistic wellness by fostering healthy behaviours and strong social networks. (5) The opportunity to earn high school course credits through the IYMP leadership experience was also a major incentive to encourage their involvement, helping to make the benefits of leadership more accessible and supporting the completion of their high school education. Conclusion: Findings from this study will inform the development of IYMP-specific accredited courses across Canada, emphasizing the importance of key leadership skills in Indigenous youth. This study highlights how IYMP supports its youth mentors' holistic wellness and future success by weaving together leadership experiences with the development of communication skills and confidence.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 134
Presenter: Saba Nisa
Supervisor: Meherali, Salima
Title: Safe Spaces for Adolescent Mental Health: A Scoping Review
Authors: Salima Meherali, Saba Nisa, Yared Asmare Aynalem, Adeyinka G. Ishola, Zohra Lassi

Theme: Children's health and wellbeing

Introduction: Mental illness is a significant challenge during adolescence period, posing a threat to individuals' health, well-being, and productivity. Despite the global burden, comprehensive evidence on the use of youth safe spaces to improve their mental health has been limited. Therefore, this review aims to explore the existing literature on the role of safe spaces in shaping the mental health outcomes of youth. Methods: We Followed the Joanna Briggs Institute (JBI) scoping review guidelines. This review focused on individuals aged 10 to 25. It explores safe spaces for youth, including community centers, schools, clubs, and online forums, and their role in promoting adolescents' mental health. We conducted a comprehensive search using PubMed/MEDLINE, PsycINFO, Web of Science, Scopus, Google Scholar, and grey literature sources. Study selection and screening were done using Covidence software, with two independent reviewers applying predefined criteria. We used the standardized table for data extraction; findings were presented using graphical and tabular formats alongside narrative synthesis. Reporting followed the PRISMA extension for scoping reviews (PRISMA-ScR) framework. Results: The review included a total of 23 studies from various regions, notably North America (USA) and Europe. These studies found that safe spaces, primarily located within schools, offered adolescents mental health support, resources, and guidance. Additionally, community organizations, outreach programs, and primary care clinics were identified as safe spaces to enhance the mental well-being of young adults. The interventions used in these safe spaces included cognitive-behavioral therapy, mindfulness programs, and multi-component approaches. Positive outcomes included reduced posttraumatic stress disorders, anxiety, and substance use, along with improved mental well-being and interpersonal relationships. However, there needs to be more focus on methodological diversity and research on other regions. Geographic imbalances exist, and evidence beyond schools and communities as safe spaces is limited. Intersectional factors are often overlooked. Conclusion: This review emphasizes the significant impact of safe spaces on youth mental health. It suggests that fostering supportive environments within schools, recreational clubs, and communities can significantly benefit adolescents' mental well-being. The findings highlight the need to expand safe space initiatives to address young people's challenges during their developmental stage.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 135
Presenter: Yared Asmare Aynalem
Supervisor: Meherali, Salima
Title: Safe Spaces Enhancing Sexual and Reproductive Health for Youth: A Scoping Review
Authors: Salima Meherali , Yared Asmare Aynalem , Saba Nisa , Adeyinka G. Ishola , Zohra Lassi

Theme: Children's health and wellbeing

Introduction: Safe spaces play a crucial role in providing support for the sexual and reproductive health (SRH) of youth. As young individuals undergo significant physical and emotional changes, they often encounter challenges such as societal taboos and a lack of accessible information related to their SRH needs. This scoping review explores the existing literature on using safe spaces to offer a supportive environment for adolescents SRH to navigate these complexities. Methods: Arksey and O'Malley's methodological framework guided this scoping review, which follows the PRISMA for Searching (PRISMA-S) extension for research strategy, including studies focusing on safe youth spaces' effectiveness for SRH among individuals aged 15 to <25 years. We searched databases (Medline, EMBASE, CINAHL, and Scopus) for relevant literature between January 2013 and 2023. The screening was done using Covidence software by two reviewers, and data extraction for analysis and synthesis. Descriptive statistics and narrative descriptions were used to summarize the findings. Results: A total of 44 studies included in this review, meeting the eligibility criteria. The findings of these studies suggest that schools (reported in 37 studies) are the most common safe spaces used for enhancing SRH of youth, such as increased use of condoms and greater utilization of health services. Community-based services offered to youth are effective in improving attitudes toward sexual health and reducing stigma. Youth clubs and digital platforms are effective in reducing high-risk behaviours and unplanned pregnancies. The interventions used by these safe spaces to improve the SRH outcomes include educational sessions, provision of resources, counselling and peer support initiatives. Conclusion: Creating safe environments where youth can freely access SRH information empowers them to make informed decisions and improve their SRH and well-being.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 137
Presenter: Camilla Fonseca Rezende
Supervisor: Haqq, Andrea
Title: Exploring 3-dimensional optical body scanners for body composition assessment in a diverse pediatric population
Authors: Camilla F. Rezende, Alice M. M. Springer, Reena Duke, Geoff D. C. Ball, Faria Ajamian, Jonathan P. Bennett, Carla M. Prado, Andrea M. Haqq#, Flavio T. Vieira# #Co-corresponding authors

Theme: Children's health and wellbeing

Introduction: Childhood obesity is a worldwide health issue due to its high prevalence and adverse health effects. While the body mass index (BMI) is commonly used to evaluate obesity, it fails to distinguish body compartments (e.g., muscle mass [MM], fat mass [FM]) and its components (e.g., visceral, ectopic). As well, BMI does not account for the FM distribution variation among different ethnic groups. FM compartments play a key role in the development of cardiometabolic diseases, and the evaluation of body composition (BC) is a more reliable measure of obesity and cardiometabolic risks than BMI. There are several methods to evaluate BC, such as dual-energy x-ray absorptiometry (DXA), air-displacement plethysmography (ADP), and bioelectrical impedance analysis (BIA), but they are often inaccessible, especially in remote and lower-income areas. Three-dimensional optical (3DO) body scanners, available as platform devices or free smartphone applications, have emerged as new BC tools; they are convenient and easy to use. They have been proven to be valid and precise in adults; however, few studies have evaluated the use of 3DO in diverse pediatrics populations. This study aims to assess the performance of 3DO (validity and precision) in estimating BC in an ethnically diverse group of adolescents with and without obesity. Methods: We will recruit 94 adolescents aged 10-18 years with a balanced representation of sex, at Edmonton Metropolitan Region. The selected individuals will be divided into 2 groups: 1 group (n=47) with elevated BMI for age/sex (≥95th or ≥85th percentile with obesity-related comorbidities), and 1 group (n=47) with normal BMI for age/sex (<85th percentile). The Indigenous population will represent a minimum of 25% of the study sample (n=24). Exclusion criteria include participants using medications for the past 90 days known to influence BC, chronic diseases that can impact BC, acute infections, recent hospitalization, metal implants, pacemaker, amputations, and pregnancy/breastfeeding. Assessments will be conducted at the Clinical Research Unit at the University of Alberta. Two different 3DO scanners will be employed: a platform device (Styku®) and a smartphone application (SizeStream Me360®). The validity of the 3DO estimates will be examined against a 4-compartment model, gold-standard method, including body mass, bone mass from DXA, body volume from ADP, and total water from BIA. Precision will be evaluated by test re-test measurement. To compare the validity and precision between adolescents with and without obesity, null hypotheses will be tested using parametric and non-parametric tests for numerical and categorical variables, as appropriate. Statistical analysis will consider the inclusion of sex, gender, ethnicity, and other demographics in multivariate regression models and subgroup analyses. Expected results and applicability: We hypothesize that 3DO body scanners will demonstrate both validity and precision in assessing BC in adolescents, regardless of sex, obesity status, pubertal maturation or ethnicity. Implementing affordable and effective BC methods in clinical practice will enhance childhood obesity management and help prevent the development of chronic diseases throughout life.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 144
Presenter: Iasmin Sousa
Supervisor: Prado, Carla
Title: Muscle mass estimation in women with breast cancer using a novel approach
Authors: Iasmin M Sousa, Ana Priscila S Souza, Carla M Prado, Ana Paula T Fayh

Theme: Lifelong women's health

Introduction: Calf circumference (CC) is a valuable measure for assessing muscle mass (MM) and nutritional status, particularly important for patients with breast cancer to improve treatment outcomes and quality of life. However, adiposity can influence this estimation, leading to an underestimation of the frequency of low MM. A novel approach adjusting CC for body mass index (BMI) has been proposed to mitigate this effect, but further studies are needed. Our study aimed to assess and compare the frequency of low CC using both unadjusted and BMI-adjusted approaches in women with breast cancer. Additionally, we compared the frequency of low muscle function among the groups with low CC vs normal CC using these two approaches. Methods: This cross-sectional study included patients with breast cancer undergoing treatment at an oncology hospital unit in Brazil. We evaluated sociodemographic (age, ethnicity, education), anthropometric (CC, body weight and height), and clinical data (time since diagnosis, disease stage, treatment performed, subjective global assessment - SGA, handgrip strength - HGS). Patients with BMI 25.0-29.9, 30.0-39.0 and ≥ 40.0 kg/m2 had their CC adjusted for BMI by subtracting 3 cm, 7 cm, and 12 cm from the CC values respectively. Low CC was defined as ≤ 33 cm and low HGS as < 16 kg. Data is presented as mean and standard deviation, median and interquartile range (IQR) or frequencies as appropriate. Results: We evaluated 57 women with breast cancer (mean age 52.0±13.1 years, median BMI 33.1 kg/m2 [IQR 25.6, 37.6], 68.4% non-Caucasian, and 59.7% had at least high school education). The median diagnostic time was 47.0 days (IQR 30.0, 84.5), with a higher frequency of individuals in stage II (47.4%), followed by stage III (26.3%). The majority have not started cancer treatment (63.2%), and 26.3% have had a combination of treatments (chemotherapy and radiotherapy or surgery). Regarding nutritional evaluation, 77.2% of the individuals were classified with overweight or obesity, and 82.9% (29 out of 34) were well-nourished according to the SGA. Median CC was 34.5 cm (IQR 32.0, 37.0) and 32.0 cm (IQR 30.0, 33.5) after the BMI-adjustment. Low CC was observed in 40.4% and after the adjustment, the frequency increased to 71.9% (1.8 times more frequent). The mean HGS was 20.1±5.3, and low HGS was found in 14.7% (5 out of 34). Individuals with low CC did not show a significant difference in HGS compared to those with normal CC (median 18.0 [IQR 15.5, 21.0] vs. 21.0 [IQR 18.0, 24.0], p=0.104). However, after adjusting for BMI, individuals with low CC had significantly lower HGS (median 18.0 [IQR 16.0, 22.0]) compared to those with normal CC (median 22.0 [IQR 20.0, 24.0], p=0.023). Conclusion: Adequate evaluation of patients with breast cancer is crucial for optimizing resources and reducing the risk of negative outcomes. Although the global assessment found a high frequency of individuals well-nourished, low CC was very frequent. Our study showed that adjusting CC according to BMI may serve to enhance the estimation of MM in patients with breast cancer, with an observed increase of 1.8 in the frequency of low CC. The adjustment also potentialized the association between low MM and low muscle function.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 145
Presenter: Maggie Wang
Supervisor: Vine, Donna
Title: Mechanisms of androgen mediated alteration in lipid metabolism in Polycystic Ovary Syndrome
Authors: Maggie Wang, Spencer Proctor, Donna Vine

Theme: Lifelong women's health

Introduction: Polycystic Ovary Syndrome (PCOS) is an endocrine-metabolic disorder in women that is diagnosed based on hyperandrogenism, menstrual-ovulatory dysfunction, and polyfollicular ovary morphology. PCOS is highly associated with cardiometabolic risk factors including dyslipidemia, insulin resistance, and obesity leading to increased risk of cardiovascular disease (CVD). Elevated serum androgens have been associated with atherogenic lipid profiles and impairments in lipid metabolism yet the mechanisms have remain unclear. The aim of this study was to complete a scoping review of the mechanisms of androgen-mediated effects on lipid metabolism, including absorption, uptake, and transport and metabolism of lipids in different tissues and how this may impact altered lipid metabolism in PCOS. Methods: We conducted a review of the literature using PubMed, Google Scholar, and Web of Science databases using keywords: dyslipidemia, androgens, lipids, hyperandrogenism and used references to search other valid mechanistic-related studies in the field. Results: Major findings from 157 articles reviewed are that those with PCOS often have increased fasting and non-fasting plasma triglycerides, remnant cholesterol, and lower high density lipoprotein cholesterol (HDL-C). Mechanisms of androgen-mediated alterations in lipid metabolism include i) androgens alter the expression of de novo lipogenic nuclear transcription genes including sterol regulatory element binding proteins (SREBP) in cell, animal, and human adipose and liver ii) elevated androgens downregulate lipolysis in adipose tissue and iii) obesity-related genes and their genetic variants in PCOS patients may promote lipogenesis and obesity. Conclusion: In conclusion, excess androgens upregulate genes involved in lipidogenesis, lipolysis, and altered lipid transport and metabolism in multiple tissues that appear to contribute to dyslipidemia and adiposity in PCOS. Future research examining treatments that target mechanisms that drive dyslipidemia, altered lipid synthesis, and metabolism are needed in those with PCOS.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 146
Presenter: Anastasia Ambrose
Supervisor: Andrews, Saadet
Title: Genetic landscape of primary mitochondrial diseases in children and adults using molecular genetics and genomic investigations of mitochondrial and nuclear genome
Authors: Anastasia Ambrose, Shalini Bahl, Saloni Sharma, Dan Zhang, Clara Hung, Shailly Jain-Ghai, Alicia Chan, and Saadet Mercimek-Andrews

Theme: Children's health and wellbeing

Introduction: Primary mitochondrial diseases (PMD) due to pathogenic variants in the mitochondrial and nuclear genome are one of the most common metabolic genetic disorders. Pathogenic variants in the mitochondrial genome can only be inherited from the mothers. PMD affect every organ and system due to deficiency in energy production. We hypothesize that there is an overlap between PMD and other genetic disorders that mimic PMD. However, genetic confirmation of PMD is very important as acute illness or prolonged fasting for surgeries in children and pregnancy and postpartum period in women require specific management recommendations. Because individuals with PMD, cannot produce required energy, they need intravenous fluid and lipid infusions to prevent metabolic decompensation and death during these stress situations. Methods: All children and adults with suspected PMD that underwent molecular genomic investigations were included. Individuals were grouped for comparison: 1) individuals with mitochondrial PMD; 2) individuals with nuclear PMD; 3) individuals with other genetic diseases mimicking PMD. We reviewed electronic patient charts and entered information into Excel Database. We applied the mitochondrial disease criteria. We performed protein 3D structure prediction for wild type and variant protein structures. We performed statistical analysis using R statistical software. Results: 297 individuals fulfilled the inclusion criteria, including 100 children and 123 women. We identified 76 individuals with PMD (mitochondrial n=46, nuclear n=30) and 22 individuals with other genetic diseases. Adults had significantly higher percentage of mitochondrial PMD while children had significantly higher percentage of nuclear PMD. Muscular phenotype was more common in adults with PMD whereas neurodevelopmental phenotype was more common in children with PMD. There was statistically significant difference for muscular, cardiac, and ophthalmologic phenotypes, seizures, hearing loss, and peripheral neuropathy in individuals with PMD compared to other genetic diseases. There were statistically significant differences for elevated blood lactate and abnormal urine Krebs cycle intermediates in individuals with PMD compared to other genetic diseases. The comparison of individuals with mitochondrial PMD and other genetic diseases revealed statistically significant difference for definite mitochondrial disease scores. The diagnostic yield of molecular genomic investigations was 33% including clinical exome sequencing 37% and mitochondrial genome sequencing 18%. The diagnostic yield of urine mitochondrial genome sequencing was 16%. Protein 3D structure prediction showed changes in tertiary protein structures due to rare pathogenic variants causing PMD. Conclusion: One-quarter of individuals had a confirmed genetic PMD as underlying genetic etiology. We report the diagnostic yield of urine mitochondrial genome sequencing for the first time as cost effective molecular genomic investigation in adults with suspected PMD. Mitochondrial disease criteria should be applied prior to genetic investigations. Protein modelling may be an effective tool when functional characterization is not possible for variant classification.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 147
Presenter: Kana Oshima
Supervisor: Stuart, David
Title: Bioengineered Escherichia coli secreting outer membrane vesicles carrying siRNAs as a therapeutic system for treating cervical cancer
Authors: Kana Oshima; David Stuart

Theme: Lifelong women's health

Introduction 99% of cervical cancers are caused by human papillomaviruses (HPV), which nearly all sexually active people will encounter. About 10% of HPV-infected women develop persistent HPV leading to cervical cancer. Despite effective HPV vaccines, cervical cancer remains the fourth most common cancer in women globally and its incidence rate has increased 3.4% annually since 2015 in Canada. Current treatments like surgery, radiation, and chemotherapy, though effective, often have significant side effects. Thus, developing alternative therapies that can more precisely target this cancer is crucial to improving the well-being of women undergoing cervical cancer therapy. Targeting HPV E6 and E7 oncoproteins, which drive cancer progression, with small inhibitory RNAs (siRNAs) could improve treatments due to their precise mechanism of action. siRNA inhibits its target gene expression in a complementarity-dependent manner - it does not affect the normal cells lacking the HPV genes. Studies have shown that outer membrane vesicles (OMVs) naturally produced by healthy bacteria can carry diverse cargoes for delivery into human cells. This project aims to bioengineer probiotic E. coli to hyper-produce OMVs carrying siRNAs targeting HPV E6 and E7. The proposed bacterial therapy has the potential to offer a novel treatment for cervical cancer that is less toxic than current treatments. Methods To develop and investigate the proposed siRNA-based bacterial therapy, synthetic DNA fragments that yield green fluorescent protein (GFP)-specific siRNA were designed empirically and incorporated into an siRNA expression vector. Deletion of nlpI and yrbE genes, which have been shown to increase OMV production, were introduced into the siRNA feeding E. coli strain, HT115, via P1 phage transduction. OMV production of these E. coli strains was measured via protein quantification of OMV isolates from each strain. The mutant HT115 strain was transformed with the plasmid GFP-specific siRNA. Expression of siRNA in the E. coli system was investigated utilizing the reverse-transcription polymerase chain reaction (RT-PCR) methods on RNAs extracted from the supernatant of the E. coli culture. The OMV packaging of siRNA was investigated using the RT-PCR methods on RNAs extracted from OMV samples, which are isolated by ultracentrifugation. Results E. coli HT115 strains were mutagenized to have nlpI and yrbE deletion mutations using P1 phage transduction. Protein quantification of OMV isolates from wild-type and mutant strains confirmed the significantly increased production of OMVs in the nlpI mutant. The protein quantifications were repeated with new OMV isolates, consistently showing increased OMV production in the nlpI mutant with >3 times the production of the wild-type strain. E. coli HT115 ΔnlpI strain was transformed with the siRNA expression plasmid. Expression and secretion of siRNAs into OMVs were confirmed in the E. coli system by multiple RT-PCR experiments on RNAs extracted from the separate supernatant and OMV samples of the E. coli system. Conclusion The proposed probiotic E. coli-mediated siRNA delivery system allows the siRNA expression and possible secretion of siRNAs into OMVs, suggesting the potential to act as a therapy for treating cervical cancer.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 149
Presenter: Dineli Fernando
Supervisor: Hartling, Lisa
Title: Parents' self-reported experiences and information needs related to managing respiratory distress in their children: a qualitative systematic review
Authors: Dineli N. Fernando, Sarah A. Elliott, Shannon D. Scott, Samina Ali, Maria Castro-Codesal, Lisa Hartling

Theme: Children's health and wellbeing

Introduction: Acute respiratory distress (RD), often due to a respiratory illness, is the most common reason for pediatric emergency department (ED) visits. RD can be a stressful experience for parents who may feel ill-equipped to manage frightening symptoms such as difficulty breathing in their children. RD, particularly in infants and young children, can appear quickly thereby intensifying parents' stress. Understanding parents' experiences and information needs managing RD is crucial to highlighting misconceptions, knowledge gaps, or systemic issues contributing to its high burden. This systematic review aims to synthesize primary qualitative evidence examining parents' experiences and information needs related to managing children's RD. Methods: We followed the Joanna Briggs Institute (JBI) approach to searching, study selection, quality appraisal, data extraction, and data synthesis. To identify relevant studies, we searched the Ovid Embase, Ovid MEDLINE, Ovid APA PsycINFO, CINAHL Plus with Full Text, Scopus, ProQuest Dissertations & Theses Citation Index, and Conference & Proceedings Citation index databases from inception to May 2024. Two reviewers selected studies for inclusion whilst adhering to the inclusion criteria determined a priori. Disagreements between reviewers were resolved via discussions with a third reviewer. We extracted data from included studies, including author(s), publication year, methods used to collect and analyze data, population characteristics and sample size, child's illness, and findings related to parents' experiences and information needs. Two reviewers appraised study quality using the JBI Checklist for qualitative research. Data were synthesized via a meta-aggregative approach. Confidence in the evidence will be assessed using the ConQual approach. Pilot testing was conducted prior to each stage to ensure reliability, consistency, and accuracy. Results: We identified 3335 independent records from the searches. We included 185 studies following title and abstract screening, and 59 after full-text inspection. Preliminary findings highlight that parents experience fear, panic, and anxiety due to the uncertainty surrounding managing RD. The onset of RD symptoms for many parents was a driver for seeking emergency care. Parents identified past healthcare experiences, how healthcare staff might perceive them, and having to navigate a complex healthcare system as barriers to seeking timely care for their child experiencing RD. Parents highlighted the value of receiving adequate information in relation to managing RD in their children, both before and after seeking care. Conclusions: Parents need adequate, easy-to-understand resources that inform care-seeking decisions, manage treatment expectations in the ED, and assist in recognizing and managing RD symptoms following discharge. The findings of this review will inform the development of a novel knowledge mobilization tool to empower parents in managing RD in children.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 150
Presenter: Emanuel Mostofi
Supervisor: Castro Codesal, Maria
Title: Novel respiratory outcomes in children with spinal muscular atrophy diagnosed by newborn screening and treated early with disease-modifying therapies: A Real-world study
Authors: Emanuel Mostofi, Vanessa Campes Dannenberg, Hanna Kolski, Maria Castro Codesal

Theme: Children's health and wellbeing

Introduction: Spinal Muscular Atrophy (SMA) is a rare neuromuscular disorder that results in progressive and severe muscle weakness, respiratory insufficiency, and high mortality within the first 2 years of life. In Alberta, since the establishment of the newborn screening (NBS) for SMA in 2022, children with SMA can receive early diagnosis and timely initiation of disease-modifying therapies (DMTs). While early treatment with DMTs for SMA is reported to be life-changing, most available data is only from clinical trials. This study aimed to compare real-world respiratory outcomes of children diagnosed through NBS and treated early with DMTs and those diagnosed and treated after symptom onset. Methods: Retrospective cohort study of children genetically diagnosed with SMA (≤ 3 SMN2 copy) treated with DMTs and followed by the Pediatric Neuromuscular Disease Clinic in the Glenrose Rehabilitation Hospital in Edmonton, Alberta between 2013 and 2023. Clinical data including need for oxygen, ventilatory support, tracheostomy, emergency department visits and hospital admissions were extracted from electronic medical records in 4 time points: at baseline, and approximately 6, 12 and 24 months of life. Patients were stratified in two groups based on whether they were diagnosed through the NBS and received early DMTs or were treated after symptom onset. Results: Ten patients were included in the study, with median age of 2.6 years (IQR 1.8 - 5.6; 1:1 male: female ratio). Four patients (40%) were diagnosed via NBS, age of 2.4 weeks (IQR 2.1 - 3.6), and therapy initiation was at age of 3.0 weeks (IQR 2.1 - 5.3). Six patients (60%) were diagnosed after symptom onset (age of 31.1 weeks; IQR 19.9 - 81.0), and therapy was initiated at age of 58.8 weeks (IQR 28.1 - 195.3). Three children (75%) diagnosed through NBS received onasemnogene abeparvovec (OA) alone, and one (25%) received a combination that included OA and risdiplam. In the late onset group treatment regimens included: OA and nusinersen (33%), nusinersen alone (33%), OA, nusinersen, and risdiplam (17%), and risdiplam alone (17%). None of the children in the NBS group needed mechanical ventilation (either invasive or non-invasive), while 83% of children in the late onset group required ventilation within the first 24 months of life (p = 0.04). Of these, 60% were using it during sleep hours only, and 40% were ventilation-dependent (>22h/day). Among late treated children, 80% were hospitalized for respiratory concerns within the first 24 months at least once, and 40% required admission in ICU. No patients in the NBS group required hospital or ICU care (p = 0.04). Conclusion: These findings highlight the critical role of NBS and significant respiratory benefits of early intervention with DMTs prior to symptom onset, particularly since the introduction of gene therapy. Further research is needed to determine whether other important aspects affecting quality of life in children with SMA also improved with early detection and therapy such bulbar function, feeding and motor development.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 151
Presenter: Samantha Louie-Poon
Supervisor: Scott, Shannon
Title: "We need to hear our stories": East Asian narratives to promote anti-racism in children's mental health resources
Authors: Samantha Louie-Poon, Solina Richter, Diane Kunyk, Shannon Scott

Theme: Children's health and wellbeing

Introduction: Anti-racism is an emerging topic within knowledge translation (KT) scholarship. Yet, minimal empirical research explores the impact of racism within the development of child mental health KT resources and how racism influences the access and utilization of these resources for East Asian parents. Gaining a deeper understanding of how racism shapes the East Asian parent perspective is critical to illuminate how KT resources may be transformed based on their unique contexts. The objectives of this study were to a) explore how to engage East Asian parents in child mental health KT research environments, and b) develop anti-racism strategies for future child mental health KT resources development. Methods: Riessman's (2008) narrative approach guided this qualitative study. Eight East Asian parents across Canada engaged in virtual interviews between August 2022 to October 2022 following Riessman's narrative interviewing approach. Two interviews were conducted with each participant. Dialogic analysis was used to inductively analyze the narrative data. Composite narratives were constructed to present data as a strategy to (re)tell a collective story with detailed accounts of individual stories, while protecting the identities of the participants. Results: Three composite narratives emerged from the data: 1) Storying issues of access within child mental health KT; 2) Seeking understanding and solidarity for the East Asian identities and stories; and 3) Unlearning, breaking barriers, and storying resistance. The composite narratives wove together seven storylines: a) availability and affordability, b) language and vocabulary barriers, c) lack of representation, d) power and whiteness, e) understanding East Asian standpoints, f) breaking cycles, and g) using culture as a source of strength. Conclusion: This study highlighted that it is critical to acknowledge and reflect whose voices are valued within child mental health research spaces. These findings recommend the need for using East Asian perspectives when developing child mental health resources, facilitating safer environments for East Asian parent partners to engage in KT research, and empowering East Asian narratives within the content of child mental health KT resources. The outcomes of these anti-racism strategies may provide two opportunities within child mental health KT: promote solidarity for East Asian experiences and enhance safety for East Asian parent partners. These findings provide future considerations for child health researchers to promote safer and inclusive research and healthcare settings for East Asian populations through the development and facilitation of KT resources.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 152
Presenter: Ling (Lily) Lu
Supervisor: Scott, Shannon
Title: Timing of Mask Fitting as a Predictor of Adherence in Children Requiring Non-Invasive Ventilation Therapy
Authors: Ling (Lily) Lu, Maria Castro Codesal, Deborah Olmstead, Shannon Scott

Theme: Children's health and wellbeing

Introduction: Home non-invasive ventilation (NIV) is used to maintain airway patency and prevent inadequate ventilation during sleep. While appropriate mask fitting and headgear adaptation enhance NIV adherence, the impact of timing on these interventions is underexplored. This study examined the timing of mask fitting and headgear adaptation on NIV initiation and adherence within six months post-initiation. Methods: This retrospective, case-control study used secondary data analysis to examine patients aged 0-17 years in the Stollery Children's Hospital NIV program who received mask fitting and headgear adaptation (if needed) between 2012-2015. Participants were divided into case and control groups based on the timing of mask fitting and headgear adaptation, either prior to initiating NIV (cases) or following initiation (controls). Demographic and clinical data were collected from the NIV program's database, and adherence data was downloaded from patients' machines into a database provided by the sleep vendors. Outcomes of interest included NIV initiation rates and NIV usage at 1, 3 and 6 months, and dropout rates at 6 months. Results: 110 patients (29% female) were included, resulting in 146 mask-fitting entries (69% cases, 31% controls). The median NIV initiation age was 8 years and upper airway conditions were the most common indication (64%). NIV was predominately initiated in outpatient settings (72%), with CPAP (63%) and nasal masks (91%) being most commonly used. Overall, 76% of patients initiated within 6 months after NIV was recommended based on clinical documentation, 72% in cases and 85% in controls (p=0.140). Based on available adherence reports, at 1 month, 54% of cases and 44% of controls initiated NIV (p=0.341), increasing to 57% and 50% by 3 months (p=0.52), and 61% and 53% by 6 months (p=0.46). When examining NIV usage over a 30-day period, at 1 month, cases used NIV for 4.6 h/night, (vs. 4.1 h in controls; p=0.4), 5.7 h (vs. 4.3 h; p=0.13) at 3 months, and 6.3 h (vs. 5.1h; p=0.51) at 6 months. The percentage of days with NIV use >4 hours was 56% in cases (vs. 45% in controls; p=0.29) at 1 month, 60% (vs. 46%; p=0.22) at 3 months, and 88% (vs. 61%; p=0.18) at 6 months. Cases used NIV on 18 days (vs. 19 days in controls; p=0.79) at 1 month, on 22 days (vs. 17 days; p=0.06) at 3 months, and on 27 days (vs. 24 days; p=0.65) at 6 months. Dropout rates were lower in cases (15%) than controls (22%; p=0.50) at 6 months. Conclusion: This study did not reveal a significant impact with respect to the timing of mask fitting on NIV initiation and therapy adherence at 6 months, although there was a trend towards higher NIV initiation rates and a lower dropout rate at 6 months in cases. This is not surprising since other known factors can impact NIV adherence, including patient comfort and level of family involvement. This study, however, showed adherence rates in both cases and controls higher than previously reported in the literature, suggesting mask fitting and headgear adaptation are key interventions in successful NIV initiation either before or shortly after NIV initiation. Since these interventions have become standard of care, collecting further information on the control group for further comparisons will be challenging.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 153
Presenter: Paulami Chatterjee
Supervisor: Davidge, Sandra
Title: Impact of preeclampsia on fetal cardiac mitochondrial function during late gestation
Authors: Paulami Chatterjee, Rebecca Molberg, Raven Kirschenman, Floor Spaans, Anita Quon, Helene Lemieux, Sandra T. Davidge

Theme: Pregnancy and developmental trajectories

Background: Preeclampsia (PE), a common pregnancy disorder, significantly increases the risk of cardiovascular diseases in the offspring. PE can lead to impaired cardiac morphology and function in the fetus; however, the mechanisms are not well understood. Mitochondria, the powerhouses of the cell, use oxygen to produce energy (ATP) through specific mitochondrial complexes (I, II, III and IV). The mitochondria constantly adapt to maintain normal function through dynamic changes in their union (fusion) and division (fission), especially to support cardiac maturation during late gestation and early postnatal life. We hypothesize that PE impairs cardiac mitochondrial function in the fetus during late gestation. Methods: We used an established rat model of PE, the selective reduced uteroplacental perfusion (sRUPP) model, where pregnant rats were subjected to sRUPP or sham (control) surgery on gestational day (GD)14. On GD20 (term=22 days), male and female fetal hearts were collected (n=6-11 dams/group). The use of oxygen by the mitochondrial complexes I-IV was assessed using high-resolution respirometry (OROBOROS Oxygraph-2k). By spectrophotometry, citrate synthase (CS) and ATP synthase (complex V) activity were assessed as markers of mitochondrial content and energy production, respectively. Markers of mitochondrial fusion (Mitofusin 1 and 2 [MFN1 and MFN2] and Optic Atrophy 1 [OPA1]) and fission (Dynamin-related protein 1 [DRP1] and mitochondrial Fission protein 1 [FIS1]) were evaluated by Western blotting. Fetal sex was analyzed separately. Data were analyzed by Student's t-test (significance: $p \leq 0.05$). Results: In the female fetal hearts of sRUPP vs control pregnancies, oxygen consumption through activity of complexes I-IV was not changed, while complex V activity was increased compared to controls ($p=0.004$). Cardiac MFN1 expression was also increased ($p=0.002$), without any changes in the other markers of mitochondrial dynamics or in the CS activity. In contrast, in the male fetal hearts in sRUPP pregnancies, oxygen consumption through complex IV was increased compared to controls ($p=0.03$), without changes in the other complexes, CS or complex V activity, or in the fusion or fission markers. Conclusion: In sRUPP pregnancies, female fetal hearts had evidence for increased mitochondrial fusion that could lead to the formation of large mitochondrial networks, which together with a higher ATP synthase (complex V) activity may improve cellular energy production and distribution. This could help generate ATP in oxygen-poor areas of the cardiomyocytes. In contrast, the increased complex IV activity in hearts of male fetuses may reflect a different attempt to increase energy production or to reduce production of damaging reactive oxygen species. However, without complementary changes to increase energy production and distribution such as the higher fusion and ATP synthase activity as observed in the females, cardiac maturation could ultimately be impaired in males. Thus, in our rat model, PE affects cardiac mitochondrial function in the male fetuses, which could contribute to cardiac dysfunction in adult life, while the cardiac mitochondria in female fetuses may be better protected.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 156
Presenter: Angie Stokes
Supervisor: Davidge, Sandra
Title: Impact of excessive hypercholesterolemia in pregnancy on the placentas of the male and female offspring
Authors: Angie Stokes, Amanda A. de Oliveira, Anita Quon, Floor Spaans, Sandra T. Davidge

Theme: Pregnancy and developmental trajectories

Introduction: Excessive hypercholesterolemia in pregnancy increases the risk of pregnancy complications such as preeclampsia (termed HC-PE). However, the underlying mechanisms are unclear. Placental dysfunction is central to the pathophysiology of preeclampsia, and may be linked to endoplasmic reticulum (ER) stress and activation of the unfolded protein response (UPR). In conditions of prolonged and/or high ER stress exposure, the UPR can activate the NLRP3 inflammasome pathway, leading to the release of pro-inflammatory cytokines (such as IL1β) and pyroptosis (a form of programmed inflammatory cell death mediated via Gasdermin D), as well as the release of danger signals (such as HMGB1). Outside of pregnancy, hypercholesterolemia induces ER stress, but whether HC-PE activates the UPR and NLRP3 pathway in the placenta, and if there are any sex-specific differences in this process, is not known. We hypothesized that HC-PE activates the UPR and NLRP3 pathway in the placentas of the male and female offspring. Methods: Sprague Dawley rats were fed a control diet (CD) or high cholesterol diet (HC-PE) from gestational day (GD) 6 to 20 (term=22 days; n=7-8/group). On GD20, placentas of the male and female offspring were collected, and the protein expression of GRP78 (a negative regulator of the UPR), the three unique pathways that form the UPR (eIF2α, IRE1α and ATF6), and components of the NLRP3 pathway (NLRP3, TXNIP, caspase 1 and 8, pro-IL1β, N-terminal Gasdermin D, HMGB1) were assessed by Western blotting. Male and female data were analyzed separately by Student's t-test (significance: $p<0.05$). Results: In the male placentas, the levels of p-IRE1α ($p=0.0244$) were decreased in the HC-PE group compared to the CD group. In addition, the levels of NLRP3 ($p=0.0197$) and its downstream effector, caspase 8 ($p=0.0340$) were increased, while the levels of pro-IL1β ($p=0.0263$) were decreased in the HC-PE group compared to the CD group. However, the levels of GRP78, cleaved ATF6, p-eIF2α and other NLRP3 effectors (TXNIP, N-terminal Gasdermin D, HMGB1, and caspase 1) were similar between groups. In the female placentas, the levels of p-eIF2α ($p=0.0060$), TXNIP ($p=0.0255$), pro-IL1β ($p=0.0437$), and HMGB1 ($p=0.0327$) were decreased in the HC-PE group compared to the CD group. There were no changes in the levels of GRP78, p-IRE1α, cleaved ATF6, NLRP3, N-terminal Gasdermin D, caspase 1, and caspase 8 between groups. Conclusion: In the male placentas, HC-PE increased NLRP3 expression, which may be attributed to reduced p-IRE1α levels, a marker of prolonged high ER stress exposure. This was associated with an increase in caspase 8 (which likely cleaved pro-IL1β to be released by the cell), but not with pyroptosis. In the female placentas, HC-PE reduced p-eIF2α levels, which is also a marker of prolonged high ER stress exposure. As activation of eIF2α inhibits translation, this may explain the reduction in protein expression of TXNIP, pro-IL1β, and HMGB1. In summary, HC-PE induced ER stress leading to activation of the UPR in placentas of both male and female offspring, but the mechanisms were sex-specific. The subsequent activation of the NLRP3 pathway in only the male placentas may indicate that the male offspring are more susceptible to the impact of HC-PE.

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Participant #: 158
Presenter: Tamara Dorfman
Supervisor: Scott, Shannon
Title: Psychosocial consequences experienced by parents and families of children with congenital heart disease and their families: A scoping review
Authors: Tamara L. Dorfman, MN, RN, NP, Mandy Archibald, PhD, RN, Mark J. Haykowsky, PhD, FACC, FAHA, FACSM, and Shannon D. Scott, PhD, RN, FCAHS, FCAN

Theme: Children's health and wellbeing

Introduction: Congenital heart disease (CHD) has substantial psychosocial impacts on the parents and families of children with CHD, including increased stress, anxiety, relational strain, and financial burden. Nevertheless, a comprehensive knowledge synthesis mapping the psychosocial impacts on parents and families of children with CHD is lacking. The objectives of this scoping review are to 1) determine the current state of knowledge on psychosocial consequences experienced by parents and families of children living with CHD in high-income countries; 2) inform research aimed at developing interventions in high-income countries to decrease negative psychosocial consequences experienced by these parents and families; and 3) identify current evaluated psychosocial interventions that exist for parents and families of children living with CHD in high income countries. Methods: An initial search of databases and grey literature included MEDLINE, CINAHL, EMBASE, PsycINFO, CENTRAL, Scopus, and ProQuest Theses and Dissertations from January 2010 to May 2022 (planned for expansion to September 2024). Citation mining of included studies and relevant associated review articles was also completed. Two independent reviewers screened studies by titles and abstracts, and then full text using pre-defined inclusion and exclusion criteria. Quality assessment was conducted on all included studies by two independent reviewers using the MMAT (V. 2018). Data from all eligible studies was extracted by two independent extractors and verified for consensus. Conflicts at any stage of the review were resolved by discussion. Arksey and O'Malley's (2005) framework was used to guide synthesis of extracted data. The data was displayed and synthesized in tables to examine potential patterns. Results: The initial search yielded 12,606 studies for review of which 104 studies met our inclusion criteria. Interim results of the review in progress indicates the most commonly researched psychosocial outcomes for parents and families of children living with CHD were parenting stress, anxiety, depression, financial burden, relational strain, and impaired family functioning. Factors influencing these outcomes included the uncertainty of the CHD and its treatments, length of hospital stay, information resources, experiences with health care providers, and social and emotional support. Twelve included studies evaluated a psychosocial intervention for parents or families of children with CHD. These interventions included psychosocial educational workshops for parents or the family (n=3), a specialized multidisciplinary clinic including a psychologist (n=1), educational and decision-making tools for parents (n=4), a recreation camp for CHD children (n=1), and in hospital interventions for parents of children with CHD (n=3). Conclusion: The results of this review provide recognition of the psychosocial impact of CHD and its treatments on parents and families of children living with CHD. It also highlights the need for evaluated psychosocial interventions. The findings from this review will inform a future knowledge translation study aimed at decreasing negative psychosocial consequences for families associated with the child's hospitalization for CHD surgery.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 162
Presenter: Nicholas Piroddi
Supervisor: Zwaigenbaum, Lonnie
Title: Perspectives and learning needs assessment of pediatric residents across medical schools in Canada: A qualitative study of autism care and education
Authors: Nicholas Piroddi Lonnie Zwaigenbaum Lori Sacrey Sandra Thompson-Hodgetts Heather Brown

Theme: Children's health and wellbeing

Introduction: Autism is a neurodevelopmental condition characterized by social communication differences and the presence of restricted, repetitive interests and patterns of behaviour. Despite its 2% prevalence rate in Canada, many pediatricians miss cases of autism due to a lack of knowledge of screening tools. Knowledge about resources and approaches to the management of co-occurring conditions is also variable. Currently, there is no literature on the evaluation of autism in the medical education system in both medical school and in pediatric residency in Canada. The overarching objectives were to assess the perceived needs and opportunities for improvement related to Canadian pediatric residents' educational experiences with regards to autism care, and to determine residents' perspectives on providing best practice care for autistic patients. Methods: Pediatric residents (n=12) from medical schools in Alberta and British Columbia, Canada participated in interviews, which focused on two main areas: best practice care and learning needs regarding autism. The interviews were conducted using Thorne's Interpretive Description phenomenological methodology, and analysis was conducted using a reflexive thematic approach to encapsulate best practice perspectives and a summative content approach to determine barriers to providing best practice care and gaps to mitigate the gaps. Results: Two categories of themes were identified from the thematic analysis, with three themes under the category of important factors of best practice care for autistic children, and four themes under the category of barriers to providing best practice care for autistic children. The content analysis also identified gaps in medical education surrounding autism best practice care, and solutions to mitigate these gaps in medical training. Conclusion: This qualitative study provides insight on the critical issues surrounding residency education regarding care for autism. Addressing learning needs and areas of improvement identified by pediatric residents could lead to better outcomes for autistic individuals and their families. By providing pediatric residents with more comprehensive training and resources, we can work towards reducing missed cases of autism and enhancing the quality of care for autistic patients.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 163
Presenter: Marie Armbruster
Supervisor: Forsythe, Paul
Title: Limited nesting in mice as a model to study the psychoneuroimmunology of post-partum depression
Authors: Marie Armbruster, Ritu Mann-Nuttel, Shivani Mandal, Paul Forsythe

Theme: Lifelong women's health

Introduction: Postpartum depression (PPD) is a common mood disorder that typically develops within 6 months following delivery and concerns 10 to 15% of women. The major symptoms include mood swings, anxiety, anhedonia and disinterest in the baby. Some mothers suffering from PPD also demonstrate increased aggression and harm towards their infants. The disease affects not only the mother's well-being but also her ability to engage with and care for their infant, resulting in impaired cognitive and social development for their children. Stress exposure during the postpartum period is a major predisposing factor for PPD, while immune factors such as T regulatory cells (Tregs) are also hypothesised to influence the development of the disorder. Here we assessed limited nesting (LN) in mice as a potential model to investigate the relationship between stress and the immune system in PPD.
Methods: C57BL6J mice and their pups were provided limited nesting material from post-natal day 3-10 while controls had standard cages. Tregs were depleted with anti-CD25 antibody injections on post-natal day 2. Maternal behaviour was observed every day over the LN period followed by an assessment of depressive-like behaviour using the splash test. Gene expression in selected brain regions was determined using qRT-PCR and the immune profile of splenocytes was characterised using FACS. Results: Postnatal LN exposure led to a significant increase in negative maternal behaviour and signs of stress in dams, including food "nibbling". However, the behaviour in the splash test was not altered. In response to the LN, BDNF expression was reduced in the prefrontal cortex (PFC) while oxytocin and corticotropin-releasing hormone expressions were increased in the hypothalamus. LN was also associated with significantly decreased pups' weights. A combination of LN and Treg depletion significantly reduced the active nursing by dams which was associated with enhanced expression of vasopressin, vasopressin receptor, oxytocin receptor and prolactin receptor in the hypothalamus. Conclusion: LN modelled some aspects of PPD behaviour including increased aggression towards offspring, with an associated reduction in BDNF expression in the PFC. BDNF is involved in neuronal growth, synapse formation, and plasticity and decreased levels of BDNF have been associated with PPD. However, LN did not alter self-care behaviour as determined in the splash test. Depletion of Treg enhanced the effect of LN on the maternal brain and behaviour decreasing active nursing and altering the expression of genes associated with maternal bond, maternal aggression and lactation. Our data suggests that, in the post-partum period, regulatory immune changes may mitigate the effects of stress on brain circuitry associated with maternal behaviour. Our study also indicates that LN in mice may be a useful model for studying the neuroimmune relationships in certain aspects of PPD.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 165
Presenter: Hao Zheng
Supervisor: Zheng, Yao
Title: Daily associations among hassles, sleep, and impulsivity: Developmental changes in the protective roles of daily peer and family support across university
Authors: Zheng, Hao and Zheng, Yao

Theme: Children's health and wellbeing

Introduction: Sleep plays a restorative role that is essential for a broad range of mental health outcomes. Life and academic stress during late adolescence and the transition to young adulthood often lends university students particularly susceptible to sleep problems, which in turn adversely impact their mental well-being. While peer and family support can mitigate the effect of stress on maladjustment through sleep over larger timescales (e.g., years), the short-term, within-person protective roles of such support in daily lives remain largely underexplored. Using a measurement burst design, this study aimed to investigate these short-term effects on impulsivity-a transdiagnostic marker for internalizing and externalizing problems-in proximal daily processes, as well as their potential developmental changes across the university period on a long-term developmental timescale. Method: Prospective longitudinal data from two waves of 30-day daily diaries spanning from the transition to university (wave 1; n = 277, Mage = 18.1, 73% female, 68% non-White, 6,340 daily reports) to the junior year (wave 2; 3,985 daily reports) were collected at a Canadian university. Daily hassles, impulsivity, peer and family support, and four sleep measures (sleep duration, quality, problems, and insufficient sleep) were measured in each daily survey. Multilevel structural equation modeling was conducted to analyze the conceptual mediation and moderation models. The Benjamini-Hochberg (BH) approach was applied to correct for multiple testing in p values. Results: Among university students, higher than their average levels of daily hassles were associated with shorter than their average levels of sleep and more than their average levels of sleep problems on the same night, which were further linked to higher-than-usual impulsivity on the next day. The indirect effects from daily hassles to next-day impulsivity through sleep problems, quality, and insufficient sleep were significant. Daily family support served as an immediate buffer in this temporal sequence during the upper year of university but not in the first year. Specifically, in wave 1, the positive relation between daily hassles and insufficient sleep was consistently significant regardless of the level of daily family support. In wave 2, on days when students' family support was higher than 0.2 SD above person-average score, the positive association disappeared. The same pattern of results emerged in sleep problems and quality models. In addition, daily family support mitigated the positive relation between insufficient sleep and next-day impulsivity in wave 2 but not in wave 1. Conclusions: The findings highlight the increasing salience of family support in coping with psychosocial challenges during the transition to young adulthood. Strengthening family relationships may be an effective strategy to maintain physical and mental well-being of university students. Future research should continue to leverage measurement burst designs to further investigate how such short-term proximal processes change over a larger timescale within a lifespan developmental framework.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 166
Presenter: Kazette Yuen Yu Chan
Supervisor: Kannu, Peter
Title: Utilizing Urine-Derived Stem Cells for Disease Modelling and Drug Testing in Skeletal Dysplasias
Authors: Kazette Yuen Yu Chan, Karina da Costa Silveira, Alexander Beke, Carrie-Lynn Soltys and Peter Kannu

Theme: Children's health and wellbeing

Many rare human genetic disorders lack suitable models for studying the underlying disease mechanisms. Our lab focuses on skeletal dysplasias (SD), a group of childhood-onset disorders affecting bone and cartilage, leading to abnormal skeletal development. Diagnosing SD remains challenging because of variants of uncertain significance (VUS) found in genetic test results. When a VUS is identified, the result neither confirms nor excludes the diagnosis. Further testing generally requires affected tissue such as bone or cartilage which are difficult to obtain. Therefore, human cell models of SD are extremely beneficial in studying and diagnosing SD. Current research relies on patient-derived stem cells, commonly sourced from blood, skin, or bone marrow, to create induced-pluripotent stem cells. As a simpler alternative, we aim to use human-derived urine stem cells to develop models of bone and cartilage. We plan to utilize this model to explore the underlying biology of specific SD, functionally assess VUS, and test potential drug therapies. Urine-derived stem cells (UDSC), naturally present in human urine, exhibit mesenchymal characteristics. While existing studies demonstrate their regenerative ability, using UDSC as an in vitro disease modelling system remains underexplored. This project aims to leverage the differentiation potential of UDSC and extend its applications into the medical and academic fields. Our preliminary results demonstrate the potential of UDSC as an SD modelling system. We recruited healthy individuals of both sexes, cultured cells derived from anonymized urine samples for 14 days. Stem cells were isolated through FACS and then differentiated in monolayer to osteogenic or chondrogenic lineage cells using specific media. The results of differentiation were examined 28 days after induction. The cells showed positive Alizarin Red staining for osteogenesis, indicating mineralized matrix deposition, and positive Safranin O staining for chondrogenesis, verifying glycosaminoglycan production. Additionally, qPCR data demonstrates the increase in osteogenic and chondrogenic markers as differentiation progresses. Our next step is to analyze gene expression profiles during the differentiation process using RNA sequencing and to establish control data for comparison with the profile of an individual affected by a specific SD with a well-established disease mechanism. Additionally, we plan to determine if a 3D micromass culture system proves to be a superior model of chondrogenesis. We anticipate our UDSC model will also be a useful platform for the preliminary evaluation of drug efficacy and safety at the cellular level. In conclusion, this project highlights the potential of UDSC as a novel in vitro model for studying SD. Our preliminary results demonstrate the successful differentiation of UDSC into osteogenic and chondrogenic lineages, suggesting that UDSC can serve as an effective model for exploring the underlying biology of SD. By further analyzing gene expression profiles during differentiation and evaluating 3D micromass culture systems, we aim to enhance the utility of this model for both research and clinical applic

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 167
Presenter: Aviva Sharma
Supervisor: Storey, Kate
Title: The Healthy Schools Certification Program: Understanding Program Utility and Impact Through an Equity-Focused Lens
Authors: Aviva Sharma, Genevieve Montemurro, Rebecca Gokiert, Chris Markham, Kate Storey

Theme: Children's health and wellbeing

Introduction: Schools are recognized as ideal settings for facilitating health promotion given their ability to reach children during critical periods of development. Increasingly, health promotion efforts in schools have been utilizing the Comprehensive School Health (CSH) framework to improve the health and well-being of school communities. As the impact of the CSH framework is widely known, an easy-to-follow resource that enables all school communities in Canada to adopt the CSH approach can be beneficial in promoting school well-being. To address this, the Ontario Physical and Health Education Association (Ophea) has developed the Healthy Schools Certification program. This program builds upon the Canadian Healthy Schools Standards and CSH, with the aim of creating a clear and actionable process that is equitable for school communities to implement. Although the Healthy Schools Certification program has been implemented in schools across Canada, the full utility and impact of the program is not well understood. Therefore, by gathering the perspectives of school interest holders, this research seeks to understand if and how the Healthy Schools Certification program creates an equitable process for school communities to adopt the CSH approach, and the facilitators and barriers of implementing the program through an equity-focused lens. Methods: Qualitative descriptive methodology will guide this research. Using purposive sampling, 1 to 3 participants per school from 15-20 schools will be recruited, for a total of 30-40 participants. Schools invited to participate will be determined with Ophea, and will be located in provinces across Canada. Semi-structured interviews will be conducted and participants will be individuals who have played a role in implementing the Healthy Schools Certification program within their school communities. De-identified annual survey data collected by Ophea from schools during the 2023-24 school year will be used as secondary data to provide additional contextual insights. Only open-ended survey data will undergo analysis. Interviews will be transcribed using Otter.ai. Data analysis for primary and secondary data will be guided by inductive thematic analysis and organized using NVivo. Results: Together, semi-structured interviews and secondary survey data will provide a rich understanding of the utility and impact of the Healthy Schools Certification program in creating an equity-focused process for schools to adopt CSH. Results will identify recommendations to further strengthen the implementation of the Healthy Schools Certification program in school communities across Canada in an equitable way. This work will begin in Fall 2024. Conclusion: By understanding perspectives of school interest holders on the Healthy Schools Certification program and whether this program is an equitable process for school communities, this research can enhance program utility and impact to bolster CSH adoption nationwide. Key learnings will be shared with Ophea, the Canadian Healthy Schools Alliance, Ever Active Schools, and Physical and Health Education Canada, as well as local school districts, and provincial health and education decision-makers across Canada.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 168
Presenter: Ishrath Khan
Supervisor: Rasmussen, Carmen
Title: Evaluating the Classroom Implementation of the Math Interactive Learning Experience (MILE) Program
Authors: Viktoria Wuest, Sukhmani K. Saggu, Jacqueline Pei, Adelee Penner, Julie Kable, Claire D. Coles, Ishrath Khan, John Waterhouse, Carmen Rasmussen

Theme: Children's health and wellbeing

Mathematical competence is imperative to everyday success and an essential part of tasks of daily living, including budgeting, time management, and measurement. Many children struggle with math and children with neurodevelopmental disorders often have comorbid math difficulties. Math interventions typically involve or build upon regular academic math curricula and may also target teacher performance to improve teacher self-efficacy to boost student math skills. The Math Interactive Learning Experience (MILE) program is an evidence-based intervention that addresses barriers to math learning by supporting underlying cognitive skills critical to math (e.g., working memory, and visual-spatial skills) and fostering self-regulation in children. MILE was originally developed to use an individual tutoring approach for early elementary children with neurodevelopmental difficulties and has been shown to be effective when administered individually and in small groups. Building on this evidence, in this study we sought to examine the effectiveness of MILE when administered by educators in classrooms for children with a variety of learning needs. MILE was implemented by educators (N = 25) across four Alberta and six Manitoba school divisions, impacting an estimated 750 students. Most educators implemented MILE in elementary school classrooms, but a small number of educators also administered MILE to junior high and high school students. Educators completed training on the MILE program and then implemented MILE with their students over 2-3 months. Educators completed the Mathematics Teaching Efficacy Beliefs Instrument (MTEBI) before and after implementing MILE. One school district also provided student math scores in the fall and spring (before and after MILE). Educators showed significance in increases in their beliefs about their mathematics teaching self-efficacy after administering MILE. After completing MILE, teachers felt 83% confident in their ability to teach math and 70% confident that their teaching would lead to better student performance in math. Students in MILE experienced greater improvements in math scores over one school year compared to students not in MILE. Educators also provided generally positive feedback about the useability and feasibility of the MILE program. Our results contribute to the evidence supporting MILE's effectiveness, and provide novel data showing MILE is effective when administered in classrooms and that MILE may positively impact educator self-efficacy.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 169
Presenter: Amanda Almeida de Oliveira
Supervisor: Davidge, Sandra
Title: Maternal treatment with aspirin improves uterine artery function in a pre-clinical model of excessive hypercholesterolemia in pregnancy
Authors: Amanda A. de Oliveira, Floor Spaans, Murilo E. Graton, Raven Kirschenman, Christy-Lynn M. Cooke, Sandra T. Davidge

Theme: Pregnancy and developmental trajectories

Introduction: Excessive hypercholesterolemia (HC) in pregnancy predisposes the mother to pregnancy complications such as preeclampsia (termed HC-PE), but the underlying mechanisms are not fully understood. We have recently shown that HC-PE impairs uterine artery endothelial function in late-pregnant rats via activation of the Toll-like receptor 4 (TLR4) pathway with prostaglandin H synthase 1 (PGHS1) as a key downstream mechanism. Low-dose aspirin reduces the risk of preeclampsia in high-risk women, and the proposed mechanism of action involves targeting PGHS1. However, whether low-dose aspirin improves uterine artery endothelial function in HC-PE, and if TLR4 is involved in this process, is not known. We hypothesized that low-dose aspirin improves uterine artery endothelial function in HC-PE dams by suppressing the TLR4-PGHS1 axis. Methods: Sprague Dawley rats were fed a control (CD) or high cholesterol (HC-PE) diet from gestational day (GD)6 to 20, and were treated with placebo or low-dose aspirin (2 mg/kg body weight) mixed in rodent treats from GD10 to 20 (term=22 days; n=7/group). This is equivalent to the start of treatment in humans. On GD20, in vivo uterine artery blood flow velocity was determined using ultrasound biomicroscopy, pregnancy outcomes were recorded, and uterine arteries were further assessed ex vivo using wire myography to evaluate endothelium-dependent vasodilation to methacholine (MCh). To assess the specific roles of TLR4 and PGHS, the ex vivo experiments were performed with and without CLI-095 (a selective TLR4 inhibitor) and meclofenamate (a pan-PGHS inhibitor). Data were analyzed with a two-way ANOVA with Sidak's post-hoc test (significance: $p<0.05$). Results: No differences were observed in fetal weight between the CD and HC-PE dams, regardless of the treatment group. However, placental weight was increased in the HC-PE placebo dams compared to the CD group ($p=0.0020$; indicating reduced placental efficiency), which was improved by low-dose aspirin in the HC-PE dams ($p=0.0029$). In the uterine arteries, the velocity of blood flow was increased in the HC-PE placebo group compared to the CD group ($p=0.0302$), and reduced by low-dose aspirin in the HC-PE dams ($p=0.0064$). In addition, vasodilation to MCh was impaired in the uterine arteries of the HC-PE placebo group ($p<0.0001$), whereby at higher doses, MCh caused vasoconstriction instead of vasodilation, which was prevented by inhibition of TLR4 ($p<0.0001$) or pan-inhibition of PGHS ($p<0.0001$). In addition, this MCh-induced constriction phenotype was absent in the uterine arteries of the HCD dams treated with low-dose aspirin ($p<0.0001$). Conclusion: Low-dose aspirin improved placental efficiency and reduced uterine artery blood flow velocity in HC-PE dams. This reduction in blood flow velocity may indicate that the treatment increased the capacity of the HC-PE uteroplacental vasculature to accommodate the increase in incoming blood flow. Low-dose aspirin also improved uterine artery endothelial function, likely by suppressing the activation of the TLR4-PGHS1 axis. In summary, our findings suggest that there may be an unidentified subpopulation of women with excessive HC in pregnancy who may also benefit from low-dose aspirin to prevent the development of preeclampsia.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 171
Presenter: Genevieve Montemurro
Supervisor: Storey, Kate
Title: Understanding the journey towards modal shift: a qualitative examination of active transportation decision-making among youth and parents
Authors: Genevieve Montemurro, Keatton Tiernan, Dr. Kate Storey

Theme: Children's health and wellbeing

Introduction: Our daily environments are critical to our health and well-being. Over 80% of Canadians live in urban areas, making the health-promoting potential of cities a vital research area. Active transportation (AT) promotes physical and mental health while also providing social, economic, and environmental benefits as such, cities worldwide are prioritizing upstream approaches that enable and encourage wide-scale shifts in behaviour, through active or multi-modal transportation. AT is linked to increased daily physical activity, reduced stress, depression and anxiety, and increased happiness and social skills among youth. It is well recognized that youth transportation decision-making is often situated within a dynamic family environment. Research emphasises the need to consider parental factors influencing travel mode-choice, and the interconnectedness of parent and child AT decision-making in shaping behaviour. Through the application of qualitative research methods and an implementation science approach, this study aims to understand parent and youth perspectives, to help determine needs, gaps, and opportunities for AT. Methods: Photovoice with child and parent dyads will be utilized to assess barriers and facilitators of AT. Photovoice is a participatory approach in which participants use photos to capture visual understandings of their lived world. Photovoice has been applied frequently with youth in diverse settings. Recruitment will occur in areas of AT network 'implementation' to meaningfully engage participants (n=30-60) to consider how the social and physical environment influences transportation decisions. A Photovoice protocol established by our team will be applied. An initial session will orient youth and parents to the research process and provide them with cameras. Participants will then complete a 'mission' to take ~20 photos on the topic of AT journeys and decision-making. Photographs will be used to catalyze interviews through the description and contextualization of the photographs. During the interview, participants: 1) Select 5-6 images they want to discuss, 2) Contextualize photos using an established guide and, 3) Codify photos by grouping them in similar themes and assigning a title, and answering a series of summary questions. Interviews will be recorded and transcribed and data will be organized using NVivo software. Data synthesis will occur iteratively throughout data generation, using inductive thematic analysis. Final analysis involves collective reflection with youth and parents, developing a conceptual description of the findings with illustrative photos and quotes. Youth and parents will be invited to present their work at a community knowledge mobilization event. Results: AT decision making for youth and families is influenced by factors at multiple levels, and these factors can change as youth move from primary to middle and high school. Understanding how youth and parents navigate AT decisions and mode choice can help to inform AT network implementation, including education and encouragement of AT for youth and their families. Conclusions: Findings will be used to support and inform active transportation network implementation in Edmonton with applicability to other Canadian cities.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 173
Presenter: Murilo Eduardo Graton
Supervisor: Davidge, Sandra
Title: Impact of excessive hypercholesterolemia during pregnancy on vascular function in the adult offspring
Authors: Murilo E. Graton, Floor Spaans, Amanda A. de Oliveira, Raven Kirschenman, Sandra T. Davidge

Theme: Pregnancy and developmental trajectories

Introduction: Preeclampsia (PE), a common pregnancy complication, has a complex unknown etiology. Hypercholesterolemia is required for normal fetal development, but excessive hypercholesterolemia in pregnancy is associated with the development of PE (referred to here as HC-PE). PE is associated with an increased risk for cardiovascular diseases, such as hypertension, heart failure, and acute myocardial infarction, in the adult offspring. Moreover, offspring born from PE pregnancies also showed impaired vasoreactivity in different vascular beds. However, the impact of pregnancy-specific excessive HC on offspring (cardio)vascular outcomes are not well understood, as are potential sex differences and mechanisms. We hypothesized that exposure to HC-PE in pregnancy impairs vascular function in the adult offspring. Methods: Pregnant Sprague-Dawley rats were fed a control diet (CD) or a high cholesterol diet (HC-PE) from gestational day (GD) 6 to 20. Dams gave birth at term (GD 22), and the male and female offspring were assessed at 4 months of age (adulthood). Vascular function was evaluated in the thoracic aorta (a large conduit artery responsible for nutrient-rich blood transport to the body) and the mesenteric arteries (systemic resistance arteries responsible for blood pressure regulation) by wire myography. Vasoconstrictor capacity, using phenylephrine and thromboxane A2 agonist U46619, and endothelium-dependent vasodilatory responses, using methylcholine, were measured. Data were summarized as the negative logarithm of the half-maximal effective concentration (pEC50; sensitivity) and the maximal responses (Emax). Offspring sex was analyzed separately by Student's t-test; $p<0.05$ was considered significant; n=4-9/group. Results: In the male offspring, HC-PE did not impact vasoconstrictor responses in aorta. However, in mesenteric arteries of HC-PE, there tended to be a decrease in the sensitivity to phenylephrine ($p=0.056$) and an increase the sensitivity to U46619 ($p=0.061$) compared to controls. HC-PE did not impact vasodilation to methylcholine in either thoracic aortas or mesenteric arteries of males. In contrast, in female offspring, HC-PE increased the sensitivity ($p=0.027$) and responsiveness ($p=0.052$) to phenylephrine, and increased the responsiveness to U46619 ($p=0.047$) in thoracic aortas compared to controls. HC-PE did not impact phenylephrine or U46619 responses in the mesenteric arteries, or vasodilation responses in both arteries in the female offspring. Conclusions: Offspring born from a pregnancy complicated by hypercholesterolemia leading to preeclampsia (HC-PE) had impaired vascular function. Moreover, there were sex-specific differences in the impact of HC-PE on vascular function in males, where HC-PE impacted the smaller resistance arteries in the males, while impacting the larger conduit arteries in females. These changes may be linked to changes in vasoactive pathways induced by exposure to a suboptimal environment during pregnancy. These results expand our knowledge on the sex-specific differences of how complicated pregnancies program cardiovascular disease in the offspring in adult life, which may allow for the development of early treatment strategies to ultimately reduce the worldwide burden of cardiovascular disease.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 174
Presenter: Xinyi (Nicole) Wang
Supervisor: Mager, Diana
Title: Food insecurity impacts diet quality and adherence to the gluten-free diet in youth with celiac disease
Authors: Xinyi Wang, Sven Anders, Zhiqian Jiang, Marcia Bruce, Dominica Gidrewicz, Margaret Marcon, Justine M Turner, Diana R Mager

Theme: Children's health and wellbeing

Introduction Celiac disease (CD) is an autoimmune gastrointestinal disorder requiring a lifelong gluten-free diet (GFD). Gluten-free foods (GFF) are more expensive, less accessible than gluten-containing foods and may lead to increased food insecurity (FI) risk. The study objective was to determine the sociodemographic risk factors for FI and the associations with GFD adherence, diet quality (DQ) and home food environment (HFE) in households with CD youth. Methods This cross-sectional study included an online survey (Phase 1) and a 2.5-hr virtual interview (Phase 2) in parents and CD children (2-18 years). Survey content included examinations of household sociodemographic features of FI (Hunger Vital Sign™, USDA Six-Item Short-Form Household Food Security Module) using validated methods. Virtual interviews were conducted in parent-youth dyads (Phase 2) to compare household (HFE, socio-demographic) and child (anthropometric, DQ, GFD adherence) characteristics between FI and food secure (FS) households using validated tools. Results FI occurred in 46.8% of households (>30% reporting low-to-very low FS). Socio-demographic risk factors for FI included lower income, renters, rural residency, single-parent and additional child dietary restrictions ($p<0.001$). 90% reported high GFF-costs as the main contributor to FI. FI was associated with reduced GFD adherence and fruit/vegetable and higher processed GFF intake ($p<0.05$) (Phase 1). Ongoing analysis in Phase 2 (n=42 parent-child dyads) will present differences in parent/child socio-demographics, HFE, diet and barriers/facilitators between FI and FS households. Conclusion FI is prevalent in households with CD children and is associated with worsening DQ and GFD adherence. Policy interventions are needed to address FI.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 185
Presenter: Simone Eeles
Supervisor: Riddell, Meghan
Title: Syncytiotrophoblast pyroptosis is regulated by caspase-7 cleavage of gasdermin-E
Authors: Simone Eeles, Ivan Kristell Domingo, Meghan Riddell

Theme: Pregnancy and developmental trajectories

Introduction: The syncytiotrophoblast (ST) is a giant, multinucleated epithelial cell that forms the maternal-blood-facing surface of the human placenta. This cell is critically important to the maintenance and viability of a pregnancy as it carries out the traditionally known roles of the placenta: oxygen, nutrient, and waste exchange between maternal and fetal systems. Common pregnancy disorders (like preeclampsia and intrauterine growth restrictions) have been linked with an increase in circulating proinflammatory cytokines like TNF-α. Recently, our lab found that the ST undergoes a form of programmed necrosis, called pyroptosis, which is initiated by TNF-α treatment. This highly pro-inflammatory cell death pathway is characterized by the formation of gasdermin-E (GSDME) pores in the cell membrane. For GSDME to form pores it must be proteolytically cleaved, but currently the protease that mediates this event in the ST is not known. Caspase-3 and caspase-7 cleave GSDME in other cells types, however, we identified pyroptotic ST lacks substantial caspase-3 activity. Thus, we hypothesized that caspase-7 is required for ST GSDME cleavage. Methods: First trimester human placental explants (9-12 weeks gestation) were cultured +/- TNF-α (100pg/mL) and +/- z-VAD-fmk (9.35mg/mL, pan caspase inhibitor) or z-DEVD-fmk (9.35mg/mL, caspase 3/7 inhibitor); n=3-6. Quantification of GSMDE cleavage was determined by western blotting analyses and GSDME pore function was assessed with dextran uptake assays. Detection of active caspase-7 was determined by western blotting analyses and immunofluorescent detection using total and active-caspase-7 antibodies. Results: TNF-α treatment led to a trend of increased anti-active caspase-7 signal within the ST as determined by immunofluorescent staining and confocal microscopy. An increase trend in active-caspase-7 was also observed by western blotting analyses of TNF-α treated explant lysates. Pre-treatment with both z-VAD-fmk and z-DEVD-fmk significantly blocked the formation of cleaved GSDME as detected via western blotting analyses and ST dextran uptake, a measure of GSDME pore function, with TNF-α treatment. Conclusions: Our data indicates that caspase-7 mediates ST pyroptosis via cleavage of GSDME. Pyroptosis is a highly pro-inflammatory form of cell-death, and is the first regulated cell death pathway known to be executed by the ST. Therefore, ST pyroptosis may significantly contribute to placental inflammation and inflammatory placental pathologies. This work identifies a critical regulatory point in ST pyroptosis that could be targeted in the future for the treatment of placental inflammatory pathologies with the goal of improving maternal and fetal morbidity and mortality by supporting placental function.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 186
Presenter: Gopesh Gopinath
Supervisor: Elahi, Shokrollah
Title: Investigating the trans-differentiation of CD71+ erythroid cells into B cells in the neonatal period
Authors: Gopesh Gopinath and Shokrollah Elahi

Theme: Children's health and wellbeing

Introduction: Neonatal immune system is shaped by regulatory cells, such as CD71+ erythroid cells (CECs), which are abundant in neonatal and placental tissues, human cord and peripheral blood. These immunosuppressive erythroid precursors make up a heterogeneous population and are linked to newborns' high susceptibility to infections but also protect against excessive gut inflammation by aiding the colonization of commensal microorganisms after parturition. A recent study suggests that CEC-like cells can originate from both malignant and non-neoplastic B lymphocytes under stress conditions like hypoxia or anemia, but the plasticity of CECs in relation to B cells remains underexplored and holds significant implications for understanding neonatal immunity. We aim to explore the trans-differentiation of CECs into B cells in neonatal mice under physiological and pathological conditions such as systemic infection and tumor models. Planned Methods: We will begin with baseline data collection by quantifying the frequency of murine B cell marker-expressing CD71+ Erythroid Cells (B-CECs) in spleens, bone marrow, and livers of neonatal and adult BALB/c and C57BL/6 mice via flow cytometry. This will be performed on different age groups (day 1 to day 28) to determine age-related changes in B-CEC frequency. Further studies will be performed to characterize their phenotype and effector functions. Additionally, neonatal CECs will be isolated through magnetic-activated cell sorting (MACS) and cultured in conditioning culture media for hematopoietic differentiation, supplemented with cytokines and growth factors known to promote B cell lineage commitment. This will be monitored for changes in surface marker expression of CECs to B cell markers. qPCR and RNA sequencing will be conducted to assess the upregulation of key transcription factors associated with B cell differentiation, along with functional assays to confirm immunoglobulin production and B cell identity. Expected Results: Preliminary immunophenotyping data shows that neonatal CECs from the spleen express 25% more B-CECs than their counterparts in the bone marrow and liver. Interestingly, we observed that mouse strain influences the frequency of B-CECs in the neonatal period. As the neonates age, we expect this subset of B-CECs to get progressively mature, characterized by the expression of mature B cell markers. We also speculate that sex plays a role in the frequency and differentiation of this cell subset. Conclusion: Our observations provide a novel insight into immune cell plasticity and trans-differentiation of erythroid progenitors/precursors to B cells. We believe that a better understanding of the mechanism underlying this immune cell plasticity has potential implications for enhancing the neonatal immune system against pathogens.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 187
Presenter: Aryan Neupane
Supervisor: Davidge, Sandra
Title: Exposure to prenatal hypoxia impairs carotid artery function and structure in the male but not female adult offspring
Authors: Aryan Neupane, Murilo E. Graton, Amanda A. de Oliveira, Raven Kirschenman, Floor Spaans, Sandra T. Davidge

Theme: Pregnancy and developmental trajectories

Introduction: Prenatal hypoxia, a common pregnancy complication, increases the risk of cardiovascular disease in the adult offspring, but the mechanisms are not known. The carotid arteries are important as they provide the majority of the blood flow to the brain, but it is not known if prenatal hypoxia exposure impacts the carotid arteries in the adult offspring. Blood flow regulation in the carotid arteries partly occurs via myogenic tone, an intrinsic tendency of blood vessels to contract in response to increases in blood pressure. Moreover, other functional properties related to vascular compliance, such as circumferential stress (thinning of the vessel wall due to pressure) and strain (changes in vessel diameter due to pressure) are also involved, which are mediated via structural proteins such as collagen and elastin. We hypothesize that prenatal hypoxia impairs the function and structure of the carotid arteries in the adult offspring. Methods: Pregnant Sprague-Dawley rats were exposed to normoxia (21% O2) or hypoxia (11% O2) from gestational day (GD) 15 to 21 (term=22 days). Male and female offspring were assessed at 4 months of age (adulthood). The left external carotid arteries (200-300 μm) were isolated and assessed by pressure myography. Arteries were exposed to steps of increasing pressure (4-160 mmHg) in 1) buffer containing calcium to assess active mechanical properties, and 2) in calcium-free EGTA buffer to assess passive mechanical properties. Changes in the inner, outer diameter and wall thickness were recorded. Myogenic tone (difference between the two pressure curves), and circumferential stress and strain were calculated (measures of vessel compliance). In sections of carotid arteries, histological analysis was performed to assess collagen (Masson's trichrome stain) and elastin (Verhoeff stain) densities. Data were analyzed by Student's t-test; $p<0.05$ was considered significant; n=3-10/group. Results: In the carotid arteries of male offspring, prenatal hypoxia exposure reduced the myogenic tone ($p=0.015$) and increased the circumferential strain ($p=0.008$), without impact on circumferential stress, compared to normoxia controls. In addition, prenatal hypoxia decreased the carotid artery collagen density ($p=0.039$) and increased the elastin density ($p=0.004$) compared to controls. In the carotid arteries of the female offspring, there was no impact of prenatal hypoxia exposure on the myogenic tone, circumferential stress or strain, or collagen and elastin densities. Conclusions: Prenatal hypoxia led to a loss of myogenic tone in the carotid arteries of the male offspring only, which may impact the regulation of blood flow to the brain. Prenatal hypoxia also reduced arterial stiffness (strain) in carotid arteries from male offspring only, which may be explained by structural changes in the artery wall (reduced collagen and increased elastin densities), and could be an important independent predictor of future adverse cardiovascular events. Surprisingly, carotid arteries of the adult female offspring were not affected by hypoxia exposure in utero. These results expand our knowledge on the sex-specific differences of how complicated pregnancies can contribute to cardiovascular disease in the adult offspring.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 190
Presenter: Nazanin Arjomand Fard
Supervisor: Wine, Eytan
Title: Exploring the Role of Klebsiella variicola and Klebsiella quasipneumonaie in Pediatric Ulcerative Colitis Pathogenesis
Authors: Nazanin Arjomand Fard, Michael Bording-Jorgensen, Christopher Cheng, Katie Kerr, Harmol Aujla, Sarah Mansour, Wael Elhenawy, Troy Perry, Eytan Wine

Theme: Children's health and wellbeing

Background and Aims: Inflammatory bowel diseases (IBD) are chronic inflammatory conditions of the gastrointestinal tract. Crohn disease (CD) and ulcerative colitis (UC) are two main subtypes of IBD. Its incidence is rising in Canada, especially among children. UC is more severe and extensive in children than in adults with pediatric-specific considerations (growth, puberty, emotional status). Recent studies indicated that Klebsiella quasipneumonaie (isolated from the stool of IBD patients) and K. variicola (isolated from the mesenteric tissue of Crohn disease patients) have the potential to induce inflammation in epithelial and preadipocyte cells, exacerbating colitis in murine models. We isolated these strains from pediatric UC patients' appendix (relevant to UC pathogenesis given the protective effects of appendectomy) and other non-inflamed colon sections. We hypothesized that these isolates are invasive and induce inflammation in UC. These strains have not been previously studied in UC.
Methods: K. variicola and K. quasipneumonaie were isolated from two pediatric UC patients' appendices and other non-inflamed colon sections and identified using 16S DNA Sanger sequencing. Virulence of the two strains was determined by infecting Caco2 cell lines and performing adhesion and invasion assays, quantifying biofilm formation, and assessing barrier functions using transepithelial electrical resistance (TEER) measurement. Importantly, we monitored the production of pro-inflammatory (e.g., IL-8, TNF-α) and anti-inflammatory (IL-10) cytokines using reverse transcriptase quantitative polymerase chain reaction (RT-qPCR). Results: K. variicola and K. quasipneumonaie exhibited high levels of biofilm formation compared to adherent-invasive Escherichia coli (AIEC), which are commonly isolated from IBD patients. Furthermore, the Klebsiella strains adhered to epithelial cells within 2-3 hours post infection. TEER experiments showed compromised barrier integrity after 6 hours and overnight infection. Except for K. quasipneumonaie isolated from the ascending colon, the tested strains exhibited a significant increase in IL-8 expression. Similarly, K. variicola from the peri-appendicular region demonstrated elevated TNF-α gene expression. Conclusions: K. variicola and K. quasipneumonaie isolated from UC patients have the potential to form biofilms, disrupt barrier integrity, and trigger inflammatory responses. These findings unravel a potential role for pathogenic Klebsiella strains in driving UC pathogenesis. Importantly, these data shed light on the role of appendix-associated bacteria in the development of UC. Future work includes using comparative genomics to map the virulence determinants of these bacteria.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 192
Presenter: Paris Jones
Supervisor: Davenport, Margie
Title: Impact of postpartum physical activity on cardio-metabolic health, breastfeeding, injury and infant growth and development: a systematic review and meta-analysis
Authors: Paris A. T. Jones, Amy Moolyk, Stephanie-May Ruchat, Muhummad Usman Ali, Karen Fleming, Sarah Meyer, Talia Sjwed, Jenna B. Wowdzia, Lauren Maier, Michelle F. Mottola, Allison Sivak, Margie H. Davenport

Theme: Pregnancy and developmental trajectories

Introduction: To examine the relationship between postpartum physical activity and maternal postnatal cardiometabolic health, breastfeeding, injury, and infant growth and development. Methods: Systematic review with random-effects meta-analysis and meta-regression. Eight online databases were searched up until January 12, 2024. Studies of all designs in all languages were eligible (except case studies and reviews) if they contained information on the population (postpartum people), intervention (frequency, intensity, duration, volume, or type of exercise, alone ["exercise-only"] or in combination with other intervention components [e.g., dietary; "exercise + co-intervention"]), comparator (no or low volumes of physical activity), and outcomes: hypertension, diabetes, cardiometabolic risk factors (systolic blood pressure [SBP], diastolic blood pressure [DBP], total cholesterol, high density lipoproteins [HDL-c], low density lipoproteins [LDL-c], and triglycerides, HbA1C, glucose and insulin concentration), breastfeeding (breastmilk quality and volume), infant growth (length and weight) and development, or postpartum injury. Results: 46 unique studies (n=8766 participants) from 20 countries were included. Moderate certainty of evidence showed exercise+co-interventions reduced the odds of developing diabetes by 28% (7 RCTs, n=2496; OR 0.72 95% CI 0.54, 0.98, I2 12%), reduced SBP (10 RCTs, n=2753; MD -2.15 95% CI -3.89, -0.40, I2 73%), and DBP (9 RCTs, n=2575; MD -1.38 95% CI -2.60, -0.15, I2 66%) compared to controls. Infant growth and development, breastmilk quality and quantity, and risk of injury were not different between exercise and control groups. Conclusion: Physical activity improves cardiometabolic health without adversely impacting breastmilk supply or quality, infant growth or maternal injury.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 194
Presenter: Olivia Sadilek-Thring
Supervisor: Clugston, Robin
Title: The sex-specific dysregulation of vitamin A homeostasis during iron deficiency in young Sprague-Dawley rats
Authors: Sadilek-Thring, O.S. Holody, C.D. Bourque S.L. Clugston, R.D.

Theme: Children's health and wellbeing

Introduction Iron deficiency (ID) is the most common nutritional deficiency worldwide, and young children are at particularly high risk of developing ID due to the increased physiological demands of growth and development. ID during childhood is associated with long-term neurocognitive, metabolic and cardiovascular deficits. Notably, ID of varying severity is known to cause the dysregulation of other micronutrients, including vitamin A (VA). VA, in its metabolically active form retinoic acid, plays an essential role in child development and thus alterations in its homeostasis during early childhood can result in adverse health outcomes including preventable blindness, compromised immunity, and infant mortality. While ID and VAD frequently co-occur, the nature of their interaction is not well understood. There is a significant literature describing the anemia that develops as a result of VAD; however, less is known about the opposite interaction - the influence of ID on VA status. Previous studies have shown that ID reduces circulating VA levels in male rats; however the molecular mechanism has not been explored nor has this phenomenon been studied in females. As such, the objective of this research is to determine the molecular mechanism of disrupted VA metabolism caused by ID modeled in weanling male and female rats. Methods Three week old male and female Sprague-Dawley rats were randomly assigned to receive either a control diet (37 mg/kg iron) or an iron-deficient diet (3 mg/kg iron). During the experimental time course, plasma hemoglobin levels were assessed bi-weekly. Following the six weeks of dietary intervention, all animals were euthanized and tissues were collected for comprehensive analysis of iron and VA metabolism. This included assessment of tissue retinoid levels via HPLC, hepatic VA- and iron-related gene expression via qPCR, and tissue VA- and iron-related protein expression via Western blot and ELISA assays. All data were analyzed by 2-way ANOVA with Sidak post hoc test. Results Dietary iron-restriction caused a significant and progressive decline in male and female hemoglobin levels over the experimental time course (-79% [$p < 0.0001$] and -73% [$p < 0.0001$], respectively). ID was associated with changes in VA metabolism in males but not females, including decreased plasma retinol (-42%, $p < 0.0001$), RBP4 expression (-64%, $p < 0.0001$), and TTR expression (-53%, $p < 0.005$), as well as increased hepatic VA storage as retinyl esters (+44%, $p < 0.05$) and RBP4 protein expression (+57%, $p < 0.05$), but decreased hepatic TTR gene and protein expression (-52% [$p < 0.0001$] and -84% [$p < 0.0001$], respectively). Conclusion Our results show that in male but not female rats, ID interferes with the homeostasis of VA through potential interactions with hepatic TTR expression. These findings begin to establish the molecular interaction that exists between ID and VA metabolism. Importantly, the observed sex differences in the effect of ID on VA homeostasis warrant further investigation.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 200
Presenter: Congxiang Yu
Supervisor: Fu, Yangxin
Title: Role of RNA methyltransferase NSUN2 in stress-induced cell death in ovarian cancer
Authors: Congxiang Yu, Zorica Nakevska, Rui Zhe Yang, Zhihua Xu, Helen Steed, Lynne-Marie Postovit, Cheng-Han Lee, YangXin Fu

Theme: Lifelong women's health

Introduction Epithelial ovarian cancer (EOC) is the fifth leading cause of cancer-associated deaths in women and the leading cause of death among gynecologic malignancies. This high mortality rate is largely due to late diagnoses, the cancer's propensity for drug resistance, and frequent recurrence. Because current treatments are ineffective against the advanced EOC cases, novel therapies are needed. RNA methyltransferase NSUN2 regulates gene expression via depositing 5-methylcytosine in all species of RNA and has been implicated in various types of cancer. Research in Fu lab has shown that NSUN2 plays a pro-tumorigenic role in EOC, suggesting that NSUN2 could be a potential therapeutic for EOC. Ferroptosis is a type of programmed cell death distinct from apoptosis and has been proposed to be a novel therapeutic strategy for EOC. Recently published studies show that NSUN2 confers ferroptosis resistance by regulating the expression of key factors in ferroptosis, SLC7A11 and NRF2, via mRNA methylation in endometrial and lung cancers, respectively. The objective of this study is to determine the role of NSUN2 in ferroptosis in EOC. Methods NSUN2 expression was knocked out in two EOC cell lines (OVCAR8 and OV-90) using CRISPR editing. The wild-type (WT) and NSUN2 knockout (KO) cells were treated with increasing concentrations of two ferroptosis inducers, RSL3 and Erastin, to determine the effect of NSUN2 KO on ferroptosis. Cell viability and survival were measured by the neutral red uptake and clonogenic assays to generate survival curves and IC50s for each cell type. RSL3 and Erastin induce ferroptosis by inhibiting GPX4 and SLC7A11 (two ferroptosis regulators), respectively. The expression of GPX4 and SLC7A11 in WT and NSUN2 KO cells was examined by RT-qPCR and western blotting. Results The neutral red uptake and clonogenic assays showed that NSUN2 KO OVCAR8 and OV-90 cells were more resistant to RSL3-induced, but not Erastin-induced, ferroptosis compared to WT cells. In keeping with this, Western blotting showed that NSUN2 KO led to an increase in the RSL3 target protein GPX4, but not in the Erastin target protein SLC7A11. RT-qPCR results showed that NSUN2 KO did not change the mRNA level of GPX4, suggesting that NSUN2 regulates GPX4 expression through translational or post-translation mechanisms. Conclusion The findings from this study show that NSUN2 KO renders EOC cells more resistant to ferroptosis. This is unexpected and opposed to the published studies where NSUN2 was shown to confer ferroptosis resistance in endometrial and lung cancers. Our results thus show that NSUN2 plays a multifaced role in EOC: it promotes cell proliferation but renders cells sensitive to ferroptosis. The results suggest that inducing ferroptosis could be a promising therapeutic approach for treating ovarian cancer with the elevated expression of NSUN2. The ongoing and future directions involve determining the molecular mechanism by which NSUN2 regulates the expression of GPX4. We will examine if NSUN2 regulates the expression of GPX4 by methylating the GPX4 mRNA and thereby inhibiting GPX4 mRNA translation.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 201
Presenter: Jad-Julian Rachid
Supervisor: Bourque, Stephane
Title: Maternal iron deficiency alters mitochondrial function and antioxidant defence within cardiac and renal tissues in hypertensive pregnancy
Authors: Jad-Julian Rachid, Claudia Holody, Si Ning Liu, Rohini Roy Roshmi, Navdeep Badhan, Anson Wong, Alyssa Wiedemeyer, Hélène Lemieux, and Stephane Bourque

Theme: Pregnancy and developmental trajectories

Introduction: Maternal iron deficiency (ID) is associated with the development of hypertensive disorders in pregnancy (HDP). Iron is crucial for mitochondrial function, particularly for oxidative phosphorylation, where it acts as a cofactor within the complexes of the electron transfer system. Consequently, the depletion of tissue iron levels may exacerbate mitochondrial dysfunction, particularly in HDP, where increased oxidative stress, impaired mitochondrial integrity, and a diminished capacity for energy production have been observed in both cardiac and renal tissues. Here we sought to investigate the effects of maternal ID on oxidative respiration and mitochondrial ultrastructural integrity in both the hearts and kidneys of pregnant spontaneously hypertensive rats (SHR) and normotensive Wistar-Kyoto (WKY) rats. Methods: Female SHR and WKY dams were fed either an iron-replete or iron-restricted diet prior to and during pregnancy. On gestational day 21, dams were euthanized, and fresh heart and renal cortical tissue were homogenized to assess mitochondrial function via high-resolution respirometry (Oroboros O2k system) or flash frozen for biochemical assessment. Inferolateral mid-sections of the heart and kidney cortex were fixed for transmission electron microscopy (TEM) and imaged at 30,000× magnification. Tissue sections were also embedded in optimal cutting temperature medium for superoxide quantification by dihydroethidium (DHE) staining. Mitochondrial morphology, density, and DHE levels were quantified using ImageJ software. Antioxidant enzyme expression was analyzed by RT-qPCR. Data were analyzed using two-way ANOVA with Holm-Sidak post hoc test. Results: Maternal iron restriction reduced hemoglobin levels in both ID-WKY and ID-SHR dams compared to their respective iron-replete controls (-36% for both groups; $P<0.001$). ID reduced cardiac mitochondrial respiration irrespective of strain, leading to diminished oxygen flux through Complex I (-16%; $P=0.02$) and Complex II (-18%; $P=0.009$) pathways. Renal cortical mitochondrial respiration was similarly impaired by ID, with a more pronounced reduction in SHR dams via Complex I (-9%; $P=0.02$) and Complex II (-11%; $P=0.01$) pathways. TEM revealed larger mitochondria with increased white space and a more heterogeneous appearance in the hearts of ID dams ($P<0.001$), indicative of mitochondrial swelling and reduced cristae density ($P=0.005$). Cardiac antioxidant enzyme expression profiles, including catalase (Cat), glutathione peroxidase I (Gpx1), and superoxide dismutase (Sod1), were elevated in ID-SHR dams, but reduced in ID-WKY dams compared to their iron-replete controls ($P=0.02$, $P=0.004$, and $P<0.001$, respectively). Similarly, ID increased renal Cat and Gpx1 mRNA expression in SHR dams, but had an opposite effect in WKY dams ($P=0.04$ for interaction for both outcomes). DHE staining showed reduced superoxide levels in ID-SHR hearts, while levels increased in ID-WKY hearts ($P=0.04$), suggesting strain-specific compensatory antioxidant responses. Conclusion: Maternal iron deficiency impairs mitochondrial respiration and disrupts oxidative defense mechanisms in the heart and kidneys of pregnant dams, with distinct effects in normotensive and hypertensive rat strains.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 202
Presenter: Ehsan Misaghi
Supervisor: Kannu, Peter
Title: Investigating PIKFYVE variants in developmental ocular disorders
Authors: Ehsan Misaghi, Ian MacDonald, Peter Kannu, Matthew Benson

Theme: Children's health and wellbeing

Introduction: Variants in PIKFYVE have been associated with developmental ocular disorders such as congenital cataracts and congenital corneal fleck dystrophy. Despite extensive mechanistic studies on the phosphoinositide kinase PIKFYVE, its specific role in ocular tissue remains poorly understood. The predominant association of PIKFYVE variants with ocular phenotypes is particularly intriguing given the gene's ubiquitous expression and the fact that biallelic loss-of-function variants in PIKFYVE are embryonically lethal. Methods: We have identified two multigenerational families with distinct PIKFYVE variants. In the first family, the proposita, who harbours a heterozygous likely pathogenic PIKFYVE variant, presents with congenital corneal fleck dystrophy. We have obtained fibroblasts and blood samples from the proposita for cell culture experiments to assess the cellular consequences of this variant. In the second family, we identified a novel PIKFYVE variant of uncertain significance associated with a potential congenital corneal fleck dystrophy phenotype. To our surprise, the proband also presents with an extensive retinal phenotype, suggestive of defects in the retinal pigment epithelium. We are currently evaluating the impact of this variant on PIKFYVE kinase activity in vitro. Results: Our preliminary experiments demonstrate that normal retinal pigment epithelial cells accumulate enlarged intracellular vacuoles upon treatment with a PIKFYVE kinase inhibitor. Staining of these vacuoles indicates that they are lysosomal in origin, suggesting a potential disruption in lysosomal degradation pathways. Given the role of lysosomes in making phagocytosis possible, we are investigating the effects of PIKFYVE inhibition on the phagocytic function of the retinal pigment epithelium cells. Conclusion: Through this project, we aim to elucidate the cellular and molecular consequences of a likely pathogenic PIKFYVE variant for the first time and to explore the role of PIKFYVE in retinal pigment epithelium.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 203
Presenter: Nazanin Abolghasemi Taree
Supervisor: Wu, Cynthia
Title: Barriers and facilitators for diagnosing and managing iron deficiency anemia from healthcare professionals' perspective in Alberta, Canada: a qualitative study.
Authors: Nazanin Abolghasemi Taree, Rebecca Rich, Nancy Zhu, Roy Khalife, Cynthia M. Wu1, Hao Wei (Linda) Sun1 1 (co-senior authors)

Theme: Lifelong women's health

Introduction: Anemia in reproductive-age women is a significant global public health issue. Iron deficiency anemia (IDA), the most common cause, disproportionately affects people from marginalized communities and is often underdiagnosed and inadequately managed. The barriers and facilitators to optimal management are poorly understood. This study aims to explore healthcare professionals' (HCPs) perspectives on the barriers and facilitators in managing and diagnosing IDA among women of reproductive age in Alberta with a focus on equity-deserving people, including Black, Indigenous, and People of Color (BIPOC), immigrants, refugees, and 2S/LGBTQIA+ individuals. Methods: We conducted a qualitative study using semi-structured interviews with HCPs who treat women with IDA. Participants were recruited through purposive and snowball sampling to ensure representation from diverse specialties. Participants discussed practice patterns, barriers, and facilitators to timely diagnosis and management of IDA, and the potential interventions to improve care for women of reproductive age. After achieving sample size sufficiency, we used Braun and Clarke's reflexive thematic analysis to code transcripts and generated themes through an iterative and inductive process. Results: We interviewed 13 participants from Alberta, specifically seven family physicians, two emergency medicine physicians, two obstetricians/gynecologists, one hematologist, and one pharmacist. Through our interviews with healthcare professionals, several themes underscored the complexities of managing IDA among women of reproductive age. One important theme is the supply and demand of resources. Participants noted various barriers, including insufficient drug coverage under Alberta Healthcare insurance, lack of hospital privileges for family doctors, and extended wait times for specialty services. Physicians' knowledge, skills, and attitudes also played a pivotal role in the management of IDA. This encompassed their familiarity and adherence to clinical guidelines, ignoring or misattributing symptoms, and efforts in patient education and engagement. Patient-centered care was also emphasized with the need to build trust in the healthcare system and address treatment intolerance. Another critical aspect highlighted was the importance of networking and integrating care. This included enhancing feedback from different care levels, integrating electronic health records, and improving coordination between acute care, primary care, and subspecialty services. For vulnerable populations, the intersectionality of biopsychosocial factors such as race, poverty, homelessness, food insecurity, mental health disorders, and substance abuse further exacerbated existing challenges related to adherence and access to care. Moreover, pervasive mistrust in the healthcare system, the need for gender affirmation sensitivity, and issues related to the affordability and cultural appropriateness of iron-rich foods and supplements were highlighted. Language barriers and limited health literacy were additional challenges experienced. Identified facilitators include having a proper multidisciplinary team in the newcomers' clinic and providing appropriate screening care for infectious diseases in refugees and newcomers.

This research has been funded by the Alberta Women’s Health Foundation through the Women and Children’s Health Research Institute.

Participant #: 206
Presenter: Efia Wiredu
Supervisor: Riddell, Meghan
Title: Gasdermin D antagonizes gasdermin E mediated pyroptosis in the human placental epithelium
Authors: Efia Tess Wiredu, Ivan K. Domingo, Meghan Riddell

Theme: Pregnancy and developmental trajectories

Introduction The placenta is an essential organ formed during pregnancy purposed for supporting fetal development through facilitating nutrient and oxygen transport, and infection prevention. The syncytiotrophoblast (ST), a multinucleated cell that makes up the outermost layer of the placenta, is the key player that performs these functions. However, in pyroptosis, a proinflammatory form of cell death, the ST's integrity is greatly disrupted by increased membrane permeability. It is known that pyroptosis is caused by proteins of the gasdermin family: gasdermin D (GSDMD) and gasdermin E (GSDME). Commonly, active GSDMD is responsible for pyroptosis by creating pores in the cell membrane. However, we have previously shown that although GSDMD is expressed within the ST, GSDME pores cause pyroptosis. Therefore, we are interested in understanding the role of GSDME and GSDMD in maintaining the ST through determining their location and relationship to one another. Methods 10-12 wk human placental explants were treated for 2 hours with TNF-α (100 ng/ml) and stained with anti-GSDME and GSDMD antibody and imaged with confocal microscopy. Next, we analyzed the production of cleaved-GSDME when treated with +/- GSDMD knockdown (KD) and/or +/- TNFα. Protein samples from 9-10 wk human placental explants were collected 48 hours post GSDMD KD and 6 hours after treatment +/- TNFα and assessed via western blotting. Functional assay was conducted on +/- GSDMD KD and/or +/- TNFα where 10 000 MW Texas red, Dextran uptake is determined using confocal microscopy. Groups were analyzed using a 2-way ANOVA test ($n \geq 3$). Results GSDME and GSDMD signal was weakly colocalized with strong anti-GSDMD or/and GSDME signal restricted to different areas within the ST. GSDMD KD significantly increased the amount of cleaved-GSDME with no additive effect with TNFα treatment ($p \leq 0.0001$), a known initiator of GSDME cleavage in the ST. The same effect was observed with the Dextran uptake assay which is a functional readout of GSDME pore formation. Conclusion Counterintuitively, GSDMD is a prosurvival factor in the ST that restricts GSDME activation. Future experiments will identify the mechanism through which GSDMD suppresses GSDME cleavage. Pyroptosis is an important pathway in placental inflammation therefore this knowledge makes anti-inflammatory treatments better suited towards placental disorders in the future.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 207
Presenter: Hayley Dicks
Supervisor: Rich, Rebecca
Title: Teachings from community: Improving health outcomes for pregnant people who use drugs
Authors: Dr. Rebecca Rich Dr. Cassandra Felske-Durksen Dr. Matthew Hicks Osnat Wine Hayley Dicks

Theme: Pregnancy and developmental trajectories

Background: Despite serving a community which is disproportionately affected by problematic substance use in pregnancy, the Royal Alexandra Hospital (RAH) currently provides no specialized services for this population. The RAH thus serves as a useful case study through which to understand the experiences of people with lived and living experience of substance use in the peripartum period. Neonatal abstinence syndrome (NAS) is a multi-system disorder that can be experienced by neonates who have been exposed to drugs in utero, usually opioids. Often, neonates with NAS are admitted to the NICU following birth for close monitoring and pharmacological intervention. There is ample data to support the prioritization of patient & family-centered care, and protective factor engagement to reduce the risks of complications and improve long-term outcomes for families. Programs across Canada have shown how a harm reduction approach can improve health outcomes for women and their babies, increase family permanency, increase engagement in prenatal and addiction services and reduce substance use. A rooming-in model of care keeps the mother-infant dyad together in the immediate postpartum period and facilitates a smooth transition to extrauterine life for substance-exposed newborns by engaging in inherent protective factors such as skin-to-skin contact and breastfeeding. Nonpharmacological management of NAS has been shown to result in a lesser need for pharmacotherapy, increased rates of breastfeeding and a shorter length of stay in hospital without increased risk of adverse outcomes through 3 months of age. Rooming-in is also associated with higher rates of discharge of the newborn with the mother. The NASCENT project team has partnered with our research team and our network of clinical, research, and community partners to hold perinatal community engagement sessions. This project is a work in progress. Methods: The sessions will take place in Amiskwaciwâskahikan / ᐊᒥᐢᑲᐧᒋᐧᐣᑲᐦᐃᐧᐃᑲᐣ (Edmonton), AB. Participants will include anyone with lived or living experience of substance use during pregnancy who is over 18 and able to provide oral informed consent. Recruitment posters will be distributed in relevant community organizations throughout the city. Oral informed consent will be gathered from each participant. Each session will include a discussion in circle, which will be co-facilitated by a member of the research team and an Indigenous Elder or Knowledge keeper to reflect Indigenous ways of sharing knowledge and to ensure that each participant has equitable opportunity to speak. The session will inquire about the participants' experiences with healthcare throughout their pregnancies, gaps in service, barriers, as well as how to best operate a rooming-in program. Honoraria will be provided to all participants. To align our work with OCAP principles and data sovereignty, we will engage with participants throughout the data analysis process. Significance: Our goal is to establish strong and lasting relationships and a care model which can extend into the very community by which it was created and built. Perspectives gained from these sessions will be used to inform the NASCENT project and a rooming-in model of care and other medical care at the RAH.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 208
Presenter: Madelyn Curle
Supervisor: Carson, Valerie
Title: Longitudinal associations between social media and mental health among adolescents: The COMPASS study
Authors: Curle, M., Hunter, S., Leatherdale, S. T., Patte, K. A., Faulkner, G., Goldfield, G., Bélanger, R., Colman, I., Ferro, M., Hilario, C., Tremblay, A.-M. T., & Carson, V.

Theme: Children's health and wellbeing

Introduction: With rising social media exposure to adolescents, it is vital to understand the impacts of social media on adolescent health, in particular their mental health and whether these effects differ based on gender. The objectives of this study were to examine: 1) the longitudinal associations between social media time and mental health outcomes among a large sample of Canadian adolescents and 2) if associations are moderated by gender. Methods: Linked longitudinal data were from waves 10 and 11 of the prospective cohort study Cannabis, Obesity, Mental health, Physical activity, Alcohol, Smoking, Sedentary behaviour (COMPASS) study (n=26,743). The exposure variable was time spent browsing/scrolling through social media (e.g. Instagram, TikTok), self-reported with a single item. The outcome variables were anxiety, depression, flourishing, personal relationships, and emotional regulation, assessed with established tools. The moderator variable was gender, categorized into cisgender girls, cisgender boys, and transgender/gender-diverse adolescents. Covariates included age, race/ethnicity, and perceived socioeconomic status. Multilevel linear modelling was conducted adjusting for covariates. Results: An additional hour/day of social media across time points was significantly associated with higher depression (B=0.583; 95% CI: 0.545-0.620; p<0.001) and anxiety (B=0.424; 95% CI: 0.392-0.456; p<0.001) symptoms, decreased flourishing (B=-0.400; 95% CI: -0.442- -0.358; p<0.001), unfavourable personal relationships (B=0.187; 95% CI: 0.174-0.200; p<0.001) and emotional regulation (B=0.448; 95% CI: 0.420-0.476; p<0.001) over time. Gender was a significant moderator in all models (p<0.0001). Cisgender girls experienced significantly larger unfavourable associations between social media and mental health constructs in comparison to cisgender boys over time. There were no identifiable trends across outcomes for the transgender/gender-diverse group. Conclusions: Social media was associated with unfavourable mental health outcomes over time in a large sample of Canadian adolescents, with stronger associations observed in cisgender girls. Findings can help contribute to ongoing policy and legislation discussions surrounding social media use and adolescent mental health, especially for cisgender girls.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 209
Presenter: Asghar Fallah
Supervisor: Kannu, Peter
Title: Self-replicating RNA technology for direct reprogramming of fibroblasts into osteoblasts and monoclonal antibody production for bone disease treatment
Authors: Asghar Fallah, Darren Lepp, Ehsan Misaghi, Carrie-lynn Soltys, Peter Kannu

Theme: Lifelong women's health

Introduction: Advancements in cell therapies have encountered challenges such as graft limitations and invasive procedures. Direct reprogramming (DR) offers a promising alternative by converting one somatic cell type directly into another, bypassing intermediate pluripotent stages. This study leverages self-replicating RNA (srRNA) technology to deliver transcription factors (TFs) for reprogramming fibroblasts into osteoblasts (OBs), providing a novel approach for treating bone diseases. Additionally, srRNA is employed for the sustained production of the monoclonal antibody denosumab, addressing osteoporosis and poor bone healing through two distinct approaches. Methods: Human fibroblasts were transfected with srRNA constructs encoding key osteogenic TFs, such as RUNX2 and Osterix, facilitating their conversion into OBs. The srRNA constructs were designed for non-integrative expression, ensuring safety by minimizing the risks associated with viral vectors and maintaining cellular identity. The first approach involved reprogramming fibroblasts into osteoblasts, which subsequently produced functional denosumab. The second approach utilized srRNA to directly express denosumab via intramuscular injection using lipid nanoparticles (LNPs) in vivo, aiming to produce and deliver denosumab efficiently within the body. Results: The srRNA-based approach successfully induced fibroblast-to-osteoblast conversion, as evidenced by the upregulation of osteogenic markers and enhanced mineralization. Additionally, in the first approach, the osteoblasts produced functional denosumab, demonstrating the potential for cell-based antibody production. In the second approach, the srRNA-LNP system effectively delivered and expressed denosumab in vitro, showcasing the feasibility of this method for future in vivo applications. Conclusion: Our study introduces a dual-function srRNA platform capable of reprogramming fibroblasts into osteoblasts while simultaneously producing the monoclonal antibody denosumab through two innovative approaches. The first approach leverages reprogrammed osteoblasts for local antibody production, while the second employs an srRNA-LNP system for direct in vivo delivery. While the in vivo studies are ongoing, these in vitro results are promising and pave the way for further development in bone regeneration and osteoporosis therapy. Future research will focus on validating these strategies in animal models and optimizing the platform for clinical applications.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 210
Presenter: Meagan Shields
Supervisor: Newton, Mandi
Title: Pharmacogenomic-guided antidepressant prescribing (PGx-GAP) in adolescent trial
Authors: Meagan Shields, Laina McAusland, Paul Arnold, Adrian Box, Jon Emery, Katherine Rittenbach, Ross Tsuyuki, Jennifer Zwicker, Amanda Newton, Chad Bousman

Theme: Children's health and wellbeing

Introduction: For adolescents with depression, medication-based treatment with selective serotonin reuptake inhibitors (SSRIs) is considered part of a comprehensive care approach. However, some adolescents struggle to find a medication that effectively treats their symptoms and does not lead to unacceptable side-effects. Personalized treatment using pharmacogenomic (PGx) testing may help physicians select a medication and dose based on drug metabolism. While benefits have been demonstrated using PGx-guided prescribing in adults, minimal research has been conducted to determine the effects of this approach in adolescents. The primary aim of this trial is to compare the efficacy of PGx-guided prescribing to current practice among adolescents with depression in the attainment of remission. Methods: This is a multi-site, triple-blinded, randomized controlled trial currently recruiting via family medicine clinics, community pediatricians, and participant self-referral in Alberta, Canada. Eligible adolescents aged 12-17 years with depression that did not respond to or tolerate fluoxetine therapy are randomized to the experimental intervention (PGx-guided prescribing) or the control intervention (prescribing using the Guidelines for Adolescent Depression in Primary Care). Both interventions are administered using identically-formatted SSRI prescribing reports sent to the participant's physician. The primary outcome is symptom remission after 12-weeks of therapy, measured by the Quick Inventory of Depressive Symptomatology - Adolescent 17-item - Self-Report (QIDS-A17-SR), and analyzed using logistic regression. The goal is to enroll 452 participants for a power of 85%, with a Type I error set at 0.05 to detect a treatment effect size of 0.25 for remission among participants with a genotype that would change medication recommendations. Results: Our preliminary work has found 82% of 538 youth seeking mental health services in Alberta carried an actionable genotype for CYP2C19 or CYP2D6 that could affect mental health medication efficacy or safety. Ten percent of these were currently taking a psychiatric medication incongruent with their metabolism phenotypes, which may increase the likelihood of treatment failure or side-effects and may benefit from PGx-guided prescribing. As such, the PGx-GAP trial hypothesizes that PGx-guided prescribing will improve depression remission rates compared to GLAD-PC guided prescribing. Conclusion: Most adolescents seeking mental health services in Alberta have actionable genetic profiles relevant to antidepressant prescribing. The results of PGx-GAP are expected to inform decisions about the clinical implementation of PGx testing in adolescent depression.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 211
Presenter: Pooja Praveen Kumar
Supervisor: Lee, Cheng-Han
Title: Drug Repurposing Screen Identifies Digoxin and Doxorubicin as an Effective Anti-cancer Therapy for Dedifferentiated Endometrial and Ovarian Cancers
Authors: Pooja Praveen Kumar, James Key, DuPreez Smith, Guihua Zhang, Ashtalakshmi Ganapathysamy, He Dong, Vincent Maranda, Nelson Wong, Carol Ewanowich, Laura Hopkins, Andrew Freywald, Lynne Postovit, Martin Köbel, Frederick Vizeacoumar, Franco Vizeacoumar, Mark Carey, Yangxin Fu, Cheng-Han Lee

Theme: Lifelong women's health

Introduction: Dedifferentiated endometrial or ovarian carcinomas (DDEC/DDOC) characterized by switch/sucrose non-fermentable (SWI/SNF) complex inactivation are clinically aggressive types of upper gynecologic tract cancers that are defined by an undifferentiated phenotype. Currently, there are no effective systemic therapies for these cancers and their aggressive clinical course limits therapeutic advancement. To circumvent this clinical bottleneck, we developed biologically precise patient-derived in vitro (3D spheroids) and in vivo models of DDEC. As a first step, we subjected the DDEC models to a high-throughput drug repurposing screen with a central hypothesis that existing clinically utilized drugs might exhibit efficacy in inhibiting DDEC tumor growth. Methods: High-throughput drug repurposing screens were performed on the in vitro 3D spheroid models of two validated SWI/SNF-inactivated DDEC cell lines (DDEC-1 and DDEC-2) using an FDA-approved drug library which comprised of 1813 compounds. Top drug candidates were selected based on the significant B scores. We also evaluated selected candidate drugs on 3D spheroid models of other biologically and histologically similar SWI/SNF-inactivated tumor types of the gynecologic tract such as DDOC (DDOC-1, TOV-112D) and small cell carcinoma of the ovary, hypercalcemic type (SCCOHT) (BIN67). Results: Cell viability-based drug screens on the DDEC cell lines identified cardiac glycosides (digoxin and digitoxin) and anthracycline (doxorubicin) as top drug hits. In vitro dose-response analysis showed that DDEC cells are more sensitive to digoxin, digitoxin and doxorubicin compared to non-DDEC endometrial cancer cells. In vivo analyses on DDEC xenograft tumor models confirmed significant suppression on tumor growth by digoxin in DDEC-1 xenograft tumor ($p = 0.0163$) and DDEC-2 xenograft tumor ($p = 0.0046$) at clinically relevant serum concentrations. Preliminary in vivo analyses also suggest effective suppression on tumor growth in DDEC-1 and DDEC-2 xenograft tumors by doxorubicin. In the in vitro settings, DDOC and SCCOHT cells appeared to be comparably sensitive to digoxin and to doxorubicin by dose-response analysis as seen in DDEC cells and are more sensitive to digoxin and to doxorubicin than non-DDOC ovarian cancer cells. Conclusion: The findings here provide compelling preclinical evidence for the use of digoxin and doxorubicin (currently available clinically as second or latter-line treatment for advanced or recurrent endometrial cancer) as a systemic therapy for DDEC, and potentially for DDOC and SCCOHT. The insights gained here may be extended to other SWI/SNF-inactivated cancer types that exhibit an undifferentiated cellular phenotype. Moreover, our study underscores a potential paradigm for preclinical drug development by integrating targeted precision tumor model development with high-throughput drug screen, which is particularly applicable to uncommon yet clinically aggressive cancer types lacking effective systemic therapy at the present.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 214
Presenter: Kelsie Slater
Supervisor: Kotelnikova, Yuliya
Title: Risk for Child Psychopathology Across Development: The Role of Paternal Internalizing Symptoms and Child Self-Regulation
Authors: Slater, Kelsie & Kotelnikova, Yuliya

Theme: Children's health and wellbeing

Introduction. Increases in internalizing and externalizing symptoms during the transition from middle childhood to early adolescence highlight the need to understand factors conferring risk or resilience to advance early prevention and intervention efforts (Merikangas et al, 2010). To date, little is known about the impact of anxiety and depression in fathers on youth, though connections between mothers' depression and youth internalizing disorders are well documented (Wilson & Durbin, 2010). Further, deficits in children's self-regulation (SR) skills are also an important mechanism of risk for psychopathology. Comprising of top-down, volitional (inhibitory control, attention) and bottom-up, automatic (approach and avoidance) response tendencies, SR is a dynamic process in which children control emotions, behaviors, and cognitions (Nigg, 2017). It is unclear if child SR serves as a risk or protective factor for youth experiencing environmental risk associated with anxiety and depression in fathers. Accordingly, the goal of this study was to clarify risk conferred by paternal internalizing symptoms and child SR and to explore if interactions between these factors compound risk for later internalizing and externalizing symptoms in youth. Methods. We conducted analyses using longitudinal, multi-method, multi-informant data from 497 community-dwelling fathers and youth using Adolescent Brain and Cognitive Development Study data (ABCD Study®). At baseline (child-Mage = 9.94, SDage = .61; 60.4% boys), fathers reported their own internalizing symptoms on the Adult Self Report (ASR) and youth symptoms on the Child Behavior Checklist (CBCL; Achenbach, 2009). In years 2 and 3 (Mage = 11.47, SDage = .69; Mage = 12.41, SDage = .72), SR was indexed using the Emotional Word-Emotional Face Stroop (EWEFS; Başgöze et al., 2015), Little Man Task (LMT; Acker, 1982), Behavioral Inhibition/Behavioral Approach System Scale (BIS/BAS; Carver & White, 1994), Urgency, Premeditation, Perseverance, Sensation Seeking, Positive Urgency, Impulsive Behavior Scale for Children (UPPS; Cyders et al., 2007), and the Early Adolescence Temperament Questionnaire - Revised (EATQ-R; Ellis & Rothbart, 1999). The CBCL was again completed by fathers at year 4 (Mage = 13.64, SDage = .74). Results. Multiple regression analyses revealed that higher paternal internalizing symptoms and ineffective SR in youth predicted youth internalizing symptoms across time. These factors further interacted, demonstrating that youth experiencing familial risk due to paternal internalizing symptoms and ineffective SR skills were at a higher risk for internalizing symptoms. Paternal symptoms did not predict child externalizing symptoms, though poor SR consistently emerged as a salient risk factor. Conclusions. Early identification of psychopathology risk factors is crucial for timely prevention and intervention. We demonstrated that paternal anxiety and depression are salient risk factors for youth internalizing symptoms. Poor SR skills in children further compound risk for both internalizing and externalizing symptoms. These findings underscore the importance of including fathers in mental health interventions and highlight potential benefits of SR-focused interventions for youth entering adolescence.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 215
Presenter: Ben Magalnick
Supervisor: Bourque, Stephane
Title: Investigating the role of ferroptosis in neonatal sepsis-induced liver injury
Authors: Ben Magalnick, Si Ning Liu, Danny Shimatu, Kimberly Macala, Stephane Bourque

Theme: Children's health and wellbeing

Introduction: Late-onset-sepsis (LOS) is the dysregulated host response to an infection occurring in infants after 72 hours of life. Even with improved treatment, LOS continues to be a major contributor to morbidity and mortality in premature infants. Recently, ferroptosis was discovered to be an iron-dependent form of cell death driven by excess lipid peroxidation. During sepsis, the liver increases iron uptake and retention to limit iron availability to bacteria as an innate immune mechanism. Additionally, the liver is the main synthesis site and supplier of glutathione, a major antioxidant against lipid peroxidation, for the rest of the body. Given that the availability of total glutathione is severely downregulated, we hypothesized that ferroptosis is occurring in the septic liver, leading to hepatic dysfunction in the neonate. Methods: Three-day old Sprague Dawley pups received an intraperitoneal injection of either fecal slurry (FS, 1.0 mg/g body weight) or vehicle (5% dextrose). All pups immediately received buprenorphine for pain control, as well as antibiotics and fluids at 4h and 16h post-FS. Pups were euthanized at 8h and 24h, which represents the time period after sepsis induction in which most mortalities occur. Tissues were collected, flash frozen and crushed. RT-qPCR and Western blotting were performed to determine transcript and protein levels, respectively, of critical regulators of ferroptosis. Biochemical assays were used to measure plasma alanine aminotransferase activity, liver iron content, liver malondialdehyde (MDA) levels, and liver hydrogen peroxide levels. Lastly, liver metabolomics were assayed at the Southern Alberta Mass Spectrometry Core Facility at the University of Calgary. Results: FS caused 30% mortality in FS pups by 24h. Plasma alanine aminotransferase activity, a marker of liver stress, was upregulated by 6-fold ($P<0.0001$) by 24h. Total liver iron was increased at 24h, along with increased liver malondialdehyde levels, a by-product lipid peroxidation. At 8h after sepsis induction, hepatic glutathione and its precursors (glutamine and glutamate) were decreased, concomitant with increased hydrogen peroxide levels, suggesting the liver has impaired capacity to detoxify reactive oxygen species. Proteins involved in glutathione synthesis (i.e. system xC- transporter) were upregulated at the transcript level by 8h post-FS, and at the protein level at 24h post-FS, which coincided with normalized hepatic glutathione to levels at 24h. The increase in system xC- transporter expression appeared to be mediated by increased phosphorylation and subsequent nuclear translocation of the transcription factor STAT3 at 8h and 24h post-FS. Lastly, transcript and protein expression of ferroptosis suppressor protein (FSP1) are downregulated in the liver of FS pups at 24h. Conclusions: Despite normalization of hepatic glutathione levels by 24h post-FS, the increase in liver total iron, MDA levels, and downregulation of FSP1 in FS pups suggests ferroptosis may be occurring. However, whether ferroptosis is involved in sepsis-induced liver injury is still under investigation.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 216
Presenter: Elise Kammerer
Supervisor: Ali, Samina
Title: Pain experiences of equity-deserving children in the emergency department: results of a scoping review
Authors: Kammerer, Elise; Hartling, Lisa; Candelaria, Patricia; Basi, Calveen; Kaaihye, Sahra; Iliscupidez, Lexyn; Sapon, Lelanie; Zelyck, Zoe; Khangura, Jaspreet; Ladha, Tehseen; Mayan, Maria; Scott, Shannon D.; Bialy, Liza; Dennett, Liz; Ruzycki, Shannon; Ali, Samina

Theme: Children's health and wellbeing

Introduction Pain is often undertreated in North American emergency departments (EDs), where children often present with painful conditions and additionally receive painful procedures. Despite ample evidence on children's pain management, most does not consider how social determinants of health may impact children's experiences. Some literature has identified that children who experience marginalization through intersectional identities (i.e., race/ethnicity, gender, class, ability, age) are less likely to receive adequate pain management. The aim of this scoping review was to identify, map, and describe existing research on the pain experiences and treatment of equity-deserving children in the ED. Methods We followed Joanna Briggs Institute methodology for scoping reviews to answer the question: What is the extent and nature of research focused on the pain experiences and management of equity-deserving children in the ED? We searched MEDLINE, PsycINFO, CINAHL, Web of Science, iPortal, Native Health Database, and Cochrane Trials. The concept of marginalization was operationalized by employing Cochrane's PROGRESS-Plus criteria. PROGRESS refers to: place of residence, race/ethnicity/culture/language, occupation, gender/sex, religion, education, socioeconomic status, and social capital. Plus refers to: personal characteristics associated with discrimination (e.g., age, disability); features of relationships (e.g., smoking parents, excluded from school); and time-dependent relationships (e.g., respite care). Our team includes five partner researchers with lived experience of marginalization and pain. Partner researchers were involved in data selection, analysis, and interpretation of data under the International Association for Public Participation's "Collaborate" mode of participation. Results We identified 36 articles published since 2013 that analyzed equity-deserving children's Ed pain management. All included studies were conducted in the United States; 75% (n=27) were retrospective chart reviews. The most frequently reported demographic variables were child race/ethnicity (100%; n=36), age (97%; n=35), and gender/sex (94%; n=34). Only 22% (n=8) of studies reported the language spoken by patients and/or their caregivers. A child's socioeconomic status was reported in 64% of studies (n=23), most often with insurance status being used as proxy (n=20). Of note, no studies conducted analyses using intersectional aspects of children's identities, and none engaged patient partners on their study teams. Conclusion Few children's pain studies focus on the experiences of equity-deserving children. To improve all children's pain, future studies must first measure and report variables associated with structural inequities. Patient partners are integral to designing robust studies on this topic, and future research should include analyses on intersecting aspects of children's identities.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 217
Presenter: Ana Sofia Parra Sanchez
Supervisor: Pagliardini, Silvia
Title: The hypothalamus mediates the CO2-chemoreflex via etonogestrel in rats
Authors: Ana Sofia Parra Sanchez, Tara Janes, Silvia Cardani, Silvia Pagliardini

Theme: Lifelong women's health

Introduction: Breathing regulation in response to CO2 involves key brain structures such as the retrotrapezoid nucleus (RTN) and the hypothalamus. The female sex hormone progesterone and its synthetic analogs, such as etonogestrel (ETO), have been shown to enhance the ventilatory response to CO2, particularly in conditions where this reflex is impaired. Previous research, including our own studies, has demonstrated that systemic administration of ETO can restore CO2-chemoreflex function following RTN impairment, which is characteristic of disorders such as Congenital Central Hypoventilation Syndrome (CCHS). Given that women experience natural fluctuations in progesterone levels, understanding how these hormonal changes influence respiratory control is crucial. This study aims to determine if ETO delivered to the hypothalamus can enhance breathing in both healthy (non-lesion) and CO2-chemoreflex impaired (lesion) rats. The rationale for focusing on the hypothalamus is twofold: it plays a crucial role in the CO2 chemoreflex and expresses high levels of progesterone receptors. We hypothesize that ETO's action in the hypothalamus may not only address the unique developmental challenges faced by children with CCHS but also reveal potential sex-specific responses to treatment. Methods: We investigated the effects of ETO on respiration in adult female Sprague-Dawley rats. By focusing on female rats, we account for sex-specific differences that may influence the effectiveness of therapeutic interventions like ETO. We monitored respiratory changes via plethysmography before and throughout a four-week ETO infusion into the dorsomedial hypothalamus. Rats were fitted with cannulae connected to Alzet pumps delivering ETO (0.056 ng/µL) or a vehicle control. Additionally, a separate group of rats had their chemoreflexes impaired through RTN lesioning performed two weeks prior to the ETO infusion. Results: In healthy rats, unilateral ETO infusion into the hypothalamus modestly increased tidal volume during 5% and 7% CO2 exposure without affecting breathing frequency. Preliminary data from RTN-lesioned rats suggest that bilateral ETO infusion partially recovered chemoreflexes, as indicated by increased tidal volume under hypercapnic conditions. Conclusion: These findings suggest that the hypothalamus plays a role in CO2-chemoreflex regulation in both healthy and RTN-impaired rats. ETO's effects, possibly mediated via hypothalamic progesterone receptors, demonstrates its potential for treating hypoventilation syndromes like CCHS.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 218
Presenter: Zhiqian Jiang
Supervisor: Mager, Diana
Title: Dietary Counselling Using the Gluten Free Food Guide is Associated with Improvements in Diet Quality in Newly Diagnosed Children with Celiac Disease: Preliminary Results from a Randomized Controlled Trial
Authors: Zhiqian (Rita) Jiang, Dominica Gidrewicz, Margaret Marcon, Justine M Turner, Diana R Mager

Theme: Children's health and wellbeing

Introduction: Children with Celiac disease (CD) require a lifelong gluten-free diet (GFD), but this often results in suboptimal dietary quality (DQ). A Gluten-Free Food Guide (GFFG) was developed to address these nutritional concerns (Mager et al. Brit J Nutrition, 2023). This study compared the effect of dietary counselling using the GFFG with the standard of care vs standard of care (SOC) alone in improving DQ and GFD adherence in newly diagnosed children with CD. Methods: Child/adolescent-parent dyads were randomly assigned to either the SOC (n=20) or the intervention (INT) group (n=20; SOC + GFFG teaching). DQ [Healthy Eating Index-Canadian adaptation (HEI-C, score ≤ 80 diet needs improvement), Healthy Eating Food Index-2019 (HEFI-2019)] and ultra-processed food intake (UPF, NOVA classification) were assessed at baseline, 3 and 6 months. GFD adherence (self-reporting and dietary gluten intake) was measured using the validated methodologies. Results: Forty child-parent dyads (SOC: n=20, 10.2 ± 3.3 yrs, 15F/5M; INT n=20, 9.7 ± 2.9 yrs, 12F/8M) were enrolled, with no significant baseline group differences in sociodemographic, anthropometric, gluten intake and DQ ($p>0.05$). At baseline, both groups had a DQ score (HEIC) characterized as 'needs improvement' (SOC vs INT: 62.6±10.3 vs 64.7±9.6; $p>0.05$). At 3 months, the INT group, compared to SOC, showed significantly higher total HEIC score (SOC: 61.1±13.8 vs INT: 70.3±11.4, $P=0.03$), dietary adequacy (SOC: 35.6±9.8 vs INT: 41.6±7.7, $P=0.04$) and variety (SOC: 4.5±5.1 vs INT: 8.9±3.2, $P<0.01$), with increased milk and alternative consumption (SOC: 2.1±1.6 vs INT: 2.9±1, $P<0.01$) only. Dietary variety improved significantly within the INT group from baseline to 3 months (BL: 5.5±2.9 vs 3M: 8.9±3.2, $P<0.01$). UPFs constituted the largest portion of food intake and were similar between groups at study entry (SOC: 52.2% vs INT: 54.2%, $P>0.05$), with no significant changes over time. No significant differences were observed between groups over time in adherence to the GFD or gluten intake ($P>0.05$). Ongoing analysis to assess the impact of the GFFG on HRQOL, parental nutrition literacy, and changes to DQ as measured by other tools will be presented. Conclusion: Dietary counselling with the GFFG led to some modest short-term increases in total DQ, specifically variety, in children newly diagnosed with CD. Ongoing support by a registered dietitian is crucial for sustained dietary improvements and optimal health outcomes.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 219
Presenter: Wei Zhang
Supervisor: Davenport, Margie
Title: Theory-based interventions aimed at promoting physical activity in pregnant women: A systematic review and meta-analysis of randomized controlled trials
Authors: Wei Zhang; Rujia Zhao; Le Zhang; Margie H Davenport; Suwen Feng

Theme: Pregnancy and developmental trajectories

Introduction: Physical activity (PA) during pregnancy has significant benefits for maternal and neonatal health, yet most pregnant women do not meet the guideline-recommended levels of PA. Previous studies suggest that theory-based health behavior interventions are more effective than interventions without a theoretical basis and that constructing intervention programs based on theory may be an effective way to increase PA. However, the effects of theory-based interventions on PA in pregnant women and maternal and neonatal outcomes are unclear. The objectives were to assess (i) the quality of theory implementation, (ii) the application of behavior change techniques, and (iii) the effectiveness of theory-based interventions in promoting PA in pregnant women and improving maternal and neonatal outcomes. Methods: A systematic search was conducted across 8 databases (CINAHL, the Cochrane Library, EMBASE, MEDLINE, APA PsycINFO, PubMed, SPORTDiscus, and Web of Science) to identify randomized controlled trials published from database inception to 8 July 2023. The Cochrane risk-of-bias 2.0 tool was used to evaluate the quality of the included studies. The theory coding scheme was used to measure the quality of theory implementation, and behavior change techniques were coded according to behavior change taxonomy (version 1) (BCTTv1). The meta-analysis was performed using RevMan 5.3. The GRADE Approach was used to assess the certainty of evidence. Results: Eleven studies met the study criteria. Nine studies were based on one theory, while two studies were based on a combination of two theories. The quality of theory implementation was generally moderate. A total of 24 unique BCTs were extracted. The most commonly used types of BCTs were 'instruction on how to perform the behavior' (n = 9), 'goal setting' (behavior) (n = 8), 'action planning' (n = 7), and 'information about health consequences' (n = 7). Theory-based interventions significantly improved moderate-to-vigorous PA (standardized mean difference (SMD) = 0.17, 95 % confidence interval (CI) [0.04, 0.30], P = 0.01; moderate certainty of evidence), reduced the average gestational weight gain per week (mean difference (MD) = -0.06, 95 % CI [-0.11, -0.01], P = 0.02; moderate certainty of evidence), and decreased the incidence of gestational diabetes mellitus (risk ratio (RR) = 0.64, 95 % CI [0.46, 0.89], P = 0.008; high certainty of evidence). However, the effects of theory-based interventions on total PA, total gestational weight gain and the incidence of gestational hypertension and preterm delivery were unclear (P > 0.05). Conclusions: (i) Most of the studies exhibited a moderate level of theory implementation quality. (ii) The use of theories varies, but common BCTs were found across studies. (iii) Theory-based interventions can improve PA and maternal and neonatal outcomes and appear to be safe. Appropriate health behavior theories and BCTs should be fully utilized in future interventions.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 220
Presenter: Elenna LaPlante
Supervisor: Aubrey, Christa
Title: Assessing the efficacy of a multidisciplinary approach to maintenance oral therapy in patients with cancer of the ovary
Authors: Elenna LaPlante, Christa Aubrey

Theme: Lifelong women's health

Introduction: With the increasing complexity of cancer care in gynecologic oncology, the utilization of multidisciplinary clinics with coordinated efforts of healthcare professionals and allied health providers to provide high quality treatment and care of patients is necessary. Despite general support for the multidisciplinary approach, challenges persist in effectively implementing these programs. Recognized obstacles include defining roles, communication, hierarchical barriers, and disparities in decision-making participation. Our objective describe a formalized multidisciplinary approach to management of gynecologic oncology patients undergoing poly adenosine diphosphate-ribose polymerase (PARP) inhibitor maintenance therapy, and analyze demographic and patient specific outcomes and experiences. Methods: A retrospective case study of patients with high grade serous ovarian carcinoma who underwent PARP inhibitor maintenance therapy in Alberta. Data was collected through patient level chart review on a secure REDCap database. Patient demographics include age at diagnosis, co-morbidities, FIGO stage, BRCA status, and information regarding chemotherapy and surgery. Outcome specifics include PARPi treatment toxicity, duration and frequency of follow up visits. Comparison of demographic information, and outcome data of those followed in the multidisciplinary clinic at the Cross Cancer Institute in Edmonton, AB since its inception in October 2020 until January 2023 were compared to those who received their follow up at the Tom Baker Cancer Center in Calgary AB, in order to determine any patient level outcome differences of the dedicated multidisciplinary clinic model. Patients who underwent treatment through the PARPi virtual clinic were also eligible for a single semi-structured phone interview exploring their experience in the clinic. Interviews will to be audio recorded and transcribed verbatim, and analyzed in an inductive, iterative approach with content analysis. Results: Our study cohort includes 64 patients from Edmonton, treated at the Cross Cancer Institute, and 30 patients from Calgary, treated at the Tom Baker Cancer Centre. Of the Edmonton patients, 38 patients are eligible for a single semi-structure phone interview, as they were followed through the multidisciplinary PARPi virtual clinic. Of the 38 PARPi virtual clinic patients, 21 patients were on niraparib and 17 were on olaparib. Twelve were discontinued from niraparib and two were discontinued from olaparib because of recurrence/disease progression. Further analysis of patient demographics and outcome specifics, as well as qualitative interviews are to follow. Expected Outcomes/Benefits: Our objective is to report on quantitative information collected through our patient demographic and patient outcomes analysis and qualitative information from patient interviews. We also aim to highlight the framework utilized for a reproducible guide in developing a successful multidisciplinary program.

This research has been funded by the Alberta Women’s Health Foundation through the Women and Children’s Health Research Institute.

Participant #: 221
Presenter: Nikita Surani
Supervisor: Sharifzadeh-Amin, Maryam
Title: Integrating oral health in school-based health programs - Preliminary analysis from a scoping review
Authors: Nikita Surani, Harmanpreet Kaur, Arnaldo Perez-Garcia, Rebecca Gokiert, Maryam Amin

Theme: Children's health and wellbeing

Introduction: Poor oral health significantly affects children's overall wellbeing and academic performance, making schools pivotal in improving both health and educational outcomes. Integrating oral health into school-based programs offers a promising avenue for cost-effective and sustainable outcomes. This review aims to systematically map school health programs that include an oral health component to analyse their intervention model and the mechanisms through which this integration is achieved. Methods: A systematic search across six databases yielded 3,520 records, with 2,240 duplicates removed. Two independent reviewers screened titles and abstracts, resolving disagreements through discussions. Full text review and data extraction has been completed by one of the reviewers, while the second reviewer is still conducting full text reviews. Hence, results of this review are preliminary and are based on the full text review and data extraction completed by the first reviewer. Full text review of 241 papers resulted in 21 studies included for data extraction. Primary studies describing oral health intervention in elementary schools within broader health programs or addressing common risk factors such as diet, tobacco/alcohol use, hygiene, stress were considered, without restricting by year or geography. Letters, commentaries, perspective papers, abstracts, reviews, manuals, clinical interventions, thesis reports, non-English articles, and publications without full text were excluded. Results: Analysis of the 21 studies revealed interventions targeting common risk factors: unhealthy diet (12), poor hygiene (9), tobacco/alcohol use (4), and unsafe practices (2). Integration of oral health into school programs was achieved through curriculum (8 studies), policy (5 studies), supervised actions (4 studies), health education (3 studies), environment restructuring (3 studies), and others (2 studies). About 14 studies reported improvements in children's oral health knowledge and behaviors. Conclusion: Oral health interventions embedded within elementary school health programs primarily addressed unhealthy diet and poor hygiene. Integration methods include curriculum changes, policy adaptations, supervised activities, health education efforts, and environmental modifications. Future research should explore the broader impacts of integrated interventions on non-oral health outcomes, assess cost-effectiveness, and identify facilitators and barriers to successful integration.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 222
Presenter: Kainat Meherali
Supervisor: Hicks, Anne
Title: Adrenal Insufficiency Secondary to Inhaled Corticosteroids in Pediatric Patients with Asthma: A Systematic Review
Authors: Kainat Meherali, Corin MacPhail, Anne Hicks

Theme: Children's health and wellbeing

Introduction: Asthma, the most prevalent chronic condition in childhood, causes significant morbidity and mortality among children. Inhaled corticosteroids (ICS) have transformed treatment and greatly enhanced quality of life and health outcomes. While ICS are crucial in managing asthma, they come with potential risks; adrenal insufficiency (AI) due to adrenal suppression from ICS is a rare but potentially life-threatening side effect that is gaining recognition. Emerging data challenges previous safety assumptions, suggesting that certain types and doses of ICS, once considered safe, may carry a risk of AI. The main goal of this project is to contribute to the existing knowledge base on the effects of ICS use in children with asthma on AI. Study Design and Methods: This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines and registered with PROSPERO (CRD42024506057). MEDLINE and Embase databases were searched to identify studies that were designed to investigate ICS-related systemic adverse effects in people with asthma. Article inclusion criteria included: pediatric patients (ages 1-17), ICS use, asthma, and mention of AI. The exclusion criteria included not pediatric patients, not related to ICS use, not related to asthma, and no mention of AI. We included RCTs and cohort studies and we excluded commentaries and case studies. Review article reference lists were also screened to identify additional articles. Results: Of the 1086 articles identified for screening, 42 were duplicates and excluded. Of the remaining, abstract and title screening resulted in the exclusion of 596 articles for reasons related to the inclusion/exclusion criteria. Review article references were screened for additional articles, resulting in the identification of 490 for full-text screening. Full-text screening is currently underway for the 385 remaining articles. We will report the findings in the full manuscript. Conclusion: We are currently working on identifying articles discussing AI in children with asthma treated with ICS. ICS are the mainstay of treatment for asthma, which is diagnosed in up to 10% of Canadian children. Given the number of children exposed to ICS, relatively rare side effects like AI, which bears a risk of significant morbidity and possible mortality, become a significant concern; the Global Initiative for Asthma (GINA) guidelines have recently been changed to reflect this risk, recently prioritizing side effects over control in children with mild asthma. This study aims to rigorously describe AI risk factors and develop suggested characteristics to trigger AI screening in children using ICS to treat asthma. The study findings will be disseminated to the broader scientific and medical community through the development and submission of a manuscript to a journal focused on Respirology.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 223
Presenter: Weiying Chen
Supervisor: Lou, Edmond
Title: Validation of a 3D spinal reconstruction method using machine learning algorithm for ultrasonography - a phantom study
Authors: Weiying Chen, Marek Reformat, Edmond Lou

Theme: Children's health and wellbeing

INTRODUCTION: Approximately 3% of children have adolescent idiopathic scoliosis (AIS), which is a three-dimensional (3D) spinal disorder. 2D radiography is the most common method to assess and monitor the progression of AIS, but the frequent use of radiography increases the risk of cancer. Ultrasonography is a non-radiation imaging method that has been gradually adopted in some scoliosis clinics, offering similar 2D scoliosis measurements. However, the existing 3D ultrasound (US) spinal image reconstruction and display lack interpretability, limiting the popularity of using ultrasound. This phantom study aimed to develop a machine learning (ML) method to reconstruct interpretable 3D spinal images and evaluate the method's accuracy. METHOD: Data: Four 1-to-1 high resolution (0.1 mm accuracy) 3D-printed spine phantoms, including two single vertebrae (T8 and T11) and two spinal sections (straight: T2-T8 and curved: T4-T9) were used. A portable US scanner (C3HD, Clarius) with 4 MHz central frequency was used to scan the phantoms with an assisted mechanical frame. The frame controlled the US scanner moving in a linear 0.5 mm step to acquire B-scan images. ML Algorithms: After acquiring a series of B-scan US images, the anatomical vertebral structures were semi-automatically segmented using the Segment Anything Model (SAM). Five landmarks, 2 endpoints on the edges, 2 laminae, and the spinous process, were identified. These landmarks were transformed into 3D space on each 2D slice based on the linear position. The registration was then performed with the multilayer perceptron, an ML method, to minimize the distance between the 3D landmarks from the US images and a predefined deformable vertebral model. The tilt angles of the paired laminae at each vertebral level were compared between the digital files and the reconstructed images. Assessment: The surface smoothness and continuity were evaluated by the visualization of the 3D spine. A difference map of the surface was performed to evaluate the accuracy of the shape. In addition, these reconstructed images were compared to the digital files using a) Chamfer Distance (CD ± SD), a metric measuring the similarity, and b) the mean absolute differences with standard deviation (MAD ± SD) of the measured tilt angles. The runtime of 3D reconstruction was also reported. RESULT: The visualization results indicated that the reconstructed surfaces exhibit good smoothness and continuity, and the difference map showed minimal discrepancies between the referenced and reconstructed shapes. For T8, the developed method achieved a small shape difference (CD: 2.46 ± 2.98 mm) and a low angular deviation (MAD: 0.51 ± 0.84°) in 17.3 seconds. T11 produced a CD of 2.51 ± 1.45 mm and a MAD of 0.56 ± 0.57°, with 16.5 seconds. For the T2-T8 section, the method yielded a CD of 3.46 ± 2.98 mm and a MAD of 1.37 ± 1.83° with 137.9 seconds. The T4-T9 section resulted in a CD of 3.73 ± 3.81 mm and a MAD of 2.76 ± 2.39°, with 152.2 seconds. CONCLUSION: This study validated a new 3D reconstruction method for US images with interpretable visualization results. Although the 3D reconstruction took approximately 3 minutes for 6 vertebrae, the results were promising. Validations for in-vivo data will be conducted in the next step.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 225
Presenter: Aida Mohammadabadi
Supervisor: Sharifzadeh-Amin, Maryam
Title: Analyzing Comorbidities between Children's Oral Health and Non-Communicable Diseases Using Natural Language Processing
Authors: Aida Mohammadabadi, Khaled Altabtbaei, Babak Bohlouli, Tahereh Firoozi, Maryam Amin

Theme: Children's health and wellbeing

Introduction: Oral health is a crucial aspect of children's well-being and quality of life. Despite being preventable, dental caries remains the most common chronic childhood disease. Recent evidence shows that children with non-communicable diseases (NCDs) exhibit higher rates of oral diseases, yet current studies yield inconsistent results. This study aims to systematically analyse patterns of comorbidities between oral health and non-communicable diseases and to enhance the understanding of the interplay between oral health and NCDs in children, facilitating more effective prevention and management strategies within integrated healthcare approaches. Objectives: To assess the prevalence of non-communicable diseases (NCDs) among pediatric dental patients and their association with oral health outcomes, to evaluate the accuracy of parental-reported medical histories in dental records by comparing them with physician-confirmed diagnoses from medical records, and to explore the relationship between systemic health conditions and oral health outcomes using Natural Language Processing (NLP) models to identify potential comorbidities and predictive factors. Methods: This research is a population-based retrospective cohort study utilizing data from children aged 5-16 years who were registered in axiUm, a dental practice management software, at the University of Alberta Dental Clinic from 2013 to 2024. The dental records will be linked with Alberta Health Services (AHS) databases using children's Personal Health Numbers (PHNs). The oral health outcomes will include: decayed and filled surfaces (DFs/dfs), percentage of caries-free children, caries risk assessment, and plaque index. NCDs will be identified using ICD-9 and ICD-10 codes within one year preceding the initial dental visit. Oral health outcomes will be assessed using standardized indices, while NCDs will be determined through physician-confirmed diagnoses in AHS databases. The data will be analyzed using logistic regression models, with additional NLP models applied to explore and predict the relationships between systemic health conditions and oral health outcomes. Significance and Implications: This study addresses the gap in interconnected data analysis between medical and dental fields, with a focus on pediatric populations. The use of NLP techniques is expected to reveal hidden variables and relationships that could lead to early detection and personalized management of comorbidities. Limitations include the reliance on retrospective data. However, the findings could significantly impact clinical practices, offering a more integrated approach to pediatric healthcare. This research will contribute to the field by providing new insights into the comorbidities between NCDs and oral health, potentially improving diagnostic accuracy and treatment planning. The study's novel application of NLP in healthcare data analysis represents an innovative step forward in understanding and managing pediatric health outcomes.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 226
Presenter: Brooke Hebert
Supervisor: Nagpal, Taniya
Title: Evaluating online comments perceived as appropriate or inappropriate to say about pregnant bodies.
Authors: Brooke J. Hebert & Taniya S. Nagpal

Theme: Pregnancy and developmental trajectories

Introduction Public perceptions surrounding ideal pregnant bodies, often described as small with limited weight gain, may perpetuate weight stigmatizing views and subject pregnant individuals to inappropriate or unwanted comments about their bodies. Experiencing weight stigma in pregnancy, such as receiving unwarranted comments about physical appearance, is associated with poor mental health outcomes. This study aimed to explore public perceptions regarding comments that would be deemed acceptable or unacceptable to say to a pregnant person about their body. Methods English-language opinion blogs were gathered through a Google search. A search strategy was developed using the automatic commonly searched phrases suggested by Google for appropriate and inappropriate things to say during pregnancy. A content analysis was performed on the identified comments. Authors of blogs were assessed and their biographies were analyzed for diversity factors including sex, and credentials. Results 7 opinion articles were identified for appropriate comments, and 7 for inappropriate comments. 32 appropriate comments were assessed, of which 50% suggested complementing one's appearance including 21.9% suggesting it is okay to comment on weight when it is just in the abdominal region or suggesting "not looking pregnant". 111 comments were identified as 'inappropriate' and content analysis findings revealed that most suggest it is not okay to make comments about weight (41.4%). The authors of all of the blogs were mostly female and did not report credentials. Conclusion The results of the content analysis suggest weight-related comments in pregnancy are mostly deemed inappropriate, unless you are commenting on limited weight gain or overall complementing one's appearance. These contradictory findings underscore that weight stigmatizing views in pregnancy are persistent. Future directions may include intervening at a public education level to dismantle weight stigmatizing perceptions in pregnancy.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 227
Presenter: Elizabeth Ziming Yan
Supervisor: Livingston, Joel
Title: Early Resolution of Neonatal and Infant Venous Thrombi: A Retrospective Review from the Stollery Children's Hospital from 2003 to 2013
Authors: Elizabeth Yan MD, Mary Baumann RN MN, Leanne Meakins RN MN, Aisha Bruce MD, Joel Livingston MSc, MD, FRCPC

Theme: Children's health and wellbeing

Introduction Neonates/infants who develop venous thromboembolism (VTE) are often treated with anticoagulation for up to 3 months. However, anticoagulation is not without risk, and anticoagulating for the shortest duration to achieve clot resolution would be optimal. Previous studies suggest shorter courses of anticoagulation (i.e., ≤6weeks) are sufficient for thrombus resolution in children. Due to differences in developmental hemostasis, neonates/infants may require even shorter therapy. Therefore, standard practice for KidClot/Stollery Children's Hospital since 2003 has been to re-image patients aged ≤90day within 2 weeks of starting anticoagulation for VTE. Objective To review rates of thrombus resolution at 2 weeks in neonates/infants (age ≤90days) treated by KidClot/Stollery Children's Hospital. Methods A retrospective review of patients aged ≤90 days with VTE treated by KidClot from Jan. 2003-Dec. 2013 was conducted. Data was extracted for patients with ≥1 VTE and started on anticoagulation therapy. Patients without follow-up imaging onsite (e.g., transferred to another hospital/jurisdiction) and those with solely arterial, superficial vein, portal vein and/or renal vein thrombi were excluded. Data on patient age, provoking factor(s), anticoagulation type(s), thrombus size/location was collected. Outcomes included thrombus resolution on imaging and long-term recurrence on up to 10-years post-therapy. Results Out of the total 70 clots, 48.6% had full resolution, 24.3% had partial resolution, 27.1% displayed no change. After 2 weeks of anticoagulation, 9.1% (3/33) of the 31 to 90-day olds and 21.6% (8/37) of the ≤ 30-day neonates had full thrombus resolution. After 3 months of anticoagulation, 42.4% (14/33) resolved in the 31-90 days population while 43.2% (16/37) resolved in the ≤30 days subpopulation. Sub-analysis based on provoking factors, site of VTE, and rate of recurrence up to 10 years post-therapy were also examined. Conclusion Results suggest a high rate (>20%) of VTE improvement within 2 weeks of anticoagulation therapy for patients aged ≤ 30 days. While further study is needed, early follow-up imaging and cessation of anticoagulation may be warranted in this age group to reduce risks of anticoagulation.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 228
Presenter: Navdeep Badhan
Supervisor: Bourque, Stephane
Title: Maternal iron deficiency anemia impacts placental vascular remodeling and alters antioxidant defence and iron transport in hypertensive pregnancies
Authors: Navdeep Badhan, Jad-Julian Rachid, Stephane Bourque

Theme: Pregnancy and developmental trajectories

Introduction: Maternal iron deficiency (ID) anemia is a major risk factor for adverse pregnancy outcomes, particularly in hypertensive disorders of pregnancy (HDP). The placenta, a highly vascularized organ, is crucial for mediating maternal-fetal exchange, ensuring delivery of essential nutrients to the developing fetus. During ID anemia, low iron levels can lead to adverse sequelae that compromise placental function, including increased oxidative stress and reduced nutrient transport to fetus. Given that HDP alone is associated with placental dysfunction, studying the impact of ID is essential to understand whether superimposition of these health complications exacerbates adverse pregnancy outcomes. This study investigates the effects of maternal ID on placental structure, antioxidant defence, iron transport, and vascular remodeling in both spontaneously hypertensive rats (SHR) and normotensive Wistar-Kyoto (WKY) rats, providing insight into how placental adaptations may differ. Methods: Four weeks prior to breeding, female WKY and SHR rats were fed either an iron-restricted (3 mg/kg) or iron-replete (37 mg/kg) diet. After this period, they were bred with strain- and age-matched males and maintained on their respective diets throughout gestation. On gestational day 21, dams were euthanized, and placental tissues were excised and flash-frozen for gene expression analysis via RT-qPCR. Matrix metalloproteases (MMPs) enzymatic activity was measured by gelatin zymography, and collagen deposition was assessed by picrosirius red (PSR) staining. Data was analyzed using two-way ANOVA with Holm-Sidak post hoc testing. Results: Maternal iron restriction reduced fetal hemoglobin levels in both ID-WKY (-60%; $P<0.001$) and ID-SHR groups (-40%; $P<0.001$). Placental weight increased in response to ID, with a 13% increase in WKY and 10% increase in SHR ($P=0.0005$), suggesting adaptive remodelling to enhance placental capacity. MMP2 and MMP9 activities were elevated in ID groups ($P=0.009$ and $P=0.03$, respectively), indicative of increased extracellular matrix remodeling. PSR staining revealed higher levels of collagen deposition in the SHR groups ($P=0.011$), but there was not an ID effect. Placental expression of vascular endothelial growth factor A (Vegfa) was upregulated within ID-WKY (+8%; $P=0.59$) and ID-SHR placentas (+17%; $P=0.04$), suggesting enhanced angiogenesis in response to ID. Iron transport genes were significantly altered with ID, where DMT1 (Slc11a2) was upregulated ($P=0.034$) and hepcidin (Hamp1) was downregulated ($P=0.035$). Notably, in SHR placenta, ferritin heavy chain 1 (Fth1), the primary storage protein, was reduced, while Ferroportin (Slc40a1), an iron export protein, was upregulated ($P=0.007$ and $P=0.03$, respectively), irrespective of iron status. Antioxidant gene expression was also affected by rat strain, with catalase (Cat) levels increased ($P=0.002$) and superoxide dismutase 1 (Sod1) expression decreased ($P=0.04$) in SHR compared to WKY, irrespective of iron status. Conclusions: Maternal ID anemia is associated with placental changes that may involve vascular remodeling and altered iron transport to the fetus. Distinct strain-specific responses suggest the placenta responds to ID differently in normotensive and hypertensive pregnancies.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 229
Presenter: Jasmine Kowalewski
Supervisor: Tremblay, Melissa
Title: Activism as a culturally grounded intervention for enhancing Indigenous youth's mental health
Authors: Kowalewski, J., Tremblay, & M., Auger, C.

Theme: Children's health and wellbeing

Introduction In Canada, Indigenous youth experience higher rates of adverse mental health conditions compared to their non-Indigenous peers, which is rooted in colonialism and historical trauma. These unique challenges have led researchers to call for specific interventions that address historical trauma to alleviate mental health symptoms and facilitate cultural reclamation. A specific form of historical trauma that is rooted in colonialism is the overrepresentation of murdered and missing Indigenous women and girls (MMIWG), which has negatively impacted Indigenous peoples, including their mental health. In response to the MMIWG crisis, Indigenous peoples have engaged in various forms of activism, including the MMIWG March. This form of activism has been healing for participants. However, there is no research examining the impact of the MMIWG crisis and March on the mental health of Indigenous youth. The objective of the current study is to (1) explore the impact of the MMIWG crisis on Indigenous youth, including their mental health, from the perspectives of the youth themselves and (2) begin to understand how the MMIWG March might function as a culturally grounded intervention that addresses historical trauma. Methods Guided by Indigenous methodologies and a community-based participatory approach, the research involved equitable partnerships with community members. Participants were recruited from a local Edmonton high school that annually attends the MMIWG March and represents the community partner for this study. Participants included students (n=8) who participated at the 2023 MMIWG March and self-identified as Indigenous. After the March, a blending of a Western focus group and an Indigenous sharing circle was held at the school. The discussion was audio recorded, transcribed, and analyzed using thematic analysis, with participants aiding the analysis to ensure cultural appropriateness and accuracy. The thematic analysis involved organizing, coding, and translating the data into themes. Results Four major themes emerged from the discussions: (1) Importance of Acknowledgment and Awareness, (2) Systems of Power and Influence, (3) Historical and Ongoing Injustices, and (4) Resiliency and Healing. The MMIWG crisis significantly impacts Indigenous youth, manifesting through historical trauma and resiliency. Participation in the MMIWG March acted as an intervention by fostering personal growth, facilitating protective factors, and contributing to changes associated with post-traumatic growth. Additionally, the youth shared potential actions to respond to the crisis, emphasizing the importance of systemic change, enhanced awareness, and community support. Conclusions This study is among the first to explore the therapeutic potential of activism within the MMIWG movement for Indigenous youth. The findings highlight the importance of culturally grounded interventions in promoting mental health and resilience. The MMIWG March not only serves as a form of advocacy but also as a means of fostering personal and communal healing, challenging the deficit-based narratives.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 231
Presenter: Sophie Lalonde-Bester
Supervisor: Vine, Donna
Title: Prevalence and types of eating disorders in females with and without polycystic ovary syndrome: a cross-sectional study
Authors: Sophie Lalonde-Bester, Beate Sydora, and Donna Vine

Theme: Lifelong women's health

Introduction: Polycystic ovary syndrome (PCOS) is the most common endocrine-metabolic disorder in females affecting quality of life and health across the lifespan. Eating disorders (ED) are psychiatric conditions associated with anxiety, depression and altered body image, that may contribute to co-morbidities such obesity, metabolic syndrome, and type 2 diabetes risk. ED have been reported to be increased in PCOS compared to controls, but there remain limited studies on the prevalence of different types of ED, particularly in Canada, in those with and without PCOS. The primary objective of this study is to develop and validate an ED screening survey, and to conduct a case-control cross-sectional study to determine the prevalence of different types of ED in those with and without PCOS in Alberta. It is hypothesized that there will be a higher prevalence of ED, particularly bulimia nervosa and binge eating disorder, in those with PCOS compared to age-, sex-, and BMI-matched controls. Methods: A questionnaire was developed based on a scoping review from our laboratory using validated questionnaires including the Eating Disorder Examination-Questionnaire (EDE-Q) and the Night Eating Questionnaire (NEQ). Questions also asked about eating behaviours and habits, body image, health status, medications, PCOS diagnosis, ED diagnosis, and anthropometrics. The complete survey was established in REDCap and piloted and reviewed by health-care professionals (n =2) and PCOS patient partners (n=3). Results: The survey was implemented, and recruitment is ongoing with 245 participants recruited to date. Confirmation of a PCOS diagnosis was completed in 34.7% (n=85) and there are 65.3% (n=160) controls that will be age- and BMI- matched. The anticipated results will explore the prevalence and specific types of EDs in individuals with PCOS compared to controls, and associations with body weight and other co-morbidities. Conclusion: The outcomes of this research will contribute to a better understanding of ED prevalence and types of ED in those with and without PCOS in Canada. There is future potential to develop the survey as a screening tool in the health-care system to facilitate identification of ED for treatment and management to improve the health and quality of life of those with and without PCOS.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 233
Presenter: Xiaoying Wu
Supervisor: Vine, Donna
Title: Increasing Risk of Atherosclerotic Vascular Disease in High-Risk Young Women with and without Polycystic Ovary Syndrome
Authors: Xiaoying Wu, Jesse Batara, Mahua Ghosh, Paolo Raggi, Harald Becher, Donna Vine

Theme: Lifelong women's health

Introduction: Polycystic Ovary Syndrome (PCOS) is associated with increased cardiometabolic risk factors and incidence of cardiovascular disease (CVD). Currently, early screening of dyslipidemia, atherosclerotic CVD (ACVD) and cardiac function are not routine in the primary care of high-risk young females with and without PCOS. The aim of this study was to provide evidence-based research to aid the development of assessment guidelines for early detection of dyslipidaemia, cardiac dysfunction and ACVD in high-risk young women with and without PCOS. Methods: A case-control study in high-cardiometabolic risk (body mass index (BMI>25) females aged 25-45 years with and without PCOS, matched for age-BMI, and healthy weight controls was conducted. Outcome measures included blood lipids, apoB-lipoproteins, carotid intima media thickness (cIMT), carotid plaque height and cardiac function using ultrasound and 2D/3D echocardiography. Results: High-risk females with (n=45) and without PCOS (n=20) had 25% lower HDL-cholesterol (C), 25% higher total apolipoprotein (apo)-B, 30% higher apo-B48, 30% higher non-HDL-C, >50% higher triglycerides (TG) and remnant-C in the fasted state compared to healthy-weight controls (n=10). The PCOS group had an additional 25% higher TG and remnant-C in the fasted and non-fasted state compared to non-PCOS controls. cIMT was increased by 15% in those with and without PCOS, and carotid plaque height was increased 30% (0.40 mm) in PCOS compared non-PCOS and healthy-weight controls (0.25mm). Age, diastolic blood pressure and total ApoB were highly associated with cIMT, and total apoB predicted 12% and 14% of the variability in cIMT and carotid plaque height, respectively. The PCOS and non-PCOS control groups had a 20% increase in systolic and diastolic blood pressure and left ventricular (LV) hypertrophic indices including mass index and posterior wall thickness, and a 5% lower LV global longitudinal strain, compared to healthy-weight controls. The PCOS group had higher re-stratification of scores for 10yr-CVD and atherosclerotic risk compared to non-PCOS and healthy-weight control groups. Conclusion: High-risk PCOS and non-PCOS controls have impairment in atherogenic apoB-TG lipoprotein and remnant-C metabolism, and these are exacerbated in those with PCOS. Apo-B dyslipidemia was positively associated with ACVD indices. Early screening for apoB-dyslipidemia, ACVD and cardiac hypertrophy may be warranted and could be used to develop a risk re-stratification model to inform prevention and intervention guidelines in high-risk young females with and without PCOS.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 234
Presenter: Karla Manzanet Freyre
Supervisor: Tan, Qiumin
Title: Investigating the role of PD-L1 in Cajal-Retzius neurons
Authors: Karla Manzanet Freyre, Rebekah van Bruggen, Abdul-Samad Olagunju, Qiumin Tan

Theme: Children's health and wellbeing

Introduction: Cajal-Retzius (CR) cells are transient neurons involved in embryonic and early postnatal brain development mainly by expressing the glycoprotein reelin. During early postnatal development, the number of CR cells is reduced drastically. However, a proportion of these cells persist in the hippocampus, a brain region important for learning, memory and seizure susceptibility. The function of hippocampal CR cells in the postnatal brain remains largely unknown. We recently found that Cajal-Retzius cells are the only cells expressing the programmed cell death ligand 1 (PD-L1) in the brain under physiological conditions. PD-L1 and its receptor PD1 form an immune inhibitory checkpoint involved in auto-tolerance, immune evasion, and neuroinflammation. Although this inhibitory pathway has been wildly studied in conditions such as cancer, new evidence points to a role in neuroinflammation and cognition. Here, we investigate the role of Cajal-Retzius cell-derived PD-L1 in the developing hippocampus. Methods: We selectively deleted PD-L1 in CR cells using the Cre-lox system. To evaluate the impact of PD-L1 knockout on PD1-expressing cells in the brain, we performed immunofluorescence studies and confocal microscopy to examine microglia, astrocytes, and perivascular macrophages populations in the hippocampus. Finally, we assessed cognitive function in knockout mice with PD-L1 deletion in CR cells. The fear conditioning paradigm was used to evaluate episodic-emotional memory and learning, which relies on hippocampal function. Results: PD-L1 was deleted from all hippocampal CR cells in the conditional knockout mice. The number of microglia and astrocytes was not significantly altered among the experimental groups. Interestingly, we found an increased number of perivascular macrophages in the knockout mice. In the fear conditioning test, the PD-L1 knockout mice behaved similarly to control mice in the context and the cue tests Conclusion: Our study demonstrates that CR cells uniquely express PD-L1 in the hippocampus under physiological conditions. Although PD-L1 deletion from Cajal-Retzius cells does not appear to cause obvious cellular or behavioral alterations, this study opens a new venue for the involvement of CR cells in the development of the brain immunological system. Future studies will explore the role of CR cell-derived PD-L1 in early postnatal development and under pathological conditions.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 236
Presenter: Sarah Beeby
Supervisor: Pei, Jacqueline
Title: Navigating aggression: Knowledge translation to support healthy outcomes in youth with Fetal Alcohol Spectrum Disorder
Authors: Beeby, S. E., Joseph, J. J., & Pei, J.

Theme: Children's health and wellbeing

Introduction Aggressive behaviour is a leading cause of youth psychiatric referrals and is linked to poor health outcomes for children and their families, causing significant stress for caregivers. Fetal alcohol spectrum disorder (FASD) is a neurodevelopmental disorder resulting from prenatal alcohol exposure, which causes impairments in brain structure and function. These brain-based vulnerabilities are associated with an increased likelihood of aggressive behaviour. Caregivers of children with FASD need support in understanding and responding to these brain-based differences to foster healthy outcomes. There are gaps in FASD-informed perspectives on youth aggression, prompting two key questions: 1) What brain-based vulnerabilities in FASD are associated with aggressive behaviour? and 2) What are caregivers' needs when it comes to feeling supported in navigating aggressive behaviour in their child with FASD? Method To address the first question, I conducted a literature review on neural structures and cognitive functions tied to aggression in youth with FASD. For the second question, I met with a panel of caregivers to explore their experiences and learn what they felt people should know about aggression in FASD. Results Several brain-based vulnerabilities contribute to the increased risk of aggression in youth with FASD. Prenatal alcohol exposure affects the development of brain regions involved in executive functioning and self-regulation, which are functions implicated in aggressive behaviours. Caregivers identified multiple barriers to addressing aggression, including stigma and a lack of FASD-informed support. Caregivers expressed additional challenges due to safety concerns and emphasized the need for trauma-informed care. Finally, caregivers requested researchers invest in knowledge translation to facilitate communication with support systems about brain-based vulnerabilities as they work towards healthy outcomes for their children. In response, I co-hosted a webinar for the Canadian FASD Research Network on conceptualizing and responding to aggressive behaviour in FASD. Additionally, I created a brochure to convey the key messages caregivers want others to understand about aggression in their children with FASD. Future meetings with caregivers will evaluate the impact of this knowledge translation resource. Conclusion Effective support for youth with FASD and their families navigating aggressive behaviour must incorporate an understanding of brain-based vulnerabilities in FASD alongside addressing stigma and safety concerns. Support grounded in empathy and knowledge is crucial for promoting healthier outcomes for these youth. Feedback from caregivers will guide future adaptations to the brochure. If effective, it would be a tool that promotes FASD-informed conversations about aggression among those who support youth with FASD. Future interventions for aggressive behaviour should also consider brain-based vulnerabilities to increase the chance they will be effective for youth with FASD and their families.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 237
Presenter: Rebecca Liedtke
Supervisor: Ali, Samina
Title: The IMAGINE Survey: Child and family preferences for distraction modalities to reduce procedural pain and distress in the emergency department
Authors: Liedtke, Rebecca; Kammerer, Elise; Trottier, Evelyne D.; Poonai, Naveen; Gattuso, Kaitlen; Ali, Samina

Theme: Children's health and wellbeing

Introduction Medical procedures such as venipuncture and intravenous cannulation (IVI) are common in the emergency department (ED) and cause significant pain and distress for children. There are numerous simple and proven ways to improve children's pain and distress experiences, such as using numbing cream, comfort positioning, or distraction. Distraction may take many forms, can be active or passive, and can employ digital or nondigital tools. In current research, the reported differences in effect size between different potential distractors is small. Thus, patient preference must be considered when implementing or testing a distraction tool. Our project aims to determine which distraction tools children and their families prefer in the ED. Methods This was a descriptive, cross-sectional survey completed by children and caregivers in three pediatric EDs (Stollery Children's Hospital in Edmonton, AB; Children's Hospital in London Health Sciences Centre in London, ON; and CHU Ste. Justine in Montreal, QC). We sought child and caregiver preferences regarding evidence-based distraction modalities including, but not limited to, iPads, bubbles, humanoid robots, seek and find posters, and virtual reality (VR). Survey development followed Burns' methodology with a panel of experts in procedural pain, emergency medicine, quality improvement, and lived experience. Research assistants approached caregivers in the waiting room, and interested families scanned a laminated QR code to access the electronic survey on their own smart device. An iPad was available for families who did not have access to a smartphone. All questions were optional, which led to a variation in response rates for each question. Results 742 surveys were completed across all sites. 78.7% (554/704) of caregiver respondents were mothers. Caregivers' mean age was 38.6 years (SD 7.6). The mean age of patients was 7.4 years (SD 4.8), and 47.2% (335/709) of children were female. Most children (84.2%; 598/710) had been to the ED before, and 52.7% (372/706) previously had bloodwork or IVI. Caregivers' top distraction choices for their child during IVI included tablet (34.5%; 241/698), smartphone (16.2%; 113/698), and VR goggles (16.2%; 113/698). Children's top distraction choices for IVI were the same: tablet (27.4%; 144/525), smartphone (17.1%; 90/525), and VR goggles (15.8%; 83/525). We are currently conducting regression analyses to determine whether top distraction choice varied by child/caregiver age, gender, previous ED experience, and previous venipuncture experience. We will present these analyses at WCHRI Research Day. Conclusion Both caregivers and children had a strong preference for digital distractors compared to non-digital ones. We hypothesize that caregivers and children were more likely to choose distractors they had either used in the past or were more familiar with. Further qualitative research is needed to understand why some distractors are preferred over others.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 238
Presenter: Shahzaib Ahmed
Supervisor: Wine, Eytan
Title: Predicting when a pediatric Crohn disease patient will most likely require bowel resection surgery
Authors: Shahzaib Ahmed, Ricardo G. Suarez Suarez, Hein Huynh, Anne Griffiths, Ayub Shaikh, Anthony Otley, Kevan Jacobson, Mary Sherlock, Colette Deslandres, Wael El-Matary, Jennifer deBruyn, Thomas Walters, Eytan Wine

Theme: Children's health and wellbeing

Introduction: Pediatric Crohn disease (pCD) patients often experience a more complicated disease course compared to adults, with a higher likelihood of requiring intestinal resection surgery. This study aims to develop a novel prediction tool to estimate the likelihood and timing of bowel resection surgery in pCD patients. By generating individual survival time distributions (ISD), clinicians can be provided with a probability distribution indicating the likelihood of surgery at specific time points after diagnosis, aiding in personalized treatment planning. Methods: This study utilized data from The Canadian Children Inflammatory Bowel Disease Network (CIDsCANN), which prospectively follows new pediatric IBD cases across 11 centers in Canada until they transition to adult services (>18 years). The cohort included 934 pCD patients, with 58 undergoing surgery, while the remaining 876 either did not require surgery by the study's end, transitioned to adult care, or were lost to follow-up. Surgeries included bowel resections for stricturing or penetrating disease, excluding perianal surgery and appendicitis-related procedures. Clinical, laboratory, and treatment data were compiled into three datasets: baseline, induction (baseline + 10 weeks follow-up data), and longitudinal (baseline + 3 equally spaced follow-up visits with all treatment data). Feature selection was performed using minimum-Redundancy-Maximum-Relevance (mRMR). Cox Proportional Hazards and Random Survival Forest were used and validated internally and externally to determine optimal performance, measured by the Integrated Brier Score and Concordance Index. Results: The Cox Proportional Hazards model performed best on the baseline (22 features, alpha = 1.0) and longitudinal datasets (110 features, alpha = 0.1), while the Random Survival Forest model (55 features, 30 estimators, max depth = 10) was optimal for the induction dataset. The respective performance metrics for the baseline, induction, and longitudinal datasets are IBS: 0.06 C-Index: 0.90, IBS: 0.01 C-Index: 0.96, and IBS: 0.07 C-Index: 0.84. In each of the three models, the features that are most informative for prediction of surgery included stricturing behavior, penetrating behavior, mid luminal disease distribution, and distal bowel involvement Conclusions: ISDs offer a more precise prediction method for assessing the likelihood of pCD patients requiring intestinal resection surgery than traditional population-based models like the Kaplan-Meier curve. The selected models and hyperparameters demonstrated high accuracy, as indicated by their performance metrics. Even with limited data, ISDs provide reliable prognoses, potentially leading to improved, personalized treatment plans for pediatric patients.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 239
Presenter: Christine Hyde
Supervisor: Lebeuf, Simone
Title: The impact of Balint groups on resident well-being and patient care in pediatric resident physicians at the University of Alberta
Authors: Simone Lebeuf MD, Principal Investigator Co-investigators: Jessica L. Foulds MD Chris Gerdung MD Christine Hyde MD

Theme: Children's health and wellbeing

INTRODUCTION Physician burnout is a well-recognized phenomenon affecting the quality of patient care, with resident physicians at particularly high risk of burnout-associated decreases in professionalism. Balint groups offer structured discussions led by trained facilitators to address challenging patient cases. Residency programs have begun to use these groups to enhance learner well-being and patient care. This study examines the effect of Balint groups on pediatric residents' well-being and patient interactions at the University of Alberta, utilizing the Psychological Medicine Inventory (PMI) and the Resident and Fellow Well-Being Index (RWBI). METHODS Eligible pediatric residents at the University of Alberta completed the PMI and RWBI before and at two points after the introduction of Balint groups during the 2022-2023 academic years. A pre-test post-test design allowed all residents to participate. Groups were supported by a trained facilitator and stratified by residency year. Surveys were administered via RedCAP. The Psychological Medicine Inventory (PMI) is a series of 9 point rating scales measuring interest and self-reported efficacy in the psychological aspects of patient care. It is a validated tool which has been used in other studies evaluating the effects of Balint training. The Resident and Fellow Well-Being Index (RWBI) was developed at the Mayo Clinic and is a validated screening tool evaluating distress across several dimensions. The RWBI questions are answered using a simple yes/no with summary scores on the 7-item index ranging from 0 (lowest risk) to 7 (highest risk). After the intervention, participants were asked to participate in a narrative survey to collect their reflections on their unique experiences in the Balint Groups. RESULTS Mean PMI scores increased from 6.5 (n=20, SD 0.9) pre-intervention to 6.8 (n=15, SD 0.9) at mid-point, indicating a small, but statistically significant improvement in self-efficacy and interest in the psychological aspects of patient care. RWBI scores increased from 3.8 (SD 1.9) to 5.0 (SD 1.9), indicating a significant decline in overall well-being. Notably, a threshold score of ≥ 5 indicates increased risk of personal and professional consequences to their distress. Unfortunately, there were not enough participants completing scales at the final interval to allow for statistical analysis. Analysis of the additional narrative data is ongoing. CONCLUSION This study suggests that while Balint groups may enhance residents' ability to manage the psychological demands of patient care, the significant increase in RWBI scores reflects a concerning decline in overall well-being during the intervention period. These findings highlight the complexity of addressing resident well-being and the ongoing need for multi-faceted approaches beyond Balint groups alone. Given the ongoing challenges of burnout, future research may explore how Balint groups can be better integrated into broader resident support initiatives. The narrative data analysis currently underway may provide valuable insights into how residents perceive the impact of Balint groups and how the format can be adapted to better address their needs.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 240
Presenter: Zorica Nakevska
Supervisor: Fu, Yangxin
Title: Investigating the role of RNA cytosine methyltransferase NSUN2 in ovarian cancer
Authors: Zorica Nakevska, Farzaneh Afzali, Huachen Chen, Zhihua Xu, Rui Zhe Yang, Holly Zhao, Guihua Zhang, DuPreez Smith, James Key, Helen Steed, Lynne-Marie Postovit, Cheng-Han Lee, YangXin Fu

Theme: Lifelong women's health

Introduction Epithelial ovarian cancer (EOC) is the leading cause of death related to gynecologic cancers. Current treatments for advanced EOC are ineffective, necessitating novel therapeutic strategies. RNA modifications, including 5-methylcytosine (m5C) mediated by the NSUN family of RNA methyltransferases (NSUN1-7), regulate the functions of all species of RNAs. Among this family, NSUN2 methylates the most diversified RNA targets and regulates mRNA level and/or mRNA translation in the cell and is implicated in a variety of cancers. However, the role of NSUN2 in EOC remains elusive. Our findings thus far suggest that NSUN2 plays a pro-tumorigenic role in EOC. However, the underlying mechanisms remain to be determined. The objective of this study is to further define the role of NSUN2 on the behavior of EOC cells and the underlying molecular mechanisms. Methods We knocked down the expression of NSUN2 in various EOC cell lines using a lentivirus-mediated shRNA approach and then analyzed the effect of NSUN2 knockdown on cell growth (the neutral red uptake assay) and colony formation (clonogenic assay). We also created NSUN2 knockout models in EOC cells via CRISPR/Cas9 editing and performed the same functional assays. We performed RNA-sequencing to identify the mRNAs whose levels are altered when NSUN2 is knocked down and knocked out. Results Knocking down NSUN2 in EOC cells decreased colony formation and cell growth compared to control. However, the effect of NSUN2 knockdown on cell proliferation becomes less pronounced in cells at late passages compared to the early ones. Similarly, NSUN2 CRISPR knockout, which involves cell expansion from single cell clones via multiple rounds of cell division, is less potent in decreasing cell proliferation compared to NSUN2 knockdown cells at the early passages. We performed an RNA-seq to compare the molecular context of NSUN2 knockdown and knockout cells, and found that there are more differentially expressed genes in the NSUN2 knockdown cells (1835 genes), than the NSUN2 knockout cells (113 genes), compared to their controls. This may suggest that the NSUN2 knockout cells have restored some of the gene expression changes in response to NSUN2 deficiency. Taken together, these results suggest that there are adapting mechanisms that compensate for the loss of NSUN2 in EOC cells, which makes targeting NSUN2 alone less effective. Synthetic lethality is a genetic interaction where combined depletion of two genes, but not either alone, leads to lethality in cells or organisms. We will employ this concept to identify the genes that are simultaneously involved in the adaptation mechanism and can be targeted alongside NSUN2 for EOC treatment. Conclusion Our study highlights NSUN2's role in promoting EOC cell tumorigenicity. Reduced NSUN2 levels impairs cell growth and colony formation and causes dynamic gene expression changes over time as demonstrated by RNA-sequencing. The potential for EOC cells to adapt to the loss of NSUN2 over time requires further study of NSUN2's synthetic lethality interactions. Our findings support NSUN2 as a potential therapeutic target for EOC, particularly if targeted alongside another gene, warranting further investigation into its molecular pathways and therapeutic implication.

This research has been funded by the Alberta Women’s Health Foundation through the Women and Children’s Health Research Institute.

Participant #: 241
Presenter: Umme Sabrina Haque
Supervisor: Yokota, Toshifumi
Title: DG9-PMO Conjugates as a Promising Therapy for Severe Spinal Muscular Atrophy: Sustained SMN Restoration and Multi-Organ Protection
Authors: Umme Sabrina Haque, Melissa Kohut, Jillian Claerhout, Razoan Al Rimon, Zamaneh Kassiri, Hong Moulton, Rika Maruyama, Toshifumi Yokota

Theme: Children's health and wellbeing

Introduction: Spinal muscular atrophy (SMA) is the leading genetic cause of infant mortality, characterized by the degeneration of motor neurons and widespread tissue damage. SMA is primarily caused by mutations in the survival of motor neuron 1 (SMN1) gene. Although a paralogous gene, SMN2, can partially compensate by producing the essential SMN protein, a sequence variant results in the exclusion of exon 7 from approximately 90% of SMN2 transcripts, leading to insufficient protein levels. Antisense oligonucleotide (ASO) therapies targeting SMN2 have shown promise in treating SMA. However, the current FDA-approved ASO, Nusinersen, is limited by its toxicity, the necessity for invasive intrathecal injections, and its limited efficacy in addressing the systemic manifestations of SMA. To overcome these challenges, we recently developed DG9, a novel moiety derived from a human T-cell peptide, which, when conjugated with Phosphorodiamidate Morpholino Oligomer (PMO) (DG9-PMO), significantly enhances ASO cellular uptake, potentially eliminating the need for intrathecal injections. In this study, we investigated the continuous administration of DG9-PMO in mouse models of SMA, assessing its ability to rescue the SMA phenotype with minimal toxicity. Methods: Severe SMA mouse models were administered 40 mg/kg DG9-PMO subcutaneously on postnatal days 0, 2, 28, and 56. Therapeutic efficacy was evaluated through survival rates, body weight measurements, and motor function assessments. Molecular analyses, including quantitative PCR and Western blotting, were conducted to evaluate the restoration of full-length SMN2 transcripts mediated by DG9-PMO. Long-term efficacy was further assessed by examining muscle pathology through Hematoxylin and Eosin (H&E) and Neuromuscular Junction (NMJ) staining. Additionally, the impact of DG9-PMO on rescuing vasculopathy and cardiac defects was evaluated using immunohistochemistry to analyze capillary bed structure and echocardiography to assess cardiac function. Results: Multiple administrations of DG9-PMO (on postnatal days 0, 2, 28, and 56) significantly extended mean survival up to 190 days compared to 8 days in non-treated (NT) mice. The treatment also prevented distal necrosis beyond postnatal day 160 and induced a more complete phenotypic rescue, including increased body weight, long-term improvements in motor function, and muscle strength, compared to NT controls and groups where dosing ceased on postnatal day 2. Notably, DG9-PMO treatment maintained SMN protein levels for a sustained period in both peripheral and central nervous system tissues, along with significant improvements in muscle pathology, neuromuscular junction, and vascularization. Echocardiography data also indicated a substantial enhancement in overall cardiac function compared to treatment with the Nusinersen analogue MOE (2'-O-methoxyethyl). Importantly, no apparent toxicity was observed. Conclusion: This study demonstrates the therapeutic efficacy of DG9-PMO conjugates in a severe SMA mouse model. The results suggest that DG9-PMO holds significant potential as a novel therapeutic approach for SMA, offering the prospect of improved outcomes for patients and eliminating the need for invasive intrathecal injections.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 242
Presenter: Umar Yunusa
Supervisor: MacDonald, Shannon
Title: Improving childhood immunization uptake and timeliness through utilization of mobile phone r reminders in Nigeria: A cluster randomized control trial
Authors: 1. Umar Yunusa RN, PhD 2. Shannon E. MacDonald RN, PhD, 3. Muhammad Awwal Ladan RN, PhD

Theme: Children's health and wellbeing

Introduction: Mobile phone-based interventions have shown promising results and have great potential to improve the uptake of routine childhood immunization, particularly in resource constrained settings. It is however yet to be implemented on a large scale in northern Nigeria, where immunization indicators are currently low. This study examined the effectiveness of mobile phone reminders in improving the uptake, completeness and timeliness of childhood immunization in the Kano metropolis of Nigeria. Methods: A parallel-arm clustered randomized controlled trial was conducted in four health facilities. Reminders were sent to eligible participants in the intervention group at specific intervals when their children were to receive the vaccines scheduled for 6, 10 and 14 weeks after birth. Immunization records of all participants' children were then tracked for 26 weeks to determine their immunization status. Results: Out of 706 women screened, 554 were eligible and recruited. After follow-up of study participants, immunization records of children in the intervention (n=275) and control (n=261) arms were analyzed. Immunization uptake was significantly (P<0.001) higher for children in the intervention arm compared to those in the control arm for vaccines scheduled for the 6th (71.3% vs 50.9%), 10th (63.6% vs 28.7%) and 14th (61.5% vs 16.9%) week after birth. Similarly, completeness and timeliness of the vaccine series were significantly higher (P<0.001) among children of participants in the intervention (n=169, 61.5% and n=138, 50.2%) compared to those in the control (n=35, 13.4% and n=13, 5%) arm. Conclusion: Mobile phone reminders were established to improve the uptake, completeness and timeliness of routine childhood immunization in the study setting. Stakeholders are recommended to implement it along with other approaches to improve routine immunization compliance. Related future studies should investigate other immunization reminder systems that are adaptable to residents of resource limited settings

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 243
Presenter: Rachel Hislop-Hook
Supervisor: Ross, Shelley
Title: Development of education modules for family physicians to increase confidence and competence in caring for children with asthma
Authors: Rachel Hislop-Hook, Dr. Anne Hicks, Dr. Shelley Ross

Theme: Children's health and wellbeing

Introduction. Asthma is the most common chronic illness among Canadian children. It affects about 1 of every 10 children in Canada and is becoming more common every year. When asthma is not controlled, it results in missed school and work, poor sleep and less physical activity. Children with asthma are most often cared for by family doctors. When family doctors lack up to date knowledge, they may refer children to specialists who are unable to prioritize their management in a timely fashion, leaving them waiting for months or years. When children's asthma is not controlled, they are at risk of severe and potentially life-threatening asthma attacks that lead to emergency department visits and hospitalizations. The purpose of this project was to design educational tools that assist family doctors in caring for children with asthma. Methods. This project involved three components. Part 1 developed easy-to-use evidence-based education modules to equip family doctors with skills and knowledge to care for childhood asthma. Part 2 involved creating a step-by-step decision support algorithm providing guideline-based selection of asthma management strategies tailored to each patient's needs, based on age and asthma severity . Part 3, closely linked with Part 2, was to produce targeted patient-education handouts about asthma. All components were reviewed by a pediatric respirologist and medical education expert. Results. Parts 1 and 2 are complete, and work is ongoing on patient education handouts. Seven modules have been created, which provide evidence-based information about diagnosing and treating asthma. Each module includes case-based knowledge questions so that readers can check their understanding of the content. The algorithm provides users with relevant information from the modules to help them with diagnosis and management related to individual patients, including relevant patient handouts (some handouts still in progress). Conclusion. The modules created in this project will be a useful resource for both practicing healthcare providers and those in training. Next steps are to evaluate the modules with family physicians and medical trainees.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 246
Presenter: Leenah Qureshi
Supervisor: Voronova, Anastassia
Title: Can multiple sclerosis originate during childhood?
Authors: Leenah Qureshi, Yauheniya Tkalich, Adrianne Watson, Sana Bibi and Anastassia Voronova

Theme: Children's health and wellbeing

Multiple Sclerosis (MS) is a neurodegenerative disorder of the central nervous system and is characterized by loss of myelin, a fatty substance that enhances neuronal communication. This leads to impairments in vision, movement and/or cognition. Importantly, the severity and speed of progression of MS symptoms varies widely between patients. Intriguingly, people with most progressive form of MS have myelin anomalies in childhood and adolescence, when myelin is developing. This suggests that severe MS may originate during brain development. Recently, MS severity was shown to have a genetic basis. For example, people with MS who carry a variant in CX3CR1 present with more severe disability. CX3CR1 is a receptor for fractalkine, a naturally occurring molecule in the brain. Our lab has previously shown that activation of CX3CR1 enhances myelination in the developing and degenerating brain. The role of CX3CR1 variants on myelin development is not known. To determine the impact of MS-associated CX3CR1 variants on myelin development, we used humanized mice, in which all cells that typically express mouse Cx3cr1 instead express human MS-associated pathogenic CX3CR1 (herein referred to as hM280). We compared these mice to CX3CR1 knockout (KO) and wild-type (WT) strains. Myelin in brain white matter (corpus callosum) and grey matter (hippocampus) was analyzed using transmission electron-microscopy (TEM) at two weeks of age when myelination just begins. Analysis of corpus callosum showed that KO had thinner myelin, and both CX3CR1 KO and hM280 had reduced proportion of myelinated axons. In contrast, KO and hM280 hippocampus showed thinner myelin but the proportion of myelinated axons remained the same. We are currently analyzing adult mice in a similar fashion. In summary, mice expressing pathogenic CX3CR1 variant have deficient myelin development. Our results suggest that individuals with MS-associated variants may display aberrant brain development, which may be important for early disease detection.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 247
Presenter: Ezra Ketema
Supervisor: Lopaschuk, Gary
Title: SIRT2 Deletion Inhibits Glycolysis Through Increased Acetylation of Glycolytic Enzymes
Authors: Ezra B. Ketema, Ruth Han, Muhammad Ahsan, Kaya Persad, Qiuyu Sun, Liyan Zhang, Gary D. Lopaschuk

Theme: Children's health and wellbeing

Introduction: Myocardial glycolysis increases in hypertrophic and failing hearts. Persistently high glycolysis rates also contribute to impaired cardiac energy maturation process in newborns with congenital heart disease (CHD). Dysregulation in the acetylation status of metabolic enzymes, including glycolytic enzymes, also occurs in failing hearts and newborns with CHD. Variable effects of acetylation on the activities of glycolytic enzymes have been reported. However, the overall impact of acetylation on the glycolytic flux and the extent to which hyperacetylation contributes to altered glycolytic rates remain poorly understood. This ongoing study aims to determine whether changes in the acetylation of glycolysis enzymes and SIRT2 activity contribute to impaired cardiac metabolic maturation and hypertrophic remodelling in newborns with CHD. . Methods: Glycolysis rates were directly measured in rat heart-derived H9c2 cardiomyocytes perfused with 5 mM [5-3H]glucose, 0.8 mM palmitate, and 4% bovine serum albumin. Before these metabolic measurements, H9c2 cells were treated with either a SIRT2 inhibitor (10 μM AGK2) or a vehicle for 24 hours. In separate experiments, SIRT2 was also knocked down in H9c2 cells using siRNA, followed by glycolysis rate determinations. The impact of SIRT2 inhibition or SIRT2 knockdown on overall or glycolytic enzyme acetylation was also assessed. Furthermore, the effects of SIRT2 inhibition on hypertrophic and insulin signalling were assessed by treating H9c2 cells with phenylephrine and insulin. Results: SIRT2 inhibition markedly decreased glycolysis rates in H9c2 cells compared to vehicle-treated cells (524±108 vs 2631±372 nmol.g dry wt-1.min-1, $p<0.05$). Similarly, SIRT2 knockdown resulted in a significant reduction in glycolysis rates compared to scrambled siRNA-treated H9c2 cells (745±31 vs 1659±168 nmol.g dry wt-1.min-1, $p<0.05$). The decrease in SIRT2 was accompanied by an increase in the acetylation status of the glycolytic enzymes, including glyceraldehyde phosphate dehydrogenase (GPDH), and phosphoglycerate mutase (PGAM2). Moreover, a trend towards increased phosphofructokinase (PFK) acetylation was also observed in SIRT2 knockdown H9c2 cells compared to scrambled siRNA-treated cells. Conclusions: SIRT2 inhibition or deletion in H9c2 cells significantly decreases glycolysis rates. SIRT2 deletion was also associated with an increased acetylation of glycolytic enzymes. SIRT2 may, therefore, contribute to the increased cardiac glycolysis seen in newborns with CHD.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 248
Presenter: Jason Lane
Supervisor: Bhavsar, Amit
Title: Identifying differential signaling pathways of TLR4 to mitigate cisplatin-induced hearing loss in paediatric cancer patients
Authors: Jason Lane, Shu Y. Luo, Olivier Julien, Amit P. Bhavsar

Theme: Children's health and wellbeing

Introduction: Cisplatin is a highly effective chemotherapeutic drug for treating solid pediatric cancers. Unfortunately, cisplatin treatment has several adverse effects, including permanent bilateral hearing loss in >50% of children. Cisplatin-induced ototoxicity (CIO) is caused by the damage and death of hair cells in the inner ear. In children, CIO can severely impact learning and socialization and leads to deficits in language and psychosocial development that persist to adulthood. Findings from this proposal seek to mitigate the toxicities associated to this treatment, contributing to a better quality of life for childhood cancer survivors. Toll-like receptor 4 (TLR4) is a pattern recognition receptor most known for its role in immunity when combatting bacterial infection by activating downstream effectors when bound to the bacterial membrane component, lipopolysaccharide (LPS). We identified that TLR4 was a critical mediator of cisplatin toxicity. However, differences in binding support further examination of differences that may occur within the cell downstream of the receptor. The major pathways in TLR4 signaling lead to activation of pro-inflammatory transcription factors AP-1, NF-kB and IRF3 that contribute to CIO. Methods: We use an in-vitro model of CIO that show robust responses to cisplatin treatment. The House Ear Institute Organ of Corti 1 (HEI-OC1) cell line is derived from progenitor Organ of Corti cells from an embryonic mouse and has been used frequently for studies of ototoxicity and otoprotectants. This cell line is the gold-standard in vitro cell line for studying CIO, and although it is not commercially available, we obtained it from the original produce of the cell line. We are using high-throughput screens for RNA and proteins using NanoString nCounter and phosphopeptide mass spectrometry, respectively. These unbiased screening experiments are designed to detect how the cells react to cisplatin compared to LPS. By examining both RNA and proteins, we intend to capture a holistic representation of cisplatin's effect on the HEI-OC1 cells to target specific proteins and pathways that could mitigate the ototoxicity of cisplatin. Results: Using both RNA and phosphoproteomic screens, we have identified AP-1 subunits, Fos and Jun, which signal downstream of TLR4. These proteins are upregulated during treatment with cisplatin but not with LPS. This differential signaling provides us with a target to examine the detrimental effects of cisplatin. To examine the effects of AP-1 activation in CIO, we are generating reporter cells lines of transcription factors downstream of TLR4 using retroviral transduction. By using retrovirus, we can create a new cell line that expresses fluorescent proteins to determine when signal transduction is occurring. This allows us to visualize the effects of cisplatin on the TLR4 pathway and allow how we can use inhibitors to mitigate CIO. Conclusions: AP-1 was identified as a target to mitigate the toxic effects of cisplatin as it is more active during cisplatin treatment than with LPS. Due to this difference in signaling AP-1 seems to be a potential target to mitigate CIO by reducing the inflammatory signals that damage the inner ear cells.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 249
Presenter: Sumaiyah Shaha
Supervisor: Riddell, Meghan
Title: Par-3 interacts with a unique Human Placental aPKC-ζ Isoform and promotes Trophoblast Fusion
Authors: Sumaiyah Shaha, Wendy Duan, Ivan K Domingo, Meghan Riddell

Theme: Pregnancy and developmental trajectories

Introduction Proper development of the human placenta is crucial for the progression of a healthy pregnancy. Critical to placental function is the human syncytiotrophoblast (ST), a giant single cell that comprises the maternal facing exchange surface. This cell is responsible for nutrient/gas exchange and acts as an immunological barrier to protect the fetus. The ST does not expand on its own but requires the incorporation of underlying progenitor cytotrophoblasts (pCT) via cell fusion to allow for placental growth. Despite the importance of this process, mechanisms governing it are poorly understood. Proteins that form the evolutionarily conserved Par complex are implicated in ST formation. This complex of polarity regulators consists of scaffolding proteins Par-3 and Par-6, and atypical protein kinase-C (aPKC) isoforms. Par-6 and aPKCs have been implicated in human ST fusion, and we have previously demonstrated that a novel aPKC isoform discovered by our lab, aPKC-ζ III, promotes pCT fusion. Unlike the kinase active aPKC-ι and aPKC-ζ isoforms, aPKC-ζ III is structurally predicted to lack kinase activity and may modulating function by competitive binding to Par-3 via canonical and conserved binding domains. Important to trophoblasts, Par-3 can modulate the activity of Hippo signaling transcriptional cofactors YAP/TAZ, which are known to repress pCT to ST fusion. Thus, we examined whether Par-3 regulates pCT fusion via its interaction with Hippo signaling components and aPKC-ζ III. Methods Human placental tissue was examined for expression and localization of Par-3 across the first trimester. CT cells (BeWo cell line) were treated with PARD3-targetting siRNA, then induced to fuse for 96 hours with 8-Br-cAMP. Cells were stained for E-cadherin and nuclei to assess fusion. To confirm Par-3/aPKC-ζ III binding, immunoprecipitations (IPs) were performed in HEK293T cells transfected with Par-3 and aPKC-ζ III encoding plasmids. PRKCZ knockout BeWo cells were created using CRISPR-Cas9 to understand the role of aPKC-ζ isoforms during pCT fusion. PRKCZ knockout cells +/- aPKC-ζ III encoding plasmid were assessed for fusion as above. Finally, PRKCZ knockout BeWo cells +/- aPKC-ζ III encoding plasmid were collected 2 hours post fusion induction to assess expression of active Hippo signaling kinase, phospho-LATS1. Results First trimester placental tissue staining revealed Par-3 localized within the CTs, a staining pattern similar to Par complex members Par-6 and aPKC isoforms in the first trimester placenta. pCT fusion was reduced by Par-3 knockdown (n=3, p=0.0118) and PRKCZ KO (n=3, p=0.0157). IPs revealed Par-3 and aPKC-ζ III form a stable interaction. Rescue of aPKC-ζ III in PRKCZ KO cells revealed an increased trend of phospho-LATS1 expression. Conclusions Our results reveal aPKC-ζ III is critically involved in pCT fusion and modulates the activity of Hippo signaling kinases via Par-3. Future directions include examining competitive binding interactions of aPKC-ζ III and other Hippo regulating Par-3 binding proteins (PP1A and LATS1). ST malformation often occurs during pregnancy complications and thus, understanding the signaling pathways that contribute to ST formation could unveil therapeutic targets for treating placental pathologies.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 250
Presenter: Reena Duke
Supervisor: Haqq, Andrea
Title: A web-based intervention to alleviate caregiver burden in genetic obesity conditions
Authors: Zeinab Gholibeigian, Reena Duke, Jacqueline Pei, Theresa Strong, William Gibson, Stasia Hadjiyannakis, Ximena Ramos Salas, David Viskochil, Andrea M. Haqq

Theme: Lifelong women's health

Introduction: Caregivers of individuals with Genetic Obesity Conditions (GOCs) such as Prader-Willi syndrome (PWS) and Bardet-Biedl syndrome (BBS) face significant challenges, including managing severe obesity, hyperphagia (an intense and persistent sensation of hunger), and behavioral issues. These conditions profoundly impact the quality of life of both children and their caregivers, who are predominantly women. With nearly 90% of individuals with GOCs living at home under family care, caregivers experience substantial physical, psychosocial, and financial stress. The complexity of caregiving tasks and the lack of effective treatments for core symptoms exacerbate caregiver burden, leading to poorer overall health outcomes. To address these challenges, the Haqq Lab developed GoCarer, an online program tailored to meet caregivers' core needs. This presentation will provide an overview of the course development and evaluation process, aimed at improving caregiver self-efficacy, reducing burden, and enhancing social support. Methods: This community-engaged mixed-methods study, guided by social cognitive theory and implementation science methodology, involves the development, piloting, and evaluation of GoCarer to address the needs of GOCs caregivers. The intervention, co-created with caregivers, includes six modules covering an overview of GOCs, practical caregiving skills, coping strategies, self-care, and social support, delivered via an interactive online platform. Unique features include chat rooms, customized videos, and an 'Ask the Expert' forum. The study is currently in the development phase, with modules being designed and refined based on feedback from a pilot study involving four caregivers. Results: Preliminary results indicate a high demand for practical skills in food and behavior management, as well as effective communication strategies. Participants have expressed strong interest in the course and found the content to be highly relevant to their needs. The full evaluation of the program, including all six modules, will proceed upon completion of the development phase. The program's effectiveness will be evaluated using a pre-post design with 54 caregivers, assessing changes in caregiver burden, self-efficacy, coping mechanisms, and quality of life. Additional information describing drivers of success, barriers experienced, and areas for improvement will also be collected. Conclusion: This presentation will: 1. Summarize the unique challenges faced by families with GOCs; 2. Outline the course content and guiding principles of GoCarer; and 3. Highlight the role of implementation science in shaping program development and evaluation.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 251
Presenter: Talah Hasanni
Supervisor: Riddell, Meghan
Title: Identifying regulators of the Hippo signaling pathway in human placental development
Authors: Talah Hasanni, Sumaiyah Shaha, Meghan Riddell

Theme: Pregnancy and developmental trajectories

Introduction: The syncytiotrophoblast (ST) layer, which is formed through the fusion of cytotrophoblasts (CT), is essential for proper placental function, including nutrient exchange and hormone production. Disruptions in CT fusion can lead to defects in the ST layer, contributing to the development of placental pathologies, such as pre-eclampsia. The Hippo signaling pathway has been shown to regulate ST fusion, although full characterization of the pathway remains to be completed. We have found that the newly discovered atypical protein kinase C, aPKC-ζ III, regulates CT fusion. We hypothesize that aPKC-ζ III via interactions with its binding partner Par-3, a polarity-regulating scaffolding protein, influences the Hippo pathway. We investigated this interaction by assessing LATS and active LATS (P-LATS) levels, along with the localization of the transcriptional cofactor YAP-both key indicators of Hippo pathway activity-to determine the role of aPKC-ζ III in CT fusion. Methods: Immunofluorescent staining was performed on first trimester human placental tissues to assess Par-3 and YAP localization. BeWo cells, a human placental choriocarcinoma cell line, were induced to fuse using 8-Br-cAMP; protein samples were collected at 0.5, 1, 2, 4, and 8-hour intervals post-fusion to measure peak P-LATS expression levels. Furthermore, aPKC-ζ III was transfected into HEK293T cells, a human embryonic kidney cell line; changes in P-LATS expression levels were assessed 24 hours post-transfection by Western blot. Results: First-trimester placental tissue staining revealed strong Par-3 localization within the cytoplasm of cytotrophoblasts (n=2). YAP signal was found to be strongly localized to the nuclei of CTs (n=1). In BeWo cells, Br-cAMP treatment resulted in a peak in P-LATS levels at 2 hours post-fusion (n=3). Additionally, upon aPKC-ζ III transfection into HEK293T cells, a trend of increased P-LATS expression was observed (n=2). Conclusion: The findings from this study provide new insights into the role of aPKC-ζ III in CT fusion into ST, a process essential for proper placental function. The localization of Par-3 within CT suggests that this scaffolding protein may play a role in CT fusion. YAP staining, which showed strong nuclear localization within CTs, indicates that the Hippo signaling pathway is active in the placental epithelium and confirms observations by others in the literature. Additionally, the observed peak in P-LATS levels following fusion induction in BeWo cells indicates the involvement of the Hippo signaling pathway during ST formation. The trend of increased P-LATS expression in aPKC-ζ III-transfected HEK293T cells further suggests that aPKC-ζ III interacts with the Hippo pathway. These results lay the groundwork for future investigations into the combined impact of aPKC-ζ III and Par-3 on Hippo signaling, which could provide valuable therapeutic targets for addressing placental pathologies.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 253
Presenter: Janet Lee
Supervisor: MacDonald, Shannon
Title: COVID-19 vaccine policies and guidance for pregnant and breastfeeding populations: Complexities with vaccine decision-making during a changing landscape.
Authors: Janet Lee, Sarah Wilson, & Shannon MacDonald.

Theme: Pregnancy and developmental trajectories

Introduction: From pregnant or breastfeeding persons to government policy makers, the pressure to make safe decisions on COVID-19 vaccinations while experiencing limited clinical evidence to support use within these groups, posed a unique challenge for all levels of decision-makers in Canada. Understanding the context of events with vaccine policies and guidance, may offer insight into why vaccine uptake among pregnant women remained lower than the general population. We aimed to identify the guidance and timing of COVID-19 vaccine policies and statements, specific to pregnant or breastfeeding persons, which were produced by government, public health authorities, and/or professional organizations at the national and provincial/territorial (P/T) levels. Methods: Phase 1: An environmental scan was conducted for Canadian COVID-19 vaccine policies and guidance issued from Dec. 2020 to 2022. Public-facing documents from the National Advisory Committee on Immunization (NACI), Society of Obstetricians and Gynaecologists of Canada, Health Canada, and P/T governments were included. Phase 2: P/T policy experts verified event summaries via email. Results: Policy expert feedback from 8 provinces and 1 territory, in addition to 515 total vaccine policies and guidance documents, were used to construct a chronological timeline of vaccine recommendations and policies at the national and P/T level. Most differences in content and timing of NACI recommendations and P/T policies occurred in early Dec 2020 to Jan 2021. The greatest alignment between national guidance and P/T policies occurred in May 2021, when vaccine safety data during pregnancy emerged. The appearance of novel contextual influences (e.g., rise in maternal hospitalizations) were most associated with vaccine policies and guidance changes for the target population. P/T polices were modified to match NACI recommendations when differences were noted, and if the change aligned with jurisdictional vaccine coverage goals. Conclusion: Timely P/T vaccine policies and guidance were issued in response to contextual influences, NACI recommendations, and unique jurisdictional responsibilities to ensure pregnant and breastfeeding populations were safe and informed. Analysis of the timing, number, and content of vaccine policy and guidance may benefit future emergency design and response - possibly improving health outcomes for both mother and child.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 254
Presenter: Mica Pabia
Supervisor: Thompson-Hodgetts, Sandra
Title: Crossroads of identity: A narrative inquiry into the mental health and quality of life of racialized Autistic youth transitioning into post-secondary education
Authors: Pabia, M. R., Brown, H. M., Caine, V., & Thompson-Hodgetts, S.

Theme: Children's health and wellbeing

Background/rationale: Autistic youth (ages 16-19) are transitioning to post-secondary education (PSE) at an unprecedented rate, yet Autistic students face disproportionately more barriers in PSE and poorer health outcomes than their non-autistic peers. Autistic students are 3x more likely to have clinical mental health conditions than non-autistic peers. Depression and anxiety are the most notable, with up to 90% of Autistic PSE students experiencing one or both. Furthermore, suicidal ideation, as well as suicide attempts and deaths, are much higher among Autistic people than their neurotypical peers. Poor mental health is further exacerbated when Autistic youth face intersectional oppressions- e.g. being both Autistic and racialized (i.e. Black, Indigenous, People of Colour, and other non-White people). Systemic racism in PSE poses further barriers to successful transitions for these youth, such as decreased access to social capital in Canada (e.g. professional networks); financial barriers; and racist misattributions of racialized students being "more suitable" to jobs that do not require PSE. Additionally, racialized Autistic people are often mis- or late-diagnosed, which decreases access to formal services and supports that require a professional diagnosis. Despite known disparities, a notable gap in research remains on the intersectional challenges encountered by these students, and on racialized Autistic people in general . Thus, the purpose of this study is to explore: 1) intersectional experiences of ableism and racism against racialized Autistic youth during the transition to PSE; and 2) mental health challenges related to racism and ableism that impact quality of life during their transition into PSE. Method: Rooted in anti-oppressive practice, this research will be guided by Critical Disability Theory and intersectionality. This theoretical orientation dismantles medicalized and pathologized discourses on autism, and critiques how dehumanizing Autistic people has salient impacts on policy, practice, and the resulting health and quality of life of Autistic people. Narrative inquiry is a powerful methodology for understanding complex and interconnected life experiences in specific contexts. Consistent with recommended sample size for narrative inquiry, we will recruit 3 to 5 racialized Autistic high school students and conduct 8-12 meetings with each participant over a 1-2 year span as they transition into PSE. Data sources will include conversations and other artistic methods per participant preference. Resonant threads across the youth will then be examined to understand experiences of mental health for racialized Autistic youth during the transition into PSE. Expected outcomes: Amplifying the lived experiences of racialized Autistic youth creates counter-narratives to dominant, oppressive narratives of disability, creating a tool for advocacy, resistance and reclamation. Findings may build awareness of the unique experience of racialized Autistic youth transitioning to PSE and inform the development of transition supports and institutional policy. By exploring the nexus of race, disability, and mental health of youth, this work directly addresses stipulated research priorities in children's mental health and EDI.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 256
Presenter: Kehan Li
Supervisor: Zheng, Yao
Title: Longitudinal Associations Between Emotion Regulation Flexibility and Emotion Dynamics Across University
Authors: Kehan Li, B.S. and Yao Zheng, Ph.D.

Theme: Children's health and wellbeing

Introduction: Ineffective emotion regulation (ER), or emotion dysregulation (ED), is a crucial component of depressive and anxiety disorders and a major risk factor for psychological and physical health problems. Theoretical work has increasingly highlighted ER flexibility, instead of frequency, as an essential factor contributing to the effectiveness of ER. Scarce research, however, has directly examined the relations between ER flexibility and emotion intensity, and extant pertinent studies have used various methodologies and reached inconsistent conclusions. Moreover, no study has examined the potential reciprocal associations between ER flexibility and emotion intensity with a longitudinal design. Furthermore, emotion as a dynamic construct shows ups and downs in daily life. Hence, the dynamic attributes (e.g., instability) of emotion also warrant more attention regarding their relations with ER flexibility. Methods: Adopting a measurement burst design with month-long daily diary assessments at both waves, this study investigated the cross-lag associations between ER flexibility (operationalized as trait ER diversity and state ED diversity) and the intensity and instability of positive (PA) and negative (NA) affect across 2.5 years in a sample of Canadian non-clinical university students (N = 175, Mage = 17.94 years in Wave 1 [W1], SD = .66, 75.4% female, 68.0% non-White). Results: Cross-lag Panel Models showed that W1 NA was negatively associated with W2 trait ER diversity, whereas W1 state ED diversity was positively linked to W2 NA and PA. Participants with higher level of daily NA (W1) endorsed less diverse, frequent, and even ER strategy in general (W2) compared to others. Participants who experienced more diverse, frequent, and even daily ED problems (W1), however, showed higher levels of both NA and PA (W2) compared to others. Moreover, W1 trait ER diversity was negatively associated with W2 NA instability. Participants who adopted more diverse, frequent, and even ER strategies in general (W1) exhibited less instability in their daily NA (W2) than others. Additionally, W1 PA instability was positively associated with W2 state ED diversity. Participants who showed more instability in PA (W1) across days experienced more diverse, frequent, and even daily ED problems (W2) than others. Conclusion: Current findings highlighted the critical influence of ER flexibility on emotion intensity and dynamics for both NA and PA. Findings also emphasized the role of emotion and its dynamic patterns as both the regulator and regulation outcomes, which could be affected and affect people's ER processes simultaneously. Furthermore, the findings underscore the importance of considering the effect of heterogeneity in operationalizing ER flexibility (e.g., state vs. trait; ER strategy vs. ED problems) as different operationalizations may lead to distinct relations between ER flexibility and emotion outcomes.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 257
Presenter: Amanda Lima Deluque
Supervisor: Alexander, Todd
Title: Cldn12 and trpv6 double knockout mice maintain plasma Ca2+ via a compensatory transcellular calcium pathway in proximal colon
Authors: Amanda Lima Deluque; Wanling Pan; Deborah O'Neill; Todd Alexander

Theme: Lifelong women's health

Introduction: Calcium (Ca2+) is an essential divalent cation, whose plasma level is tightly controlled by the integrated interaction of bones, intestine, and kidneys. Two general (re)absorption pathways contribute to the vectorial transport of Ca2+ across renal and intestinal epithelia: 1) a paracellular pathway, which depends on claudin-2 (Cldn2) or claudin-12 (Cldn12) in the epithelial tight junction and the electrochemical gradient, and 2) a transcellular pathway, which requires an apical influx mechanism (Trpv6 in intestine and Trpv5 in kidney), intracellular buffering and basolateral efflux, to actively transport Ca2+ across the epithelial cell. Despite this, Cldn12 knockout mice do not have hypercalciuria or calciotropic hormone compensation, likely due to transcellular compensation. Similarly, mice homozygous for a non-functional Trpv6 channel (Trpv6D541A/D541A) do not display alterations in serum Ca2+ or urinary excretion. We hypothesize that the absence of a phenotype in these murine models is due to the compensation of one pathway in the absence of the other. Methods: To test this hypothesis, we crossed Cldn12 knockout mice with mice expressing the Trpv6 mutant, generating a functional double knockout (DKO, Cldn12-/-/ Trpv6D541A/D541A). Male and female were used in this study. Ca2+ homeostasis was assessed by metabolic cage balance studies and compensation pathways via quantitative real-time PCR (RT-qPCR). Results: DKO mice had normal serum-ionized Ca2+ levels, unaltered urinary Ca2+ excretion, as well as similar Ca2+ bioavailability and balance to wild-type littermates. However, DKO mice had increased calcitriol and parathyroid hormone (PTH) levels as well as Cyp27b1, the enzyme that hydroxylates calcidiol to generate active vitamin D, consistent with strong hormonal compensation. Male DKO mice had an increased loss of water in the feces (fraction of wet feces less dry), as well as an increase in hematocrit and hemoglobin compared to the wild-type. Additionally, they also had increased serum sodium (Na+) and increased urinary excretion of magnesium (Mg2+) and phosphate (PO4). Whole kidney RT-qPCR revealed increased renin and aquaporin-1. In addition, male and female DKO mice had increased renal expression of Trpv6 and decreased claudin-3 (Cldn3) expression. Male DKO mice had reduced claudin-14 (Cldn14) and Trpv5 expression, while NCX1 expression was increased. Intestinal RT-qPCR revealed increased Trpv5, Trpv6, calbindin-9K, PMCA1b, NCX1, and Trpm6 expression. In addition, male and female DKO mice displayed differences in bone microarchitecture and mineral density compared to wild-type mice. Conclusion: Together, these results are consistent with increased paracellular and transcellular pathways in the proximal colon and kidneys, compensating for the loss of intestinal transcellular Ca2+ absorption, in order to maintain serum Ca2+ levels.

This research has been funded by the Alberta Women’s Health Foundation through the Women and Children’s Health Research Institute.

Participant #: 260
Presenter: Connor Oborn
Supervisor: Kannu, Peter
Title: Unravelling the Mystery of a Rare Tibial Dysplasia in Kids: Osteofibrous Dysplasia Inside the Cell
Authors: Connor Oborn, Carrie-Lynn Soltys, Karina da Costa Silveira, Ashgar Fallah, Wei Xiang Xie, Peter Kannu

Theme: Children's health and wellbeing

Introduction: Osteofibrous dysplasia (OFD) is a rare pediatric skeletal dysplasia with an unknown etiology. It is characterized by benign lesions unilaterally on the tibia alongside tibial bowing with a tendency to fracture. Clinical cases of OFD are seen in children under ten years of age and lesions self-limit with skeletal maturity. A discovery of bilateral OFD in three unrelated families with an autosomal dominant germline variant in the MET gene pointed to a novel patho-mechanism. The heterozygous variants in the MET gene were found to result in exon skipping of exon 14 at the RNA level (METΔ14). Exon 14 encodes for a regulatory domain that facilitates activated receptor recycling and degradation. METΔ14 is a known oncogenic variant, however, variants in a germline form are rarely submitted in oncological reports. Our current study aims to explore the recapitulation of OFD disease pathology in human cells. We posit that the proto-oncogene MET must play a pivotal role in the process of osteoblast differentiation. Thus, we hypothesize that the METΔ14 alteration leads to ligand dependent signaling defects such as defective internalization and prolonged signaling, leading to two consequences. The first is a proliferative and motile state in which differentiation is perturbed. The second is an altered secretome, including an upregulation of ECM organizers. Methods: Cells were harvested from a tibial lesion on an affected 5 year old male, these patient cells are maintained in high glucose DMEM alone or with 50ng/ml of human recombinant hepatocyte growth factor (HGF). HGF treatment over 7 hours was used to monitor disappearance of both wildtype and mutant c-Met in conjunction with 50ug/ml of the protein synthesis inhibitor cycloheximide. Treatments for 0, 5, 30, and 60 minutes were used to monitor for short-term signaling changes in the immediate downstream factors ERK1/2, AKT, and STAT3 on western blots. Finally, treatment over 24 and 48 hours was performed to observe changes to various ECM organizing enzymes. Results: Proteomic findings suggest accelerated degradation of the existing wildtype c-Met in patient cells and a heightened activation of the factors ERK1/2 and AKT, but not STAT3. Transcriptomic results show significant upregulation of the secreted protease MMP1, but not MMP2 or MMP9. Together these data suggest increased proliferation, motility, and anti-apoptotic signals being conferred in the presence of HGF for pathogenic extended periods of time. We anticipate observing a delay in osteoblast maturation dynamics by monitoring key genes throughout differentiation. These findings will provide valuable insights into the molecular mechanisms underpinning OFD and highlight the critical role of MET in pediatric skeletal development. Understanding these processes not only sheds light on the pathogenesis of OFD but also raises intriguing questions about the self-limiting nature of the disease at skeletal maturity for future work.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 261
Presenter: Alice Missagia de Mattos Springer
Supervisor: Haqq, Andrea
Title: Assessment and treatment approaches in pediatric patients with obesity and insulin resistance
Authors: Katie L. Klein*, Alice M. M. Springer*, Camilla F. Rezende, Edward C. Deehan, Carla M. Prado, Andrea M. Haqq#, Flavio T. Vieira# *Co-first authors #Co-corresponding authors

Theme: Children's health and wellbeing

Introduction: The development of insulin resistance (IR) in childhood is an increasing global health concern. Characterized by reduced insulin sensitivity, IR leads to compensatory hyperinsulinemia and can result in hyperglycemia over time, increasing the risk of type 2 diabetes mellitus (T2DM) and other metabolic disorders. Pediatric obesity, a significant risk factor for IR, is closely related to a range of metabolic dysfunctions, including the potential progression to T2DM. The prevalence of pediatric obesity is increasing at an alarming rate, driving a significant rise in IR and T2DM among youth. Pediatric T2DM is characterized by a more aggressive disease course compared to adults, marked by rapid progression and an earlier onset of complications. Consequently, this accelerated disease trajectory in pediatrics underscores the critical need for early identification and management of IR to prevent the onset of T2DM and related metabolic disorders. However, the diverse symptoms and lack of standardized assessment methods for IR complicate its diagnosis, while the limited availability of effective, evidence-based treatment strategies further challenges IR management. This narrative review aims to synthesize current evidence on the diagnostic methods and treatment approaches for IR in pediatric patients with obesity. Methods: This narrative review is based on a search of the Ovid MEDLINE and Scopus databases. Specific keywords and MeSH terms, and their respective synonyms, are organized into categories: 1) population: "adolescents," "children" and "pediatric"; 2) clinical conditions: "insulin resistance," "obesity," and "type 2 diabetes"; 3) interventions and treatments: "diet," "exercise, " "fiber," "metformin," "biguanides," and "glucagon-like peptide-1". Studies are restricted to those published in the last 10 years and written in English. Articles are screened for relevance, with inclusion criteria focusing on studies that address the management of IR in pediatric patients with obesity, including topics related to laboratory and clinical diagnosis, diet modification, and nutritional assistance. Only original studies will be included, and the strengths, limitations, and applicability of recent methods for assessing IR in this population will be discussed. Treatment options will be categorized into nutritional approaches, pharmacological interventions, and combination therapies. By evaluating the effectiveness, feasibility, and long-term outcomes of each treatment, the review aims to provide a thorough insight into potential treatments to address IR in pediatric patients. Expected Results and applicability: This narrative review aims to offer a summary of the most effective strategies for early identification and management of IR in pediatrics, with practical implications for clinical settings. By synthesizing evidence on effective approaches, this narrative review will serve as a foundation for new studies addressing identified research gaps related to diagnostic methods and treatment strategies for pediatric IR. The goal is to improve clinical practices, thereby contributing to improved health outcomes and quality of life for pediatric patients with IR and obesity.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 263
Presenter: Emma Pilgrim
Supervisor: Underhill, Alan
Title: Mapping complex localization determinants in the lysine methyltransferase KMT5B and their relevance to neurodevelopmental disorders and diffuse-type glioma
Authors: Emma D. Pilgrim, Justin W. Knechtel, Jordan D. Brooks, D. Alan Underhill

Theme: Children's health and wellbeing

Introduction Our DNA is wrapped around octamers of the histone proteins H2A, H2B, H3, and H4 to form nucleosomes, which are the repeating unit of chromatin. Nucleosomes are subject to reversible chemical changes that control all aspects of chromatin structure and function. Importantly, the proteins that control these modifications are essential to cellular health, as their dysfunction frequently results in disease. For example, the lysine (K) methyltransferase KMT5B catalyses the dimethylation of histone 4 lysine-20 (H4K20me2), which is the most abundant methylation state of H4K20 and is important in DNA repair. Mutations in KMT5B are present in a variety of neurodevelopmental disorders and diffuse type gliomas, with ~200 unique alterations occurring across the length of the protein. Despite this, we do not understand how these mutations affect the proper functioning of KMT5B. Specifically, localization of KTM5B relies on a carboxy-terminal intrinsically disordered region (IDR) that spans over 500 amino acids and harbours dozens of pathogenic missense mutations. To address their potential functional impact, we utilised advanced fluorescence microscopy and molecular biology techniques to map the various localization determinants contained with the KMT5B IDR. Methods We utilized a suite of sequence analysis tools to map potential localization determinants to discrete regions of the KMT5B IDR. From there, we designed both truncated and mutated mEmerald fusion proteins and performed fluorescence microscopy to evaluate the localization determinants of the KMT5B IDR. Fluorescence recovery after photobleaching (FRAP) and nuclear compartment enrichment analysis were conducted to quantify the dynamics and localization of KMT5B and its truncated or mutated derivatives. Additionally, we used heat shock as a proxy for cellular stress to evaluate the role of KMT5B in the stress response. Results Analysis of the KTM5B IDR revealed a complex relationship between multiple localization determinants. These determinants encoded localization to various subnuclear compartments including constitutive heterochromatin, lamina-associated domains, nucleolar-associated domains, and the granular component of nucleoli. Together our analyses suggest KMT5B localization determinants are distributed throughout the IDR and their combinatorial use can give rise to distinct nuclear distributions. We speculate that heat shock may lead to conformational changes of the IDR that unmasks determinants for nucleolar localization. Targeted disruption of determinants for heterochromatin localization elicited a nuclear blebbing phenotype that suggest KMT5B has an unrecognized role in maintenance of nuclear integrity. Together, these findings suggest pathogenic mutations may alter KMT5B function in different ways. Conclusion Our research demonstrates the importance of intrinsic disorder in regulating the localization of KMT5B and creates a foundation for understanding how alterations in its carboxy-terminal IDR result in protein dysfunction. On a broader scale, our work further highlights the important role of intrinsic disorder in health and disease. This research is fundamental to defining how pathogenic mutations in KMT5B cause childhood developmental disorders and cancers.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 265
Presenter: Shivani Patel
Supervisor: Hicks, Matt
Title: Clearing the air: Investigating seasonal trends in Edmonton's indoor and outdoor air quality for a cohort of pregnant individuals
Authors: Shivani Patel, Lesley J. Brennan, Alvaro Osornio-Vargas, Anne Hicks, Matt Hicks

Theme: Pregnancy and developmental trajectories

Introduction: With the global threat of climate change, our environment will play an ever larger role in our health. Both outdoor and indoor environments impact health. Exposure to air pollutants from traffic, industry, and second-hand smoke, can increase susceptibility to poor pregnancy and pediatric health outcomes such as preterm birth, low birth weight, and respiratory illness. In Alberta, wildfires have increased, leading to increases in both indoor and outdoor fine particulate matter (PM2.5). Wildfire smoke can penetrate into homes through windows, doors, ventilation systems and other openings. Given the impact of climate change and increased occurrence of wildfires on our air quality, there is a need to better understand the association between air quality, pregnancy and early childhood development. Methods: The project is embedded in Healthy Baby Brains, a prospective cohort study examining the link between pregnancy exposures and early childhood development. The cohort included pregnant people in Edmonton, enrolled from 2023 to 2024. Indoor air quality data was collected from homes using the IQAir Air Visual Pro indoor monitor, for an average of 2 weeks. Outdoor data was from the Alberta Environment and Parks online database. Descriptive statistics were used to summarize air quality trends over time. Indoor and outdoor quality were examined for differences by month of year, season, home smoking status, and home type. All statistical analyses were performed in Excel or intercooled Stata Version 18.0 (College Station, Texas). All tests were two-sided (where applicable) and significance was defined as p-value <0.05. Univariate and bivariate analyses were used to describe the sample. Continuous variables were summarized with means and standard deviations (or medians and interquartile ranges, for non-normal distributions); Categorical variables were summarized with frequencies and percentages. Categorical variables were compared by Fisher's exact test and continuous variables by Student's t-test (two-sided). Results: Data for eighty-one of eighty-four participants have been reviewed. Three participants were excluded due to missing or incomplete data. Preliminary findings indicate similar patterns in 2023 and 2024 for both indoor and outdoor air quality. Clear differences in both indoor and outdoor PM2.5 were seen between the winter and summer with significant increases seen during the summer months. Discussion/Conclusion: Indoor air quality analysis suggests differences between air quality in the summer months compared to the rest of the year. Indoor PM2.5 levels during the summer were higher. Periods with noticeable increases in PM2.5 match with reports of poor air quality (PM2.5), and reports of wildfires. The observed differences between seasons can be attributed to differences in behavior. In the summer, people are more likely to open windows and doors to ventilate their homes, which increases the influx of outdoor air pollutants inside. Understanding the correlation between outdoor and indoor air quality, along with seasonality is important for establishing evidence-based interventions to protect vulnerable populations such as pregnant individuals and children from the health risks associated with poor air quality.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 269
Presenter: An Nhien (Annie) Tong
Supervisor: Fu, Yangxin
Title: Investigating the synthetic lethality of two RNA methyltransferase NSUN2 and TRDMT1 in ovarian cancer
Authors: An Nhien (Annie) Tong, Zorica Nakevska, Rui Zhe Yang, Zhihua Xu, Helen Steed, Lynne-Marie Postovit, Cheng-Han Lee, YangXin Fu

Theme: Lifelong women's health

Introduction Ovarian cancer is the leading cause of death among gynecologic malignancies. Unfortunately, most ovarian cancer patients are diagnosed at an advanced stage, and the 5-year survival rate is only 15-25% for patients with the advanced ovarian cancer. Ovarian cancer involves complex alterations in various genetic and epigenetic pathways, including RNA methylations. NSUN2 (NOP2/SUN RNA Methyltransferase Family Member 2), known to be responsible for cytosine methylation (m5c) in all species of RNAs, is upregulated in ovarian cancer and correlates with poor patient prognosis. Studies in Fu lab show that NSUN2 plays a pro-tumorigenic role in ovarian cancer, however, it appears that adaptive mechanisms exist that compensate the loss or reduced expression of NSUN2 over time in ovarian cancer cells. Through literature searches, we identified TRDMT1 as a potential compensatory factor, because a synergy between NSUN2 and TRDMT1 (tRNA aspartic acid methyltransferase 1), another RNA methyltransferase, was reported in a published study where knockout of both genes, but not either alone, significantly reduced RNA modifications and cell proliferation in mouse cells. We hypothesize that NSUN2 and TRDMT1 collaboratively promote a pro-tumorigenic phenotype in ovarian cancer by enhancing the expression and translation of pro-tumorigenic mRNAs. This project aims to determine the impact of individual and combined NSUN2 and TRDMT1 depletion on the tumorigenic phenotypes in ovarian cancer and the underlying molecular mechanisms. Methods NSUN2 expression was knocked out in OVCAR8 cells (a high-grade serous ovarian carcinoma cell line) via CRISPR editing. Lentivirus-mediated shRNA interference was used to knock down the expression of TRDMT1 in both wild type (WT) and NSUN2 knockout (NSUN2 KO) OVCAR8 cells. Western blotting was used to examine the protein levels of NSUN2 and TRDMT1. Cell growth and colony formation were determined by the neutral red uptake assay and clonogenic assay, respectively. Results cBioPortal analysis showed that TRDMT1 mRNA level is upregulated in 10% of ovarian cancer patients. Neutral red uptake assays and clonogenic assays showed that knockdown of TRDMT1 decreased cell growth and the number of colonies in both WT and NSUN2 KO cells compared to the control cells. However, no synergy between NSUN2 KO and TRDMT1 knockdown was observed, because TRDMT1 knockdown decreased cell growth and the number of colonies in both WT and NSUN2 KO cells to a similar extent in OVCAR8 cells. Conclusion The results show that TRDMT1 knockdown in OVCAR8 cells leads to a significant reduction in cell growth and colony formation (which measures single cell survival and proliferation), suggesting that TRDMT1 might play a pro-tumorigenic role in ovarian cancer. However, we do not observe a synergy between NSUN2 KO and TRDMT1 knockdown in OVCAR8 cells. Future directions involve development of TRDMT1 KO models in OVCAR8 cells and in additional ovarian cancer cell lines, which will allow us to investigate the long-term effect of single and combined KO of NSUN2 and TRDMT1 on the tumorigenic phenotypes in ovarian cancer. Additionally, our findings in vitro will be further tested in vivo using the mouse xenograft models.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 270
Presenter: Harry Wilton-Clark
Supervisor: Yokota, Toshifumi
Title: The development of N-of-1 exon skipping therapy to treat a young boy with Duchenne muscular dystrophy
Authors: Harry Wilton-Clark Eric Yan Sebastian Rodriguez Hernandez Toshifumi Yokota

Theme: Children's health and wellbeing

Introduction Duchenne muscular dystrophy (DMD) is a genetic disorder affecting approximately 1/5000 young boys characterized by progressive muscular degeneration, mandatory wheelchair use, and premature death, often in a patient's mid-late twenties. DMD is caused by a mutation in the DMD gene encoding for dystrophin, a protein that is necessary for muscular strength and stability. While no cure exists for DMD, a recent therapeutic approach called exon skipping therapy has shown great potential to help children affected by this deadly disease. This approach uses small DNA-like molecules called antisense oligonucleotides (AONs) to "skip over" the DMD-causing mutation, restoring the reading frame and dystrophin production of DMD to alleviate the disease. Since 2016, four AONs have received FDA approval to treat DMD, however all four AONs target mutations in a similar region and only cover ~30% of the DMD population, meaning that most patients still do not have access to this therapy. Here, we partnered with the family of a young boy with DMD caused by a mutation not currently treated by AONS, with the intent of developing N-of-1 AONs to halt the progression of his disease. In doing so, we hope to develop novel AONs that can treat both our patient and others with similar DMD-causing mutations, expanding the applicability of exon skipping therapy. Methods AONs predicted to help our patient were designed using in silico tools and synthesized. Patient-donated muscle cells were then treated with our AONs, and the most effective AONs were identified by assessing the percentage of exon skipping induced in patient transcripts and the level of dystrophin protein restored compared to the patient's untreated cells. We then developed a novel DMD mouse model containing the same mutation as our patient, and assessed the efficacy of our AONs in vivo by measuring and visualizing dystrophin restoration compared to untreated mice. All statistical analyses were one-way ANOVAs with post-hoc Tukey's test, $P<0.05$. Results We successfully developed AONs capable of inducing significant dystrophin restoration in our DMD patient cells. Similarly, our AONs were able to induce significant dystrophin restoration well beyond the therapeutic threshold in vivo in our novel mouse model. Notably, we also demonstrated that the exon-skipped protein product generated by our AONs co-localizes with other critical dystrophin-associated proteins in vivo, which is necessary for clinical benefit. Conclusions Based on our promising findings to date, we and our patient partners are extremely optimistic about the therapeutic potential of our AONs, and we are in the process of filing for an Investigational New Drug (IND) application with the FDA to begin treating our patient. In the interim, we are also assessing the efficacy of our AONs in patient cardiomyocytes to determine their cardiac benefit. We hope that based on the results of our IND trial, we can continue with larger scale clinical trials, helping to expand the availability of exon skipping therapy to as many patients with DMD as possible.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 271
Presenter: Dania Al-Rimawi
Supervisor: Dyck, Jason
Title: Pharmacological inhibition of ROMO1 reduces ovarian cancer cell proliferation
Authors: Dania Al-Rimawi, Yasser Abuetabh, Matthew D. Martens, Seyed Amirhossein Tabatabaei Dakhili, John R. Ussher, Jason R.B. Dyck

Theme: Lifelong women's health

Introduction: Despite our best therapeutic interventions, it is estimated that 6 women die from ovarian cancer every day. With such a high mortality rate, there is a pressing need for the development of more effective targeted anticancer therapies. Recent studies suggest that a mitochondrial protein, Reactive Oxygen Species Modulator 1 (ROMO1), is upregulated in tumour cells of female cancers, which has been correlated with metastasis and poor prognosis. Previous studies suggest that ROMO1 promotes the production of mitochondrial reactive oxygen species (ROS) which drives rapid cell cycle progression and cancer cell survival, growth, and proliferation. As such, ROMO1 may be a key anticancer therapeutic target of interest. Based on this, we hypothesized that pharmacological inhibition of ROMO1 may be an effective anti-tumour agent in ovarian cancer and that reduced ROMO1 activity lessens activation of signaling pathways that drive proliferation and cell cycle progression. To explore this, database-generated survival analyses were conducted and in silico modeling was performed by collaborators to screen a library of FDA-approved compounds. From this, a novel pharmacological inhibitor of ROMO1 was identified (Rxi-1). We subsequently used in vitro human ovarian cancer cells to explore the effect of Rxi-1 on metabolic activity and proliferation, followed by immunoblot analysis to examine expression levels of p27, a protein which inhibits cell cycle progression. Methods: Ovarian cancer patients were categorized into low or high ROMO1-expressing cohorts using the Kaplan-Meier (KM) plotter online database, and progression-free survival and overall survival were assessed as endpoints. Human ovarian cancer cells were cultured and treated with vehicle, 3.125μM Rxi-1 or 6.25μM Rxi-1. After 24 hours, cellular metabolic activity, which is positively correlated with proliferation, was quantified using colorimetric MTT assays. To assess the effect of ROMO1 inhibition on p27 expression, ovarian cancer cells were treated with the Rxi-1 and subjected to western blot analysis. Statistical analysis was performed using one-way ANOVA, where appropriate. Results: KM curves revealed that elevated ROMO1 expression in ovarian cancer greatly reduces progression-free survival and overall survival. Ovarian cancer cells treated with 3.125μM and 6.25μM Rxi-1 exhibited a 21% and 60% reduction in proliferation, respectively, compared to control. Consistent with our hypothesis, western blot analysis showed upregulated p27 expression in ovarian cancer cells treated with Rxi-1, indicative of cell cycle arrest. This was phenocopied in cells transfected with siROMO1, suggestive of a ROMO1-dependent effect. Conclusion: Our data show that elevated ROMO1 levels are correlated with reduced progression-free survival and overall survival, and that pharmacological inhibition of ROMO1 with Rxi-1 effectively blunts ovarian cancer cell proliferation. Furthermore, our data suggest that Rxi-1 treatment increases p27 expression, thereby providing a basis for further investigation into the mechanism by which ROMO1 influences cancer cell proliferation. Ultimately, this work may assist in the development of novel treatments to improve clinical outcomes of Canadian women with ovarian cancer.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 272
Presenter: Rebecca Tan
Supervisor: Alexander, Todd
Title: Knockout or genetic variations in the Aquaporin-1 water channel causes hypercalciuria and kidney stone disease
Authors: Rebecca Tan, Henrik Dimke, Todd Alexander

Theme: Children's health and wellbeing

Introduction: Kidney stones are mineral deposits that form within the kidney or urinary tract causing pain. Importantly, incidence of kidney stone disease is increasing 5-10% annually among children. More than 85% of kidney stones are composed of calcium and therefore, the greatest risk factor for stone formation is hypercalciuria (urine with high calcium content). Hypercalciuria results from failure of the glomerulus to reabsorb calcium along the nephron with defective proximal tubule calcium transport implicated as a factor in stone development. The proximal tubule is where the majority (~70%) of calcium is reabsorbed. Sodium reabsorption drives water reabsorption through Aquaporin-1 (AQP1) water channels, which in turn drives calcium reabsorption from this segment. GWAS studies identified intronic SNPs near AQP1 associated with increased kidney stone risk. However, how altered AQP1 expression or function results in stone formation is unknown. We hypothesize that reduced water flux through AQP1 in the proximal tubule results in hypercalciuria and increased risk of stone formation. The hypotheses are i) AQP1 SNPs associated with increased stone formation risk are associated with reduced AQP1 gene expression, ii) coding variants in AQP1 found in humans with hypercalciuria and kidneys stones reduce water flux and iii) Aqp1 knockout (KO) mice have hypercalciuria and renal calcifications. Methods: Male Aqp1 KO and wild-type (WT) mice were placed in metabolic cages for 3 days and received a low calcium (0.01%) diet (WT n=8, KO n=13) or normal calcium (0.7%) diet (WT n=31, KO n=35). Urine, feces, blood, and tissues were collected. To determine the effect of the AQP1 rs1000597 (Heterozygous T/C) SNP found to be associated with increased kidney stone risk, mRNA was extracted from human kidneys (n=22 female, n=37 male) and cDNA generated. QPCR was used to measure AQP1 gene expression normalized to 18S (DeltaCt AQP1). DNA from the human kidneys were sequenced to determine genotype (Reference T/T or Heterozygous T/C). Finally, we expressed WT and two AQP1 coding mutants found in a cohort of humans with kidney stones, then measured AQP1 water permeability by exposing oocytes to an anisosmotic solution and measured swelling by video microscopy. Results: Aqp1 KO mice have unaltered plasma ionized calcium levels and polyuria on both diets. KO mice had significantly higher urine calcium compared to WT mice only when fed a normal calcium containing diet. Only 9 male and 0 female human kidneys had the rs1000597 T/C SNP. There was no significant difference in AQP1 mRNA expression between male T/C (6.36 ± 2.57) and reference T/T allele (5.31 ± 2.99). AQP1 V107I and I115V mutations resulted in water pores with less permeability than WT. Conclusions: Aqp1 KO mice have hypercalciuria, suggesting AQP1 is necessary for calcium reabsorption from the proximal tubule. More human kidney samples with the rs1000597 T/C SNP are required to determine whether AQP1 expression is altered. Humans with coding mutations in AQP1 have hypercalciuria and kidney stones. These studies suggest loss of AQP1 expression or function result in hypercalciuria and increased kidney stone risk. Ultimately these studies will inform targeted therapies for kidney stone patients.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 274
Presenter: Neeharika Reddy Mattayavalahally Nagesh
Supervisor: Pagliardini, Silvia
Title: Perinatal Exposure to the cannabinoid THC disrupts Sleep and Respiratory Development Across Early Life Stages
Authors: Neeharika Reddy, Vivian Biancardi, Ismail Babale, Tara Janes, Gregory Funk, Silvia Pagliardini

Theme: Pregnancy and developmental trajectories

Introduction- Sleep and breathing development in newborns can be profoundly impacted by perinatal exposure to environmental and chemical agents, including cannabis use during pregnancy. This exposure is associated with substantial risks, such as sudden infant death syndrome (SIDS), preterm birth, low birth weight, and long-term developmental challenges like cognitive impairments, behavioural issues, and delayed physical development. With the legalization of cannabis, there is a growing perception that it is safe during pregnancy. Consequently, 5-15% of pregnant women in Canada and the US, particularly younger ones (under 25 years old), use cannabis during pregnancy and lactation. However, frequent and high-dose prenatal cannabis use is linked to negative outcomes in offspring such as cognitive impairment, behavioural problems, emotional and mental health issues, physical developmental delay neurodevelopmental effects and increased risk of SIDS. This study investigates the effects of perinatal exposure to Δ-9-tetrahydrocannabinol (THC), the primary psychoactive constituent of cannabis, known to act as a partial agonist at CB1 and CB2 cannabinoid receptors, on the development of sleep and breathing patterns across eight developmental stages (post-natal days - P - 0, 1, 2-3, 6-9, 10-11, 12-14, 21-23, and >42) in rats, aiming to understand its developmental consequences for the respiratory control and sleep pattern. Method- Pregnant rats were exposed to THC (1 mg/Kg) or a vehicle solution (PEG: H2O; 1:1) via osmotic pumps from gestational day 5 until P 14. To assess sleep patterns, P0-P14 rats underwent surgery to implant electromyography (EMG) electrodes in their nuchal muscles. From P21, rats were equipped with nuchal EMG and electroencephalography (EEG) electrodes for comprehensive sleep assessments. Breathing rate and sleep pattern were evaluated simultaneously using temperature-controlled whole-body plethysmography. Respiratory function was further measured using head-out plethysmography from P0 to P11 under normoxic, hypoxic, and hypercapnic conditions. Results- P6-7 THC-exposed pups exhibited a reduced percentage of active sleep, a milestone typically observed at P10 in control groups, suggesting a premature transition to a mature sleep pattern. Additionally, chemoreflex responses to both O2 and CO2 were significantly attenuated in THC-exposed pups across developmental stages, indicating impaired respiratory adaptability. The findings suggest that THC disrupts the normal development of both sleep and respiratory function, particularly during critical early postnatal periods. Conclusion- Perinatal THC exposure significantly disrupts sleep-wake patterns and respiratory function in postnatal rats, with early exposure leading to premature shifts in sleep states and compromised respiratory reflexes. These disruptions highlight the potential for long-term neurodevelopmental consequences following prenatal cannabis exposure, underlining the importance of addressing cannabis use during pregnancy in the context of women's and children's health. Further research is warranted to explore the long-term impact of perinatal cannabinoid exposure on offspring development and health outcomes.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 275
Presenter: Devarasa Giriyapura Murugeshappa
Supervisor: Sharifzadeh-Amin, Maryam
Title: Adolescents' perspectives on social media's influence in shaping oral health
Authors: Devarasa Murugeshappa, Harmanpreet Kaur, Gordon Gow, Arnaldo Garcia-Perez, Maryam Amin.

Theme: Children's health and wellbeing

Introduction: Despite a global decline in caries prevalence, high-risk groups still face significant oral health challenges. Proper diet, brushing, flossing, and fluoridated toothpaste, combined with regular dental visits, are essential to prevent dental caries and gum disease. Adolescents, especially disadvantaged ones, often face barriers to care. In Alberta, 26% of uninsured children and 6% with insurance avoided dental visits due to cost. Caries prevalence among 12-19-year-olds has risen to 59%, with higher risks due to diet changes and the shift to autonomous care. Social media offers a platform to reduce health inequalities by providing accessible health information. While used for health education, its impact on adolescents' oral health behaviors remains underexplored. This study aims to understand adolescents' perceptions of oral health and their views on using social media for oral health purposes. Methods: A qualitative study was conducted using photo-voice, individual interviews, and focus groups with fifteen adolescents aged 13-18 years old living in Edmonton. For the photo-voice, participants were asked to bring oral health-related content, such as photos or videos, from their preferred SM to encourage active discussions. The interviews and focus groups were recorded, transcribed verbatim, and analyzed using NVivo-14 software. Open coding was done by reading the transcripts. The codes were grouped into categories and interpreted using manifest content analysis. Results: Adolescents perceived a healthy mouth as being free of cavities and gum infection, having clean teeth without plaque and deposits, and no oral malodor. Beyond the understanding of the significance of dental plaque and sugar, they also recognized the value of regular dental visits and having white, well-aligned teeth. Most participants brushed their teeth twice daily, but only a few flossed regularly. Participants used social media platforms like Instagram, YouTube, TikTok, and Snapchat daily, but favoured those that enabled communication with friends, had a larger follower base, and offered opportunities to comment and share opinions. While most participants indicated that they had come across oral health information on these platforms, only a few actively sought oral health information on a specific topic like teeth whitening. However, when it came to obtaining reliable information about oral health and hygiene, they preferred consulting dental health care providers over social media. Conclusions: The results indicate that while adolescents are aware of basic oral health practices and encounter related information on social media, they still rely on dental health care providers for trustworthy guidance. This highlights the need for integrating credible oral health education into the social media spaces where adolescents are already active.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 276
Presenter: Brennan Salte
Supervisor: Pituskin, Edith
Title: A systematic review of assessment techniques for cancer treatment-related autonomic dysfunction in women with ovarian and breast cancer
Authors: Brennan Salte Dr. Kathleen Hegadoren Dr. Edith Pituskin

Theme: Lifelong women's health

Introduction 1.5 million Canadians have received a cancer diagnosis in the last 25 years. Of these, breast and ovarian cancers encompass 40% of cancers affecting females. The cornerstone of both breast and ovarian cancer therapy are taxanes with known neurotoxic effects. The contribution of these medications to peripheral neuropathy are known, but even more significant impacts are believed to occur to the autonomic system, called "cancer treatment-related autonomic dysfunction" (CTRAD). CTRAD remains poorly understood, and as with many women's diseases remains under-diagnosed, under-treated and under-supported. Nurses are most commonly the first health professionals to perform symptom review and clinical assessments. To date, there is no sensitive and specific bedside clinical screening tool for early signs of CTRAD. Methods The goal for this project will be to both determine what assessment techniques for CTRAD are used in the literature as well as to evaluate their potential efficacy and applicability to the clinical environment. The methodological framework used will be Joanna Brigg's Institute recommendations for systematic reviews of effectiveness. The search strategy under these recommendations is an a priori three-phase process. First, initial key words will be identified and used in a limited number of databases. Analysis of text words in the title, abstract and index terms of this initial search will be used to broaden key words. Secondly, each database in the review protocol will be searched. The third phase will examine reference lists of all initial studies to identify additional literature for inclusion. The search strategy will be evaluated by a university librarian prior to implementation. Inclusion criteria will be papers investigating CTRAD in female patient with breast and ovarian cancer in the last 15 years. These techniques will be extracted and compiled. The GRADE approach will be used for the reporting of the strength of evidence of techniques used. Data synthesis approach will be narrative summary/synthesis. Reporting of results will comply with the PRISMA-P guidelines. Results This abstract represents a 'work in progress' and thus no results are available. It is the aim of this project to perform a systematic review of screening tools used for the determination of CTRAD associated with taxane-based chemotherapy in breast and ovarian cancer. A secondary goal is the evaluation of these screening tools for efficacy and applicability for the bedside nurse. The expected outcome of this project is identification of screening tools used to detect CTRAD. If one or more of these techniques can be utilized in the clinical environment, this would be a highly valuable tool for oncology nurses worldwide. If no such tool can be identified this could indicate the need for valuable future research to develop such a tool. Conclusion CTRAD is a condition which is affecting a growing number of women as survivorship from breast and ovarian cancer improves. Yet, bedside screening tools are not routinely used in the clinical setting. If such a tool exists, it is the intent of this research to identify a suitable candidate to improve early recognition of this neurotoxic effect.

This research has been funded by the Alberta Women’s Health Foundation through the Women and Children’s Health Research Institute.

Participant #: 277
Presenter: Zahra Zandi
Supervisor: Bhavsar, Amit
Title: Unraveling the Role of Matrix Metalloproteinases in Cisplatin-Induced Hearing Loss: Implications for Therapeutic Intervention
Authors: Zahra Zandi, Bridgette Hartley, Wesam Bassiouni, Maria J. Spavor, Richard Schulz, Olivier Julien, Amit P Bhavsar

Theme: Children's health and wellbeing

Introduction: Cisplatin is a cornerstone chemotherapeutic agent for treating solid tumors in adults and children. This potent chemotherapeutic is associated with irreversible hearing loss in a substantial percentage of patients, notably affecting children, as up to 70% of children treated with cisplatin develop hearing loss. Studies have shown that the induction of reactive oxygen-nitrogen species (RONS) plays a vital role in cisplatin-induced hearing loss (ototoxicity). On the other hand, matrix metalloproteinases (MMPs) are a family of zinc-dependent proteases that are activated downstream of RONS and take part in the induction of inflammation and cell death. This study aimed to investigate the involvement of MMP2 and MMP9 in cisplatin-induced ototoxicity and to identify the possible targets of MMPs that may cause damage to cochlear cells. Methods: HEI-OC1 cells were used as an in-vitro model of cochlear hair cells, and MMP2/9 expression and activity were assessed via qPCR and gelatin zymography post-cisplatin treatment. Cytokine secretion served as a method to study the inflammatory status of the cells, while MTT assay was used to measure cell viability. Mass spectrometry also unveiled proteome alterations as a result of cisplatin treatment. Results: Results revealed immediate MMP2/9 overexpression following cisplatin exposure, with MMP2 and MMP9 activity escalating later, suggesting the involvment MMPs in CIO progression. It was also shown that MMP2/9 inhibition or gene knockdown mitigated cisplatin-induced interleukin-6 secretion and cell death in hair cells, introducing these proteins as potential targets for mitigating CIO. Finally, mass spectrometry hinted at the RAB protein family as possible downstream MMP targets post-cisplatin treatment. Conclusions: The results of this study indicate that MMPs contribute to cisplatin-induced ototoxicity, suggesting that targeting MMPs could render a potential therapeutic opportunity for preventing or mitigating CIO in patients treated for cancer, especially for the most vulnerable group, children.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 278
Presenter: Randall Allen
Supervisor: Yokota, Toshifumi
Title: Antisense oligonucleotide mediated exon inclusion as a patient customized treatment for giant axonal neuropathy
Authors: Randall Allen, Umme Sabrina Haque, Farhia Haque, Satomi Shirakaki, Jessica Yang, Rohini Roshmi, Stanley Woo, Rika Maruyama, Hanna Kolski, and Toshifumi Yokota

Theme: Children's health and wellbeing

Introduction: Giant axonal neuropathy (GAN) is a rare autosomal recessive neurodegenerative disorder with an onset during early childhood. GAN patients experience motor, sensory, and central nervous system impairments with most becoming wheelchair bound by their teenage years. The molecular basis of this disease results from mutations in the GAN gene which encodes the gigaxonin protein. Gigaxonin functions as an E3 adaptor protein, critical for regulating the degradation of intermediate filaments (IFs). In the absence of functional gigaxonin, IFs including neurofilament accumulate within cells. In neurons, this neurofilament aggregation leads to axonal swelling, neuronal degeneration, and the subsequent neurological dysfunction present in patients. Unfortunately most GAN patients do not survive past their twenties and there are currently no approved treatment options. To fill this much needed gap, we explore the use of synthetic DNA-like molecules called antisense oligonucleotides (ASOs) as a therapeutic approach for GAN. Methods: In a child with GAN, we identified an intronic mutation present in intron 4 of their GAN gene. This weakens an existing splice acceptor site causing exon 5 to be skipped and disrupting the gigaxonin reading frame. We hypothesize that modulating pre-mRNA splicing with ASOs can lead to exon 5 inclusion, restore the protein reading frame, and produce functional full length gigaxonin. Customized ASOs of various sequences and chemistries were designed targeting GAN intron 4 and tested in a patient-derived GAN fibroblast cell model. RT-PCR with agarose gel electrophoresis was employed to screen for ASOs capable of promoting exon 5 inclusion. Immunocytochemistry (ICC) assessed aggregation of the IF vimentin to evaluate potential functional benefits provided by ASO treatment. Results: Our patient-customized ASOs were found to induce a significant increase in full length GAN mRNA in vitro. Preliminary ICC results indicate reduced vimentin aggregation following treatment providing evidence of functional gigaxonin restoration. Conclusion: This study presents the development of a novel n-of-1 ASO-mediated treatment for GAN. Ongoing research to validate the safety and efficacy of our approach provides a promising new therapeutic outlook for this devastating disease.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 279
Presenter: Bethan Wilson
Supervisor: Riddell, Meghan
Title: Title: Comparing the endothelial genetic signature alterations and vascular structural changes in the non-pregnant human endometrium and across the first trimester
Authors: Bethan Wilson, Juan Gnecco & Meghan Riddell

Theme: Pregnancy and developmental trajectories

Introduction: An essential process to ensure pregnancy establishment is the conversion of the endometrial lining into the decidua during the secretory phase of the menstrual cycle. This requires extensive vascular adaptations in the expanding tissue that begins pre-implantation. However, mapping of human decidual vascular adaptations aside from spiral artery remodeling is limited. Endothelial cells (EC) are key drivers of remodeling of vascular networks. Therefore, we mapped EC adaptations of the human endometrial lining into the decidua basalis in the first trimester of pregnancy using single-cell RNA sequencing (scRNA-seq) and visualised large-scale vascular network remodeling using light sheet microscopy. Methods: Decidual scRNA-seq was performed using 10X genomics on dissociated human decidua basalis, gestational age (GA) 4-13 weeks (n=16). Endometrial scRNA-seq was used from PMID: 36539619. Gene ontology (GO) pathway analysis with [g:Profiler]. Decidual and endometrial tissue sections (1cm3) were stained with UEA-lectin (EC), anti-SMA (smooth muscle actin) and cleared via an adapted iDISCO protocol, imaged by light sheet microscopy, and quantified with Imaris software. Results: Top EC differentially expressed genes (DEG) included higher expression of MKI67, a marker of EC proliferation, and neo-vascularization markers APLN and ESM1 in the endometrial progesterone receptor positive EC. GO pathway analysis revealed enrichment of EC gene expression associated with lymphocyte chemotaxis in the endometrial arteries. Imaging analyses revealed a shift towards large caliber vessels from endometrium to decidua, with decreased EC proliferation with pregnancy. Conclusion: Our results reveal that the human decidual vasculature develops high calibre blood vessels in the near absence of EC proliferative gene signatures when compared to the endometrium. The EC of the endometrium appear to increase EC availability and blood vessel numbers while the decidua appears to remodel vascular structures via EC migration. Therefore, improper adaptation of the EC gene expression and overall vascular structures could limit vascular capacitance and contribute to the development of pregnancy complications and recurrent spontaneous abortion.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 281
Presenter: Kaiden Conway
Supervisor: Khoury, Michael
Title: Can a Virtual Home Exercise Intervention Improve Exercise Performance in Children with CHD?
Authors: Kaiden Conway, Rae Foshaug, Christopher Spence, Samira Rowland, Joshua Perka, Michael Stickland, Jennifer Conway, Andrew Mackie, Nee Khoo, Michael Khoury

Theme: Children's health and wellbeing

Introduction The MedBIKE program is a home-based, videogame linked high intensity interval training (HIIT) telemedicine program for 10 - 18-year-old children with congenital heart disease (CHD). We are evaluating the impact of this intervention on exercise capacity, physical activity, vascular function, self-efficacy towards physical activity (PA), and health-related quality of life (HRQoL). Methods Trial recruitment for the MedBIKE study is currently underway, and consists of a randomized crossover trial in 10-18-year-old children with repaired moderate-severe complexity CHD. After recruitment, participants undergo a baseline assessment involving assessment of vascular function (via EndoPAT), cardiopulmonary exercise testing with spirometry, questionnaire assessment of HRQoL, self-efficacy, and PA levels, and PA assessment via accelerometer for 7 days. Following this, participants are randomized to either receive the MedBIKE or enter a usual care arm. Following installation in their home, participants in the MedBIKE arm undergo a 12-week, 36 session HIIT intervention. The MedBIKE permits remote audio and visual supervision from an exercise specialist, with remote modulation of resistance, and ECG and oximetry monitoring capabilities. All participants undergo a repeat assessment following the intervention (and 12-weeks post baseline for usual care participants), after which crossover occurs such that those in the usual care arm undergo the MedBIKE intervention with a repeat assessment thereafter. Follow-up evaluations also occur 6 - and 12- months post-MedBIKE intervention. Results The trial is currently ongoing. Thus, only limited, preliminary results are being reported. To date, 24 participants have been recruited and 12 participants have completed the MedBIKE intervention (13.8 ± 2.5 years old, 58% male). Among those that have completed the MedBIKE intervention, pre- and post-intervention peak oxygen consumption (VO2) was 1.56 ± 0.4 L/min and 1.70 ± 0.5 L/min, respectively, and peak work rate was 98.9 ± 36.9W pre-intervention and 116.2 ± 36.8W post-intervention. There have been no adverse effects attributed to the intervention thus far and adherence to the intervention protocol has been high, with all participants completing at least 35 of the 36 sessions thus far. Full analysis, including secondary outcomes (PA, HRQoL, vascular function, self-efficacy, and 6- and 12-month follow-up evaluations) will be completed at the conclusion of the trial. Conclusion Preliminary analysis from this ongoing randomized crossover clinical trial suggests that the home-based MedBIKE HIIT program is safe, feasible, and well tolerated, and has yielded promising early findings suggesting potential improvements in exercise capacity. This trial will yield important insights towards the development of a home-based telemedicine cardiac rehabilitation for children with repaired CHD.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 284
Presenter: Sela Scott
Supervisor: Castro Codesal, Maria
Title: Barriers and facilitators to the implementation of a care pathway for medically complex children with tracheostomy
Authors: Scott, Sela; Kammerer, Elise; Ofosu, Daniel; Qureshi, Nadia; Kam, Karen; Mack, Cheryl; Van Manen, Michael; Castro-Codesal, Maria

Theme: Children's health and wellbeing

Introduction In Alberta, <40 children per year receive a tracheostomy (trach), but they account for >60% of children hospitalized for >180 days and >30% of the province's annual acute care budget. To reduce length of stay and improve children's health outcomes, our team is implementing a project called DECIDE-T to standardize a tracheostomy care pathway embedded in Connect Care. We administered a cross-sectional survey to identify barriers and facilitators to implementation of the project and recruited interested survey participants to participate in a follow-up interview to discuss their perspectives in depth. Methods We created a cross-sectional survey based on the revised Consolidated Framework for Implementation Research (CFIR) to identify potential barriers and facilitators to implementing DECIDE-T. Participants were invited to provide their contact details for a follow-up interview. The semi-structured interview guide was also based on CFIR. Unit leaders of all hospital units implicated in the care of children with trachs at the two tertiary children's hospitals in Alberta (Stollery/SCH and Alberta/ACH Children's Hospitals) distributed the survey to among staff and physicians including NICU, 2 PICUs, 4 ward units, the respiratory department, and homecare programs. Results We collected 62 responses from March to April 2024: 85% (n=53) respondents from SCH, 7% (n=4) from ACH, and 8% (n=5) from children's homecare. Respondents worked in respiratory therapy (n=23; 37%), nursing (n=22; 35%), medicine (n=10; 16%), and other areas like occupational therapy or social work (n=7; 11%). Half of respondents (n=30; 48%) had <10 years' experience caring for children with trachs. 90% of respondents (n=55) had not yet been engaged in the DECIDE-T program. Important facilitators to implementing the program include: (1) demonstration of an adequate evidence base (e.g., "Provide clear and concise evidence of the problem [and] the change that is chosen") and (2) emphasizing shared values and beliefs around caring for children with tracheostomy (e.g., "Changes have clear benefit to caregiver/patient experience"; "Convince me that the care would be safer for the patient"). Factors that could impede implementation of the program include: (1) negative changes to workload (e.g., "If it is very time consuming with frequent high workloads") and (2) if information sharing was deemed suboptimal (e.g., "Excessively wordy emails, lack of context for why the change is occurring, lack of communication when posed with questions about the changes"). We conducted 5 interviews with frontline workers between April and June 2024. We will present the results of our analysis at WCHRI Research Day. Conclusion To implement the DECIDE-T program, evidence promoting the changes should be clearly communicated with an emphasis on the shared evidence-based value of improving children's care and outcomes, and disruptions to provider workload must be minimized wherever possible.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 286
Presenter: Caitlin Hurd
Supervisor: Yang, Jaynie
Title: Parent-therapist partnership to ELEVATE gross motor function in children with perinatal stroke: results of a randomized controlled effectiveness trial
Authors: Caitlin Hurd, Michelle Barnes, Christa M Diot, Elizabeth G Condliffe, Man-Joe Watt, John Andersen, Adam Kirton, Jaynie F Yang

Theme: Children's health and wellbeing

Introduction Early, active rehabilitation enhances motor function following early brain injury. This is especially clear in the upper extremity, whereas less is known for the lower extremity. We previously found in a laboratory setting that intensive rehabilitation targeting the lower extremity, an intervention called ELEVATE (Engaging the Lower Extremity Via Active Therapy Early), resulted in significant improvement in gross motor function, as compared to a usual care control group. The purpose of this trial was to evaluate the effectiveness of ELEVATE for children with perinatal stroke when delivered using a parent-therapist partnership model of therapy. Methods We conducted a three-centre waitlist-control, single-blind randomized controlled trial. Participants were children with perinatal stroke aged eight months to three years with signs of hemiparesis. Participants were randomly allocated to an ELEVATE intervention group, or a waitlist-control group, who received usual care for six months. The ELEVATE intervention involved one hour of training four days per week for 12 weeks, with a community pediatric therapist and a parent or guardian each delivering two sessions per week. The intervention progressively challenged the child while standing and walking. The primary outcome measure was the Gross Motor Function Measure-66 (GMFM-66), which was assessed by physiotherapists blinded to the participants' group allocation. Secondary outcomes included treatment fidelity, passive range of motion of the ankle and an instrumented measure of spasticity. Results Twenty six participants enrolled in the study, but seven withdrew due to interruptions from the COVID-19 pandemic and personal reasons. All participants were classified as Gross Motor Function Classification System (GMFCS) Level I at baseline. The average baseline GMFM-66 score was 48.5 ± 9.7 for the intervention group and 41.3 ± 13.7 for the control group. Out of a possible 48 sessions, participants completed an average of 41.3 ± 12.1 including 20.5 ± 2.8 with a therapist and 23.2 ± 5.4 with a parent. For children who were not walking independently at the beginning of the intervention, the average number of strides during the one-hour intervention increased from 1397.5 ± 741.1 in the first week to 1872.1 ± 814.1 in the final week. GMFM-66 scores improved by an average of 9.5 ± 4.4 in the intervention group, and by 6.3 ± 3.4 in the control group over the first 6 months in the study (p = 0.10). The increase in passive dorsiflexion range of motion over six months was 10.0 ± 5.9 degrees for the intervention group and 3.0 ± 9.5 degrees for the control group (p=0.24). Spasticity assessments revealed that the change in angle at reflex onset over the first six months was 1.6 ± 12.5 for the intervention group and -7.4 ± 10.8 for the control group (p=0.23), where a negative value indicates the reflex is occurring at a more plantarflexed position. Conclusion The results suggested that parents and community therapists can deliver the ELEVATE intervention in a parent-partnership model of rehabilitation, but did not demonstrate a significant increase in gross motor function. This study was underpowered statistically, so results should be interpreted with caution.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 289
Presenter: Jaqueline Munhoz
Supervisor: Field, Catherine
Title: Determinants of maternal and infant omega-3 long-chain polyunsaturated fatty acids status at 3 months postpartum
Authors: Jaqueline Munhoz, Nour Wattar, Susan Goruk, Mohammadreza Pakseresht, Megan Jarman, Laura Forbes, Rhonda C. Bell, Catherine J. Field.

Theme: Pregnancy and developmental trajectories

Introduction: The essential long-chain polyunsaturated fatty acids (LCPUFAs) docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) are crucial dietary components for optimal maternal and infant nutrition. Numerous studies have associated higher maternal omega-3 LCPUFA status with improved birth outcomes. However, there is still no consensus on the ideal intake during pregnancy or lactation. Additionally, the impact of dietary intake and supplements, and the role of various maternal and infant sociodemographic factors, is not yet fully understood. This study aimed to investigate nutritional intake and sociodemographic characteristics as maternal predictors of DHA and EPA levels in serum phospholipids and breast milk at 3 months postpartum within a large prospective cohort. Additionally, the study explored the associations between maternal DHA and EPA status and the corresponding fatty acid status in their infants. Methods: The study participants included pregnant women (n=1481) and their offspring (n=526) at 3 months postpartum, recruited into the Alberta Pregnancy Outcomes and Nutrition (APrON) longitudinal cohort. Dietary intake was assessed at 3 months postpartum using face-to-face 24-hour recalls or the validated online Food Behaviour Questionnaire, followed by food processor analysis. Blood samples from both mothers and infants, along with maternal breast milk samples, were collected to determine fatty acid composition using a modified Folch extraction method and gas chromatography analysis. Univariate and multivariate linear regression analyses were conducted to explore the associations. Statistical significance was considered at $P<0.05$ (two-tailed). Statistical software SPSS was used for all analyses. Results: Maternal total intake of DHA, EPA, and their combined total, from both supplements and overall dietary sources, was positively associated with their respective percentages (w/w%) in maternal serum phospholipids and breast milk at 3 months postpartum ($P<0.01$). Among maternal characteristics, pre-pregnancy BMI was inversely associated with the proportion of DHA, total n-6, and total PUFAs in both serum phospholipids and breast milk total lipids ($P<0.05$). Non-white ethnicity was positively associated with DHA in maternal serum phospholipids ($P<0.001$). Exclusively breastfeeding was positively associated with the proportion of omega-3 LCPUFAs in infant plasma phospholipids compared to infants fed formula in combination with breastfeeding ($P<0.001$). Significant associations were found between the composition of omega-3 LCPUFAs in maternal serum phospholipids and breast milk total lipids, as well as between breast milk composition and infant plasma phospholipids (all $P<0.001$). Conclusion: Maternal intake of omega-3 LCPUFAs from diet and supplements is a predictor of omega-3 LCPUFAs composition in maternal serum and breast milk at 3 months postpartum, which in turn influences the fatty acid status of infants. Exclusive breastfeeding strongly predicts a higher omega-3 LCPUFAs status in infants at this age. Future research should investigate the impact of different formulas, particularly those with DHA, on omega-3 status in non-exclusively breastfed infants and compare their status to that of exclusively breastfed infants.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 290
Presenter: Dalal Alzaid
Supervisor: MacLean, Joanna
Title: Long-term non-invasive ventilation in children with central nervous system disorders : a systematic review
Authors: Dalal Alzaid BSc.; Florence Birru MBBS; Deborah Olmstead MN, NP; Joanna MacLean MD, PhD.

Theme: Pregnancy and developmental trajectories

Introduction Long-term non-invasive ventilation (LT-NIV), where support for breathing is given through a mask, is a common treatment for sleep-related breathing disorders in children. Children with central nervous system (CNS) disorders are at risk for obstructive sleep apnea and impaired respiratory gas exchange because of impairments in upper airway muscle function and breathing control. Although LT-NIV has demonstrated benefits for respiratory function and quality of life in children with other medical conditions, its effectiveness in this population is uncertain. Our research question focuses on whether the use of LT-NIV in children with CNS disorders leads to improved mortality, shorter hospital stays, enhanced respiratory function, improved sleep study parameters, and improved quality of life. Methods This systematic review is an extension of a scoping review of LT-NIV in children. The scoping review search strategy utilized Medical Subject Headings (MeSH) and free-text terms for "child" and "non-invasive ventilation." Human studies of children aged 0-18 years published since 1990 were identified through MEDLINE, Embase, CINAHL, and the Cochrane Library. The results of the scoping review were searched for studies on children with CNS disorders. All study designs were included, and reference lists were reviewed for relevant articles. Studies of children using non-invasive ventilation <3 months or only in an acute care setting were excluded. Result A total of 43 articles that included 1828 children with CNS disorders using LT-NIV were identified from the scoping review. Children with CNS disorders accounted for 19% of those receiving LT-NIV. While most articles discussed CNS disorders within a broader context of non-invasive ventilation, congenital central hypoventilation syndrome was the single most common CNS disorder in the included articles (11/43, 25.6%). There were no articles reporting on respiratory function or quality of life in children with CNS disorders. Sleep study parameters from four articles showed improvements following LT-NIV initiation in children with CNS disorders. This included improved SpO2 (pre-NIV 95.3% vs. post-NIV 99%), apnea-hypopnea index decreased (pre-NIV 21.3 vs. post-NIV 12.2 events/h), and a reduction in the time spent with SpO2 < 95% (pre-NIV 22.2% vs. post-NIV 7.85%, $p < 0.05$). The overall mortality rate from six articles indicated 11% (29 out of 259) of children with CNS disorders died while using LT-NIV. Combining three articles, hospitalization outcomes varied: among nine children, the hospitalization rate remained unchanged with 33 total visits before and after LT-NIV initiation. Children with CNS disorders had 3.3 times higher odds of hospitalization compared to other children on LT-NIV ($p < 0.001$). In one case study including 4 children, one child had an extreme instance of 24 hospital admissions post-LT-NIV. Conclusion The results of this review indicate that LT-NIV can be effective for children with CNS disorders. However, there is no data on the effect of LT-NIV on respiratory function and quality of life in these children and limited data on hospitalization and mortality rates. Further research is needed to confirm its effectiveness and optimize LT-NIV strategies.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 292
Presenter: Madison Pilon
Supervisor: Caluseriu, Oana
Title: Evaluation of prenatal whole exome sequencing in pregnancies with anomalies - an Edmonton experience
Authors: Madison C. Pilon, Oana Caluseriu

Theme: Pregnancy and developmental trajectories

Introduction With any pregnancy, patients and families will face moments of important lifelong decision making that can impact the health of both the mother and child. Prenatal genetics has increasingly been able to offer earlier detection of such diagnoses, which are crucial in providing medical and social support for managing these complex pregnancies. Following its clinical success in pediatric and adult cases, whole exome sequencing (WES) has become one of the most powerful technologies used in prenatal genetics. In 2021 Alberta Health Services initiated a pilot program to utilize WES during pregnancies with anomalies and this study set out to evaluate the impact of prenatal WES utilization within the initial 2.5 years of the program. Methods Prenatal WES was offered to patients referred to medical genetics whose pregnancies showed congenital anomalies on fetal imaging and had negative preliminary testing. Our study involved comprehensive chart reviews for each prenatal WES case, assessing medical records that included detailed clinical histories, imaging findings and genetic test results. Analysis was completed to determine the overall yield of genetic diagnoses established using WES and to assess the clinical phenotypes and outcomes for all cases. Results A total of 72 prenatal WES cases were performed at the Edmonton maternal fetal medicine clinic between April 2021 and December 2023. Within our cohort, 22.2% (16/72) received a positive diagnosis that could explain the fetal phenotype. 87.5% (14/16) of these diagnosed fetuses presented with multisystem abnormalities, demonstrating prenatal WES's valuable utility in these pregnancies. Further analysis elucidated novel and previously unrecognized prenatal phenotypes in several rare genetic disorders. Additionally, our study recorded information relating to maternal health, contributory family history, detailed pre- and postnatal phenotype, and pregnancy outcomes, enhancing our understanding of the prenatal cases managed by medical genetics in Edmonton. Conclusion Through a retrospective evaluation of real-life clinical cases, our study provides a status of the integration of prenatal WES and demonstrates its utility within the context of our unified public healthcare system. Our next step is to similarly evaluate prenatal WES cases performed in Calgary, therefore, helping guide prenatal genetics care in Alberta and beyond.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 293
Presenter: Patricia Candelaria
Supervisor: Ali, Samina
Title: Non-steroidal or opioid analgesia for children with acute musculoskeletal injuries: the No OUCH trials
Authors: Candelaria P, Poonai N, Bhatt M, Gouin S, Sawyer S, Stang A, Ali S, on behalf of the KidsCan PERC Innovative Pediatric Clinical Trials No OUCH Study Team

Theme: Children's health and wellbeing

Introduction: Musculoskeletal (MSK) injury is associated with moderate to severe pain in most children. While ibuprofen is recommended as first-line therapy for children's mild-moderate MSK pain, optimal management for more severe pain remains unclear, especially when considering family concerns surrounding opioids. Methods: Using a novel preference-informed complementary trial design, we conducted 2 simultaneous randomized, double-blind, controlled trials. Children 6-17 years, presenting to one of six Canadian pediatric emergency departments with an acute MSK injury (<24 hours) of a single limb and a verbal numerical rating scale (vNRS) score >5/10 were recruited from April 2019 to March 2023. Our primary objective was to determine the effectiveness of a combination of oral opioid and non-opioid analgesic medications [ibuprofen (IBU-10mg/kg) + acetaminophen (ACET-15mg/kg); IBU (10mg/kg) + hydromorphone (HM-0.05mg/kg); IBU (10mg/kg) alone]. The primary outcome was self-reported vNRS score at 60 minutes. Results: A total of 699 children were randomized and 653 were included in the primary analyses (IBU+ACET=295, IBU+HM=110, IBU alone=294). Mean (SD) age was 11.5 (3.5) years, 47.4% (331/699) were female, and initial mean (SD) vNRS score was 6.4 (1.8); demographic characteristics were similar across the three study groups. The most frequent injury location was the upper limb 43.3%, 302/698). Mean (SD) vNRS scores 60 minutes post drug administration were 4.6 (2.4) IBU+ACET, 4.8 (2.6) IBU+HM, and 4.6 (2.3) for IBU alone. Mean (SD) pain reduction at 60 minutes was -1.9 (2.2) IBU+ACET, -1.7 (2.1) IBU+HM, and -1.8 (1.9) for IBU alone. Mean (SD) pain reduction at 120 minutes was -2.0 (2.4) IBU+ACET, -1.6 (2.2) IBU+HM, and -2.0 (2.3) for IBU alone. Proportions of children achieving a VNRS <3 were 19.9%, 23.4%, and 19.3% for IBU+ACET, IBU+HM, and IBU alone. The proportion of children achieving a vNRS score reduction of >2 were 53.0%, 55.1%, and 51.3% for IBU+ACET, IBU+HM, and IBU alone. Adverse events occurred most frequently in IBU+HM (28.2%) compared to IBU+ACET (6.1%) and IBU alone (6.1%). No serious adverse events occurred. Conclusion: Combining ibuprofen with either acetaminophen or hydromorphone did not provide better analgesia than ibuprofen alone for children with an MSK injury. Adverse events were over 4-fold more frequent with hydromorphone use. These trials' results do not endorse adding oral hydromorphone or acetaminophen to ibuprofen for moderate-severe MSK injury pain in children.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 294
Presenter: Abigail Yohannes
Supervisor: Parent, Eric
Title: A systematic review of the effect of progressive weaning compared to sudden cessation on the outcomes of bracing in adolescents with idiopathic scoliosis
Authors: Abigail Yohannes, Jide Ukaigwe, Brianna Fehr, Vincent Mcrorie, Sarah Southon Hryniuk, Kathleen Shearer, Eric Parent

Theme: Children's health and wellbeing

INTRODUCTION: Adolescent Idiopathic Scoliosis (AIS) affects 3% of adolescents with uneven shoulders, a protruding ribcage, and waist asymmetries. Some have back pain or poor self-image. Rigid bracing is prescribed 18-23hrs per day for curves 20 to 40° until skeletal maturity. The value of progressive weaning to allow muscles to adapt to removing the brace is controversial. OBJECTIVE: This systematic review aimed to compare the effect of progressive brace weaning to sudden brace weaning on curve progression in AIS. METHODS: This review was registered in Prospero (CRD42024502861). We searched: CINAHL, EMBASE and MEDLINE. Clinicians and librarians combined search terms on AIS treated with different braces, reporting curve angles or progression to surgery. Articles were selected studying adolescents 10-18yrs at baseline, diagnosed with AIS, prescribed a rigid brace, and describing a weaning strategy. Screening of abstracts and full-texts was completed by pairs from six reviewers. Two reviewers completed extraction and used the Newcastle Ottawa scale, to assess study quality (/9 pts). Low quality was defined as <7. Outcomes included frequency of scoliosis progressions defined as >5°, to severe (eg >40°), and to surgery. Summary statements were formulated based on the study quality and the consistency of the results to label the evidence as Strong, Moderate, Limited, Conflicting, or no evidence. We meta-analysed changes in Cobb curve angles from baseline to a minimum 1 year follow-up comparing studies using progressive or sudden weaning. RESULTS: Our search found 417 abstracts. We then reviewed 89 full-text articles. We included 35 papers for extraction. This summary includes six papers each on progressive brace weaning and sudden weaning with at least 1 year follow-up. For progression by >5°, we found insufficient evidence from a single low-quality study of progression with sudden weaning, and conflicting evidence from 4 groups using progressive weaning. For progression to severe, no evidence was identified for sudden weaning, and progressive weaning in 4 groups presented conflicting evidence. For progressions to surgery, sudden weaning showed conflicting outcomes in 3 groups, and no evidence was available for progressive weaning. The meta-analysis of curve angle changes from baseline to follow-up included 8 groups with progressive weaning with no significant curve change during treatment -4.2° [-8.5; 0.2]. One showed some improvement, five had worsened and 2 did not change. Meta-analysis from 15 groups reporting on sudden weaning also showed no significant curve change during treatment 2.7° [-6.4; 11.8] Seven showed significant improvement, three found no change but the other five found curve worsening over time. There was no significant difference between the pooled effect of progressive weaning and sudden weaning 0.3° [-6.9; 7.5]. CONCLUSION: Low-quality and heterogeneous evidence showed no difference between the effect of using progressive or sudden brace weaning after at least 1 year follow-up in AIS.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 295
Presenter: Tanin Shafaati
Supervisor: Ussher, John
Title: Increasing circulating ketones has minimal impact on the cardiac abnormalities present in a mouse model of Barth syndrome
Authors: Tanin Shafaati, Keshav Gopal, Magnus Stenlund, Seyed Amirhossein Tabatabaei Dakhili, Jordan S.F. Chan, Christina T. Saed, Sally R. Ferrari, Indiresh Akil Mangra-Bala, Jennifer Kruger, Farah Eaton, Gavin Y. Oudit, John R. Ussher

Theme: Children's health and wellbeing

Introduction: Barth syndrome (BTHS) is an x-linked rare genetic disease with symptoms appearing as early as the first year of life. Cardiomyopathy and heart failure are major causes of infant mortality in BTHS. BTHS is caused by mutations in the TAFAZZIN gene, a gene responsible for remodeling the mitochondrial phospholipid cardiolipin. These mutations result in impaired mitochondrial function and consequent alterations in cardiac metabolism. These myocardial energy metabolism perturbations lead to the weakening of the heart and therefore, cardiomyopathy. Though Of interest, protein expression of the ketone oxidation enzyme, B-hydroxybutyrate dehydrogenase, is elevated in TAFAZZIN knockdown (TazKD) mice, and increases in myocardial ketone oxidation are posited to be an adaptive response in heart failure. We thus hypothesized that increasing circulating ketone levels via oral ketone ester (KE) treatment may benefit cardiac function in TazKD mice. Methods: TazKD mice and their wildtype (WT) littermates were treated with either vehicle or an oral KE via daily oral gavage for 6-wks, and ultrasound echocardiography was used to assess cardiac function pre- and post-treatment. We also assessed exercise capacity in all mice via treadmill and voluntary activity wheels. Results: Circulating ketone levels were increased to an equivalent extent in both TazKD and WT mice via KE treatment, though we did not observe any major effects on cardiac structure or function in TazKD mice. While KE treatment increased exercise capacity in WT mice, no improvement was observed in TazKD mice. Conclusion: Increases in circulating ketone levels do not appear to benefit the hypertrophic cardiomyopathy that characterizes TazKD mice.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 296
Presenter: Nicole Applin
Supervisor: Clugston, Robin
Title: Mesenchymal vitamin A signalling in diaphragm development: a novel mouse model to enhance understanding and improve outcomes in fetuses with Congenital Diaphragmatic Hernia
Authors: Nicole H.M. Applin, Juan F. Garcia Rivas, Jaida F.P. Albrechtsen, Michael R. Doschak, and Robin D. Clugston.

Theme: Pregnancy and developmental trajectories

Introduction: Congenital diaphragmatic hernia (CDH) is a birth defect of the diaphragm; in utero, a hole defect allows the abdominal organs to traverse into the thorax, obstructing lung development. Despite CDH occurring in 1:2500 live births, its pathogenesis and etiology remain unclear. Thus, current treatments can only address the consequences of the defect on neonatal breathing, not its developmental origins in the diaphragm and lungs. Because of this, morbidity and mortality rates in neonates and early childhood have remained stagnant at 20-25% for the past few decades despite prenatal/postnatal care advancements. Current research has traced the defect's origin to the non-muscular mesenchyme of the embryonic diaphragm, and highlights the importance of vitamin A derivatives like retinoic acid (RA) in its normal development. However, it is not understood what would happen if RA signaling is abolished in this tissue, and how maternal dietary intake of vitamin A may alter fetal outcomes in this state. To better understand the role of RA in the mesenchyme, we tested two hypotheses: 1) Conditional blockade of mesenchymal RA signaling causes CDH. 2) RA/vitamin A supplementation of pregnant dams restores endogenous RA signaling and rescues CDH. Better understanding of gene-RA interactions in the mesenchyme offers the possibility of preventing or rescuing the diaphragmatic defect in utero, addressing the developmental roots of this birth defect and leading to better fetal and neonatal outcomes. Methods: Our lab bred mice expressing a dominant negative retinoic acid receptor (Rardn) with Prrx1-Cre mice to conditionally block mesenchymal RA signaling in Prrx1-Cre:Rardn fetuses. This genetic CDH model was leveraged in two protocols. First, an RA-enriched diet was given to pregnant dams between embryonic day (E)8.5-13.5. Second, female mice were placed on diets with 0, 4, or 25 IU vitamin A/g throughout pregnancy. In both studies, fetuses were collected at (E)16.5 for microscopic diaphragm dissection to assess CDH incidence and severity. Tissue analysis included MicroCT, morphological analysis via ImageJ, and histology. Results: Prrx1-Cre:Rardn fetuses have 100% incidence of servere CDH (n=17), with defects in the diaphragm, lung and heart. Diaphragm surface area of double transgenic fetuses was significantly reduced for both the right and left hemidiaphragms compared to controls. Lung volume and histology reveals reduced lung volume, reduced alveolar air spaces and reduced diameter of pulmonary vessels. Maternal RA supplementation resulted in a 24.3% increase in the incidence of diaphragm eventration defects - in which tissue lacking normal muscularization takes the place of a hole defect, representing a mild rescue phenotype. Maternal vitamin A deficiency prior to pregnancy appears to exacerbate the herniation of abdominal organs into the chest compared to fetuses from a mother with sufficient vitamin A. Conclusion: Abnormal mesenchymal RA signaling results in CDH defects, and maternal RA/vitamin A deficiency or supplementation can modulate the severity of fetal CDH phenotypes. This study emphasizes the importance of RA in the developing diaphragm and how maternal nutrition plays a crucial role.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 298
Presenter: Erynne Sjoblom
Supervisor: Montesanti, Stephanie
Title: Measuring health and well-being from preconception to early life in Indigenous populations: An Indigenous-informed scoping review protocol
Authors: Erynne Sjoblom, Stephanie Montesanti

Theme: Children's health and wellbeing

Introduction: Indigenous Peoples face a notable absence of standardized equity indicators tailored for non-communicable diseases (NCDs). Existing models, grounded in the Euro-Western biomedical framework of health, tend to overlook and neglect the unique perspectives on health held by Indigenous communities. These models, characterized by their restrictiveness, predominantly center around narrow disease indicators and treatments, perpetuating an emphasis on deficits rather than holistic well-being. This scoping review aims to identify and evaluate research that utilizes, assesses, or validates measurement for wellness, health, and supportive early environments in Indigenous populations. Methods: Employing an Indigenous-informed scoping review study methodology, a systematic search across global academic and grey literature databases will be performed to identify relevant literature. Selected studies will include those that assess or validate the measurement of health and wellness spanning from preconception through pregnancy, infancy, and early childhood within Indigenous populations. Articles will be screened and assessed for eligibility by two reviewers. From eligible articles, data including author and year of publication; source country; target population; objectives of study; name(s) of instrument(s); type(s) of measure(s); development/ adaption/ validation process; main outcomes; community engagement process; quality assessment; and other descriptive variables with be extracted from each source. A thematic analysis approach guided by an Indigenous Community Advisory Committee will be applied to synthesize and summarize the findings. Discussion: This scoping review will identify and synthesize literature on tools and instruments used to measure health, well-being, and supportive early environments in Indigenous populations. This work aims to inform the development of Indigenous wellness indicators for the Indigenous Healthy Life Trajectories Initiative Cohort Research Study (I-HeLTI). Traditional population health monitoring methods, rooted in Western paradigms, have often perpetuated colonial biases and overlooked the unique contexts of Indigenous communities. This review seeks to bridge knowledge gaps in developing and validating Indigenous wellness indicators that align with Indigenous values and aspirations. The findings are expected to advance ethical approaches to health measurement in Indigenous populations, supporting data sovereignty and culturally-inclusive wellness indicators.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 299
Presenter: Rebecca Reif
Supervisor: Hemmings, Denise
Title: Chondroitin sulfate A (CSA) levels are increased in the intervillous space of the placenta in malaria infections
Authors: Rebecca Reif, Melisa Gualdron-Lopéz, Kennedy Chisholm, Precious Akindele, Amanda Maestre, Eliana Arango, Samuel Chenge, Francis Kobia, Bernard Kanoi, Stephanie, K. Yanow, Denise Hemmings

Theme: Pregnancy and developmental trajectories

Objective: Placental malaria occurs when P. falciparum infected red blood cells (iRBCs) sequester in the placenta, leading to adverse health outcomes for the mother and fetus. The maternofetal interface of the placenta is the syncytiotrophoblast (ST); it comprises the outer multinucleated cell layer of the fetal villi and is in direct contact with maternal blood. The villi project into the intervillous space (IVS) which contains a matrix - comprised of various proteoglycans - and the maternal blood. Sequestration of iRBCs occurs mainly in the IVS. This is facilitated by the binding of VAR2CSA, a parasite antigen found on the surface of iRBCs, to chondroitin sulfate proteoglycans on the placenta. VAR2CSA preferentially adheres to 4-O-sulfations on CSA - which is unique to the placenta. Two of these proteoglycans are syndecan-1 (SDC-1) and glypican-3 (GPC-3). Both SDC-1 and GPC-3 attached to ST can be cleaved to enter the IVS. A biomarker has not yet been identified for early prediction of infected pregnant women at risk of placental malaria; this is only identified at the time of delivery. We hypothesized that CSA in the IVS will be increased in placental malaria. Methods: Human term placentas from uncomplicated pregnancies were obtained with consent from Edmonton, Alberta (n=10), and term placentas with (Pf+) or without (Pf-) evidence of P. falciparum infection were obtained from women in Colombia (n=23, n=21) and Kenya (n=20, n=15). Tissue biopsies with the IVS preserved were embedded in paraffin and sectioned. CSA, SDC-1 and GPC-3 expression on the ST and in the IVS was quantified using dual immunofluorescence. Whole tissue sections were scanned with a Zeiss AxioScan.Z1 and analyzed using HALO imaging software. Results: Comparisons of CSA, SDC-1 and GPC-3 were made between Colombian Pf-, Pf+ and Kenyan Pf-, Pf+ cohorts. The ratio of CSA in the IVS compared to the ST was significantly higher in the Pf+ compared to Pf- (p=0.0020) Colombian placentas. Similarly, CSA IVS to ST ratio was significantly higher in the Pf+ compared to Pf- (p=0.022) in the Kenyan placentas. The ratio of SDC-1 in the IVS to ST was higher in Pf+ Kenyan placentas compared to Pf- (p=0.043). However, higher SDC-1 was not observed in the Colombian Pf+ to Pf- (p=0.20) placentas. GPC-3 was not higher in the Pf+ compared to Pf- placentas in either the Colombian (p=0.61) or Kenyan (p=0.21) cohorts. Conclusion: CSA in the IVS was elevated in Pf+ compared to Pf- samples from Kenya and Colombia. There were higher levels of SDC-1 in the IVS of Pf+ samples in the Kenyan cohort.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 301
Presenter: Santwana Carstensen-Sinha
Supervisor: Thompson-Hodgetts, Sandra
Title: A 'Space' for me: exploring how an autism-centering program influences the belonging and well-being of autistic students at school
Authors: Carstensen-Sinha, S., Brown, H., Gokiert, R., Thompson-Hodgetts, S.

Theme: Children's health and wellbeing

Introduction Belonging is a fundamental human need and an essential contributor to well-being. Children spend a significant portion of their day at school. Belonging at school is integral to their well-being, and supports learning and success at school. There are physiological, psychological and academic costs when belonging is absent. Autistic children experience difficulty with belonging and well-being at school. Attempts at inclusion fall short of belonging. Cooperation and co-existence are often defining elements of inclusion, but these do not necessarily encompass the intimacy of connection and relatedness that is essential for belonging. When belonging is absent, well-being is compromised. This is the unfortunate reality that many autistic students encounter at school. We need to consider new models to support belonging for autistic students at school. Administrators at one elementary school created the 'Space' program to offer meaningful opportunities for autistic students from different classes to interact as part of their inclusive educational experience. The primary purpose of this study will be to explore the influence of the 'Space' program on the belonging and well-being of the autistic children at this elementary school. Our key research question is: How does the presence of an autism-centering program influence the experience of belonging and well-being of autistic children at the school? Methods Guided by a critical disability lens and the neurodiversity paradigm, this Community-Based Participatory Research will be conducted following the guidelines of the AASPIRE Practice-Based Guidelines for the Inclusion of Autistic Adults in Research as Co-Researchers and Study Participants. An instrumental case study design will be used to engage and understand the experiences of the 6-8 autistic children in the program, their families and the staff at the school as they participate in and/or run the 'Space' program. Data will be collected in multiple forms and from multiple participants, including observations, semi-structured interviews, focus groups and arts-based research methods. Reflexive Thematic Analysis will be used to generate themes related to research questions. Rigor will be demonstrated through triangulation of data from different sources (including from autistic and non-autistic perspectives) member checks with staff and students when possible, audit trails throughout analysis, and researcher reflexivity. Potential Results and Conclusions Autistic-centering spaces, such as the 'Space' program, are recommended as part of inclusive neuro-affirming environments to support the belonging and well-being of autistic students. There is potential to scale the 'Space' program to other schools if this model appears to be an effective approach to improve school experiences and outcomes for autistic students. While qualitative work is not 'generalizable', we anticipate that our findings may transcend this case and be transferable to the creation of other autism-centering programs and spaces.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 302
Presenter: Patricia Oliva
Supervisor: Menon, Geetha
Title: A Deep-Learning Model for Automatic Contouring of Critical Organs in MRI-based Cervical Cancer Brachytherapy: Improving Treatments through Artificial Intelligence Applications
Authors: Patricia Oliva, Shrimanti Ghosh, Fleur Huang, Ericka Wiebe, Julie Cuartero, Pierre Boulanger, Jihyun Yun, Kumaradevan Punithakumar, Geetha Menon

Theme: Lifelong women's health

Introduction: For women with locally advanced cervical cancer, better treatment outcomes following brachytherapy (BT) is achieved by precise tumor irradiation to curative doses while sparing surrounding critical organs at risk (OARs; bladder, rectum, sigmoid, small bowel). Hence, accurate OAR segmentation on MRI is key during BT treatment planning. However, manual contouring by radiation oncologists (ROs) is laborious, time-consuming (~3hrs), and prone to intra- and inter-user variability. Deep learning (DL)-based autocontouring models can mitigate these issues, but no suitable commercial software is available. This study utilizes a large, multi-applicator 3D-MRI dataset to develop a DL-model for simultaneous autocontouring of the core OARs in MRI-BT. Methods: T2-weighted, 3D MRIs from 200 cervical cancer BT cases were split for training|validation|testing (136|34|30). The dataset featured 5 applicator types and all 4 OARs manually contoured (ground truth; GT) by 3 experienced gynecological ROs (% cases 36:33:31) as per EMBRACE-II definitions. The developed DL-Model (DLM) is based on nnU-Net, a method that adapts itself to any input dataset using interdependencies in the dataset properties and network design choices. Rigorous hyperparameter tuning was performed to determine the best model for this task by minimizing the validation loss and comparing GT vs DLM contours. The final model accepts 3D-MRIs and outputs the predicted OAR contours as a multi-label mask. DLM-generated contours were assessed using: (1) quantitative metrics vs GT; Dice Coefficient (DC) and Hausdorff Distance 95% (HD95) reported here, (2) qualitative grading by ROs using a 5-point Likert Scale (1=accept, 2=minor changes, 3=major changes, 4=reject, 5=undecided), and (3) quantitative and qualitative comparison to GT of dose-volume parameters; dose to 2cc volume (D2cc) reported here. Results & Discussion: Compared to GT, the DLM (batch size=2, patch size=160x128x112, learning rate=0.01, epochs=500, DC+cross-entropy loss function, momentum optimizer) produced median DC|HD95(mm) for bladder of 0.93|2.01, rectum 0.89|3.94, sigmoid 0.75|12.61, and small bowel 0.67|21.03. Higher DC and lower HD95 indicate better agreement to GT. Due to large variability in GT volume and anatomical location, complex OARs (sigmoid & small bowel) had poorer prediction consistency compared to bladder (has high contrast in BT MRI) and rectum (has less variability in anatomical location). On the 5-point Likert Scale, 86% of contours were acceptable for clinical use (28% as is and 58% needed non-clinically relevant changes), 14% required major changes, and none were rejected. For all OARs, the mean D2cc difference was minimal (< 0.7Gy). Qualitative and dosimetric evaluations suggest contour inaccuracies are located outside of high-dose, clinically relevant regions. The total training time was 103.2 hrs, prediction time was 1.47min/case using NVIDIA V100 Volta 32GB (Digital Research Alliance of Canada). Conclusion: Clinically ready, accurate contours of all critical organs was generated by the DLM in <1.5mins. Clinical translation of this model will reduce manual contouring times and improve contouring consistency, advancing BT treatment plan quality and thereby outcomes for women with cervical cancer.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 303
Presenter: Linden Stuart
Supervisor: Wine, Eytan
Title: Exploring host-microbial interactions in pediatric inflammatory bowel diseases
Authors: Linden Stuart, Nazanin Arjomand Fard, Christopher Cheng, Michael Bording-Jorgensen, Troy Perry, Eytan Wine

Theme: Children's health and wellbeing

Introduction: Inflammatory bowel diseases (IBD), including ulcerative colitis and Crohn disease, are characterized by chronic inflammation of the gastrointestinal tract. Escalating rates of IBD in children, combined with few approved pediatric treatments, necessitate further understanding of potential causes and therapies for the disease in this population. Although the specific causes of IBD remain unclear, the interaction of the gut's microbial population with the host is certainly critical. Pathobionts (bacteria with pathogenic potential) can outcompete commensal bacteria, leading to dysbiosis and inflammation. Some bacteria produce beneficial metabolites, for example, indole-3-propionic acid (IPA), which has been shown to reverse dysbiosis and reduce host inflammation (possibly by impacting siderophore production and bacterial capsules). We aimed to assess host-bacteria interactions using potential pathobionts isolated from non-inflamed colon of pediatric IBD patients: Enterococcus avium, E. casseliflavus, Klebsiella quasipneumonaie, and K. variicola. We hypothesized that the Enterococcus strains are invasive and induce inflammation in IBD. Additionally, we proposed that IPA reduces Klebsiella virulence potential and their ability to outcompete commensal bacteria. Methods: Gentamicin protection assay involving infection of PMA-induced Thp1 macrophages with Enterococcus strains assessed intracellular bacteria survival. Supernatants were collected following a two-hour infection to measure proinflammatory chemokine (IL-8) concentration using ELISA. RNA was extracted from harvested cells and RT-qPCR measured IL-8 and IL-10 (an anti-inflammatory cytokine) expression. Treated (0.5 mM IPA) and untreated Klebsiella cultures were prepared, and RT-qPCR measured the expression of three genes associated with virulence factors: entB (siderophores), manC (capsule), and hcp1 (type VI secretion). A chrome azurol sulfonate (CAS) assay quantified siderophore production, and Anthony's capsule stain was employed to visualize the bacteria capsule. Results: Enterococcus showed pathobiont abilities with intracellular survival, but less than a known pathogen (LF82). All Enterococcus strains induced IL-8 expression, with E. casselfilavus showing lower levels than LF82 and E. avium, and all bacteria induced lower IL-8 secretion than LF82. IL-10 expression was much lower than IL-8 across all strains. Treatment of Klebsiella with IPA resulted in increased expression of entB, manC, and hcp1 genes, except for K. variicola where manC expression exhibited no change. Results from Anthony's capsule stain and CAS assay are under analysis. Conclusion: E. avium and E. casseliflavus, isolated from children with IBD, can cause an inflammatory response by immune cells, suggesting they potentially play a role in pediatric IBD pathogenesis. Identifying pathobionts in IBD, such as Enterococcus, will aid in developing targeted therapeutics. Additionally, the increased expression of Klebsiella virulence genes after IPA treatment suggests that these particular factors are not responsible for IPA's ability to reduce bacteria invasion, but other virulence genes warrant investigation. The host-microbe interface likely plays a critical role in the pathogenesis of pediatric IBD.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 304
Presenter: Laura Osachoff
Supervisor: Davenport, Margie
Title: The Relationship Between Sleep Disordered Breathing during Pregnancy with Arterial Stiffness, and Physical Activity.
Authors: Laura Osachoff, Sushmita Pamidi, Tamara Cohen, Rshmi Khurara, Craig Steinback, Margie Davenport, Brittany A. Matenchuk

Theme: Pregnancy and developmental trajectories

Background Sleep-disordered breathing (SDB) is a spectrum of conditions characterized by changes in airflow during sleep which can lead to low oxygen levels and sleep disruption. This condition contributes to heart disease in nonpregnant individuals. SDB in pregnancy is associated with a 2-3 times higher risk of complications including pre-eclampsia, gestational hypertension, and gestational diabetes. These complications increase the likelihood of future maternal cardiovascular disease and events such as stroke, blood clots, and heart attacks. Arterial stiffness is a well studied measure of cardiovascular health. Stiffer vessels require the heart to work harder and are associated with increases in blood pressure. While SDB is not commonly treated during pregnancy, physical activity may have a protective effect on the development of SDB. Objectives We hypothesize that SDB in pregnancy will be associated with worse maternal cardiovascular health and increased arterial stiffness. Participants engaging in higher levels of physical activity will be less likely to develop SDB. Methods This is an a priori planned midpoint analysis of the study outcomes. We recruited pregnant individuals who did not work shift work, were not receiving treatment for SDB, and did not have known cardiovascular disease. Measurements were taken in the third trimester (28-36 weeks gestation). During the 7-14 day measurement period, participants complete an at-home Type III sleep test (Apnealink Air; ResMed) for one night to measure breathing, oxygen levels, snoring, and heart rate. They also wore a tri-axial accelerometer (Actigraph wGT3X-BT Monitor; Actigraph LLC) for one week to measure physical activity (daily moderate-to-vigorous physical activity [MVPA]). Participants then underwent a non-invasive cardiovascular assessment including an electrocardiogram (heart rate), finometer (blood pressure), and Doppler assessment of carotid and femoral blood flow (distance/time) to determine the central pulse wave velocity, a gold standard measure of arterial stiffness. SDB was determined by Oxygen Desaturation Index (ODI) rather than the Apnea Hypopnea Index (AHI), as it has been suggested as a measure of SDB in pregnancy due to sex-specific differences in the presentation of SDB. SDB status was determined by ODI ≥ 5 events/hr. Results 24 participants (gestational age 34 ± 2) were included in data analysis and 20.8% (n=5) of participants had an ODI ≥ 5. We found that participants with SDB were significantly older than those who did not have SDB (32.7 ± 2.9 vs 36.4 ± 4.7 years; p = 0.04). Heart rate (81.2 ± 11.9 vs 80.1 ± 4.3 bpm; p = 0.84), systolic blood pressure (101.3 ± 6.4 vs 106.2 ± 9.3 mmHg; p = 0.2), diastolic blood pressure (68.0 ± 6.9 ± 71.1 ± 10.2 mmHg; p = 0.4), pulse wave velocity (5.5 ± 1.6 vs 4.8 ± 0.8 m/s; p = 0.3), and physical activity levels (17% vs 0% meeting MVPA guidelines of 150 min/wk; p = 0.4) were not different between individuals with ODI < 5 and ODI ≥5. Conclusion Pregnant individuals who were older were more likely to have an ODI ≥5 indicating SDB. More participants are needed to see if there is a significant difference in physical activity habits and pulse wave velocity in pregnant individuals with and without SDB in pregnancy.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 305
Presenter: Sarah Demedeiros
Supervisor: Montesanti, Stephanie
Title: A Decolonized Approach to Digital Storytelling (DST) for Restoring and Supporting Healthy Family Systems in Indigenous Communities
Authors: The Grandmothers' Wisdom Network (Dene Elder Lorraine Albert, Plains Cree Elder Muriel Lee, Blackfoot Elder Jackie Bromley, Woodland Cree Elder Darlene Cardinal and Métis Knowledge Keeper Norma Spicer), Sarah Demedeiros (presenter) and Dr. Stephanie Montesanti.

Theme: Pregnancy and developmental trajectories

Background: Damaging colonial practices, such as residential schools and child welfare policies, have disrupted Indigenous kinship structures and transmission of traditional and cultural knowledge. The Grandmothers' Wisdom Network (GWN), composed of five Indigenous Grandmothers and Elders from Treaty 6, 7, and 8 and the Métis Nation of Alberta, aims to strengthen family systems and facilitate cultural (re)connection by sharing their knowledge and teachings on what it means to live a beautiful life. Decolonizing research methodologies, including knowledge translation (KT) practices, is essential for creating ethical, respectful, and meaningful research that aligns with the needs, values, and worldviews of Indigenous communities. This project focused on identifying culturally responsive KT strategies to preserve and transmit cultural and traditional knowledge. We used Digital Storytelling (DST) as an art-based method to share the Grandmothers' stories on restoring and supporting the physical, mental, emotional, and spiritual health of family systems. The Grandmothers led an assessment of the DST process, critically reflecting on the ethical considerations of sharing Indigenous knowledge within community-academic partnerships Methods: This project adopted a community-based participatory research (CBPR) approach and was grounded within an Indigenous research paradigm. Before data collection, we gathered in a Sacred Pipe Ceremony to set good intentions and seek guidance from our ancestors in this work. The Grandmothers participated in a three-phase workshop to create digital stories for younger generations and reflect on the DST process. Qualitative data was gathered through Indigenous storytelling, sharing circles and descriptive observations. The data was analyzed inductively to identify preliminary themes, which were then reviewed and confirmed by the Grandmothers to ensure they maintained control and ownership of their data and its representation. Results: The theme 'connection'-to family, community, culture, ancestors, and the Land-emerged as a key factor in promoting generational health and well-being. These vital relationships are sustained through stories passed down from generations of living on the land and shared by Elders through storytelling. DST was identified as a strength-based, healing-centered KT approach that aligns with oral traditions and emphasizes ownership and autonomy in knowledge sharing. Key considerations for ethically engaging with Indigenous knowledge included trust, relationships, respect, reciprocity, autonomy, ownership, control, and cultural awareness. These considerations informed the development of a framework for guiding ethical and respectful dissemination practices in academic-community partnerships Conclusion: This project demonstrated DST as a culturally responsive strategy capable of transmitting and preserving cultural knowledge for intergenerational health and wellbeing. By emphasizing decolonized approaches and adhering to ethical considerations for Indigenous knowledge sharing, this project contributed to the advancement of equitable KT practices that uphold Indigenous data sovereignty and self-determination in health research.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 306
Presenter: Kara Goodkey
Supervisor: Voronova, Anastassia
Title: Loss of chromatin regulator Ankrd11, associated with neurodevelopmental disorders, induces neuroinflammation and hydrocephaly
Authors: Kara Goodkey, Imre Papp, Leenah Qureshi, Nicole Dittmann, Anastassia Voronova

Theme: Children's health and wellbeing

INTRODUCTION: Proper brain development and function requires spatiotemporal formation of neurons (main signalling cell types) and glia (non-neuronal cells). Macroglia include astrocytes and oligodendrocytes, which are derived from neural stem cells, and support neuronal function during development and in adulthood. Specifically, oligodendrocytes form myelin, a major brain white matter component required for efficient neuronal communication. The other major class of glia cells are microglia (brain macrophages). In addition to their immune roles, microglia have a neurobiological role in development by shaping neuronal networks, supporting developmental mye¬lination, and phagocytosing "excess" cells. Much of brain development is regulated by chromatin regulators. Deletions of or mutations in the chromatin regulator ANKRD11 (Ankyrin Repeat Domain 11) cause rare neurodevelopmental KBG syndrome and autism spectrum disorder. We have previously shown Ankrd11 regulates the formation of neurons during embryonic brain development. However, the role of Ankrd11 in glia formation and function is unknown. We hypothesize that ablation of Ankrd11 in macroglia perturbs postnatal brain development and function. METHODS: Conditional knockout of Ankrd11 in murine embryonic neural stem cells was achieved via the tamoxifen inducible Cre/Lox system (Ankrd11fl/fl;NestinCreERT2 or Ankrd11nscKO). Ankrd11 knockout in neural stem cells was induced at embryonic day (E) 14, a timepoint prior to the start of gliogenesis, but after majority of neurons are formed. Brain structure and cellular organization of the cortex was analyzed at multiple timepoints during late embryogenesis (E18), early postnatal development (postnatal day [P] 5 - P15) and in juvenile age (P30). RESULTS: While E18 and P5 Ankrd11nscKO brains were morphologically similar to controls, P10 Ankrd11nscKO mice displayed gross brain abnormalities, including hydrocephaly, leading to decreased survival at P30. To elucidate the molecular mechanism behind these phenomena, we performed bulk RNA-sequencing at P15. Surprisingly, our results showed a drastic increase in the expression of genes associated with neuroinflammation in Ankrd11nscKO brain white matter. Immunohistochemistry revealed a spatiotemporal microgliosis in Ankrd11nscKO mice, with a sharp increase in microglia density at P5-P10. This was followed by an increase in the density of mature oligodendrocytes, but not astrocytes, in the P15 white matter tracts. Since oligodendrocytes produce myelin (major component of brain white matter), we assessed myelination via transmission electron microscopy. At P30 Ankrd11nscKO mice displayed aberrant myelin formation. Overall, our results demonstrate that microgliosis precedes Ankrd11nscKO brain structural defects and myelin abnormalities. Future work will elucidate the functional involvement of microglia in observed phenotypes. CONCLUSIONS: In summary, we show that neural stem cells and macroglia that lack Ankrd11 cause aberrant myelination, neuroinflammation and brain structural defects. These results could explain the mechanism of neurological phenotypes in patients with KBG syndrome and other similar disorders.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 307
Presenter: Vincent McRorie
Supervisor: Parent, Eric
Title: Correlations and regression of anterior-posterior spinal stiffness using indentation and spine flexibility measured with inclinometers in healthy young adults
Authors: Vincent McRorie, Laura Beaveridge, Eric Parent, Greg Kawchuk

Theme: Children's health and wellbeing

Introduction Adolescent idiopathic scoliosis (AIS) is a sideways rotation and curvature of the spine affecting 2-3% of children. Surgery is recommended for correction of severe curves. Flexibility of the spine helps plan surgery and decide on operated levels. Flexibility may be measured for thoracic and lumbar regions, but not easily for individual spinal levels. New devices can reliably measure posterior-anterior spinal stiffness through indentation of specific levels. This study aimed to determine how posterior-anterior spinal stiffness correlates with and predicts spine flexibility in healthy young adults. If a strong relationship exists, further studies may be able to assess flexibility of individual spinal levels and measure responsiveness to pre-op flexibility programs before AIS surgery. Methods Thirty participants aged 18-30 were recruited using ads. Participants were healthy, non-pregnant, with no back pain or open back wounds. Age, height, and weights were recorded. Flexion, extension, left and right side bending were measured using double-inclinometers in the lumbar and thoracic regions. Frontal ROM was the sum of left and right side bending measurements. Sagittal ROM was the sum of flexion and extension measurements. Spinal stiffness (SS) was measured using a smoothed force displacement curve from robotic indentation which progressively applied three trials of 100N posterior to anterior at T4, T6, T8, T10, T12, L2 and L4. Pearson correlations and multiple regression were used to determine if spine flexibility measured with inclinometers could be predicted from SS data including the average, minimum, or maximum SS values. Results Thirty participants were recruited with a mean age of 23.7 years (SD: 3.2), height of 173.5cm (SD: 9.3) and weight of 72.3kg (SD: 14.3). Three participants who did not tolerate full indentation pressure and two outliers were excluded. Lumbar sagittal ROM correlated significantly with SS at T10, T12, L2, and L4 (r = -0.49 to -0.51). Lumbar frontal ROM correlated significantly with SS at T6, T8, T10, and T12 (r = -0.44 to -0.49). Thoracic sagittal ROM only correlated significantly with SS at T10 (r = -0.53). Thoracic frontal ROM correlated significantly with SS at T10, L2, and L4 (r = -0.43 to -0.52). Total sagittal ROM correlated significantly with SS at T8, T10, T12, and L2 (r = -0.40 to -0.64). Total frontal ROM correlated significantly with SS at T10, T12, L2, and L4 (r = -0.51 to -0.63). Average and maximum SS across all levels correlated with lumbar frontal ROM (average and maximum respectively: r = -0.50, -0.61), lumbar sagittal ROM (r = -0.47, -0.47), and thoracic frontal ROM (r = -0.43, -0.45). 44.9% of the variance in total frontal ROM was explained by the maximum SS value. Conclusion Moderate to strong correlation exists between spine inclinometer measurements and SS measurements. There was not a clear pattern of thoracic or lumbar stiffness influencing their respective ROM, but the SS of levels near T10 and T12 related more strongly to frontal and sagittal ROM. Total frontal ROM was partially predicted by the maximum SS, but other factors yet unidentified do play a role. This healthy information may help interpret findings when these measurements are used for children with AIS.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 309
Presenter: Devika Shreekumar
Supervisor: Lytvyak, Ellina
Title: Sex, ethnicity and clinical outcomes in autoimmune hepatitis: results from a large multicenter longitudinal cohort
Authors: Lytvyak E, Shreekumar D, Hirschfield GM, Plagiannakos CG, Ko HH, Swain M, Hercun J, Worobetz L, Vincent C, Flemming J, Qumosani KM, Chen T, Grbic D, Cheung A, Umar N, Iqbal I, Gulamhusein AF, Mason AL, Hansen BE, Montano-Loza AJ

Theme: Lifelong women's health

Introduction: Autoimmune hepatitis (AIH) is a rare, autoimmune liver disease characterized by inflammation and damage of the liver tissue. Women are three to four times more likely to have AIH compared to men. Sex and ethnicity have been shown to impact prognosis in liver diseases of different aetiologies; however, data on their impact on outcomes in people living AIH are limited. We aimed to identify and quantify the magnitude of associations between sex, ethnicity, treatment response and clinical outcomes in a large multicentric cohort of people with AIH across Canada. Methods: A multicentre, retro- and prospective cohort study was conducted using data of people with AIH from the Canadian Network for Autoimmune Liver Diseases (CaNAL). Adverse events were defined as the development of decompensation, hepatocellular carcinoma (HCC), liver transplantation (LT), or death. Treatment response was defined as normalization of alanine transaminase (ALT) at 6 months after treatment initiation. Results: Data of 1198 people living with AIH with 13443 person-years follow-up and median disease duration of 9.5 years [IQR 4.6-15.4] were analyzed. The cohort had a high female predominance (73.6%), and the vast majority were Caucasians (76.9%). Males were significantly younger at the time of AIH diagnosis compared to females (median age at diagnosis 35.2 [IQR 21.9-55.5] vs. 47.9 y.o. [IQR 31.2-59.0]; p<0.001). No significant difference was observed between males and females in the frequency of cirrhosis at diagnosis (29.4% vs. 26.1%; p=0.249), development of cirrhosis (39.0% vs. 33.3%; p=0.124), decompensation at diagnosis (9.6% vs. 8.7%; p=0.632) or during follow-up (21.6% vs. 17.3%; p=0.112), and mortality (13.9% vs. 13.2%; p=0.729). However, males had twice the frequency of HCC (4.0% vs. 1.8%; p=0.034) and LT (19.3% vs. 9.1%; p<0.001) compared to females as well as poorer transplant-free survival (71.2% vs. 80.5%; p=0.001). Moreover, males have substantially lower biochemical treatment response compared to females (36.6% vs. 56.7%; p<0.001). Compared to other ethnicities, Indigenous Canadians had the highest frequency of adverse events (44.1% vs. 27.0%; p=0.027) that was mainly driven by twice the frequencies of development of decompensation over the course of the disease (34.6% vs. 18.0%; p=0.031), LT (26.5% vs. 11.3%; p=0.007), mortality (26.5% vs. 13.0%; p=0.023) and poorer transplant-free survival (61.8% vs. 78.5%; p=0.001), They also had a substantially shorter event-free survival time (4.3 [IQR 1.5-9.5] vs. 8.2 [IQR 3.8-14.2] years; p<0.001). In a time-dependent Cox regression, Indigenous people have a significantly higher risk of developing adverse outcomes (HR 2.70, 95%CI 1.60-4.54; p<0.001) that remained strong after adjusting for male sex, age and cirrhosis at diagnosis and lack of treatment response (HR 2.80, 95%CI 1.01-7.80; p=0.049). Conclusion: Males living with AIH have a higher frequency of HCC and LT and have lower rates of treatment response compared to females. From the ethnicity perspective, Indigenous Canadians living with AIH have a higher risk of developing adverse liver outcomes compared to other ethnic groups.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 310
Presenter: Juliana Lasso-Mendez
Supervisor: Hornberger, Lisa
Title: Maternal Heart Disease is Associated with Altered Ventricular-Arterial Coupling in the Midtrimester of Pregnancy
Authors: Lasso-Mendez, Juliana, Davenport, Margie H., Littlefair, Shauna, Haughian, Brendan, Lin, Lily, Cooke, Christy-Lynn, and Hornberger, Lisa K.

Theme: Pregnancy and developmental trajectories

Introduction: Maternal heart disease (MHD) affects 4% of all pregnancies and is associated with maternal/fetal complications. That all MHD pregnancies with complications do not have ventricular dysfunction suggests factors such as vascular pathology could be contributory. We examined ventricular-arterial coupling (VAC), which incorporates both vascular load and left ventricular (LV) efficiency, and cardiac function in MHD and control participants and explored their relationships with the utero-placental-fetal circulation. Methods: Participants with and without MHD were recruited between 18-24 weeks of gestation (midtrimester) and were matched by maternal age, body surface area and pre-pregnancy body mass index. Cardiovascular parameters including VAC, cardiac output (CO), LV ejection fraction (LVEF), global longitudinal strain and E/E' were obtained by transthoracic echocardiography. VAC was calculated using the single beat-method by Chen et al. Fetal biometry and Doppler-based uterine (UtA) and umbilical (UA) artery pulsatility indices (PI) were assessed by fetal echocardiography, compared in centiles. Independent samples t-test or Mann-Whitney U statistical test were used to compare outcomes between MHD and controls. One-way ANOVA or Kruskal-Wallis tests were used to compare outcomes between severity of MHD (mild or moderate-severe) and controls. Results: We recruited 33 MHD and 32 control pregnancies. Maternal heart rate and blood pressures did not differ among groups. VAC was higher in MHD vs controls (0.78±0.15 vs 0.69±0.01, P=0.0063), particularly in those with moderate-severe MHD (0.80±0.18, P=0.009). Although CO, global longitudinal strain and strain rate were not different among groups, LVEF was significantly reduced in MHD vs controls (61±9% vs 67±6%, P=0.0033) and E/E' higher (median [IQR]: 7.1 [3.7] vs 5.8 [1.9], p=0.015), especially in those with moderate-severe MHD. Finally, UtA-PI, UA PI and fetal biometry were similar among groups. Conclusion: Increased VAC in MHD could suggest the presence of reduced LV function, increased arterial load or both in affected pregnancies. Reduced LVEF and increased E/E' indicate reduced cardiac function in MHD, possibly contributing to increased VAC.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 311
Presenter: Mikayla Barber
Supervisor: MacDonald, Shannon
Title: An environmental scan of vaccination in Canadian neonatal intensive care units
Authors: Mikayla Barber Cassandra Barber Janet Lee Shannon MacDonald

Theme: Children's health and wellbeing

Introduction Infant prematurity and critical illness often require a neonatal intensive care unit (NICU) admission. Although beneficial, hospitalization may interrupt the usual mechanisms through which infants receive vaccines in the community. To mitigate potential vaccination disruptions, an infant's NICU stay may be an opportunity for timely vaccine delivery. However, in the Canadian context, the strategies and practices for vaccine administration vary across different NICU centres. This study aimed to identify the available options and highlight the differences between methods of vaccine delivery in Canadian level-3 NICUs, providing insight into current practices and identifying opportunities for standardization and improvement. Methods A pan-Canadian environmental scan of level 3 NICU centre vaccine policies, practices, and procedures was conducted from May to October 2023. Data collection included an internet search and email consultation with NICU professionals (i.e., nurses, physicians, etc.). Information was synthesized to identify the commonalities and differences between vaccination practices across Canada. Results Twenty-one (out of 32) level-3 NICUs responded, with all locations (21/21) confirming that they provided some routine vaccinations and respiratory syncytial virus (RSV) prophylaxis during admission. NICU nurses (21/21) were the main vaccine provider, with hospitals in one province augmenting delivery with public health nurses (3/21). Only 6/21 NICUs reported delivering in-hospital rotavirus vaccines. Conclusion Across Canada, all surveyed level-3 NICUs reported delivering some routine vaccinations, indicating an effort to optimize vaccine uptake during hospitalization. There were variations in the type of vaccines offered (e.g. rotavirus vaccines). Gaining an understanding of these variations is essential for guiding efforts to enhance the consistency and safety of vaccine delivery in NICUs across the country. Having awareness of in-hospital infant vaccination deliveries can inform better planning and implementation of future programs, optimizing the opportunity for all infants to receive protective immunizations before being discharged into the community.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 313
Presenter: Shrimanti Ghosh
Supervisor: Rakkunedeth Hareendranathan, Abhilash
Title: Automatic Detection of Bone Fracture and Upper Extremity Injury in Pediatric Wrist, and Elbow Ultrasound Images Using Artificial Intelligence
Authors: Shrimanti Ghosh, Yuyue Zhou, Jessica Knight, Natasha Akhlaq, Abhilash R Hareendranathan, Jacob Jaremko

Theme: Children's health and wellbeing

Introduction: Upper extremity injuries are common, especially in children, and impose significant healthcare costs. Traditional imaging methods like X-rays and MRIs are time-consuming, costly, and involve radiation. Point-of-care ultrasound (POCUS) offers a faster, radiation-free alternative, particularly for diagnosing wrist and elbow fractures and shoulder rotator cuff tendon tears in pediatric patients. However, POCUS requires significant training to perform and interpret. Expertise in performing and interpreting these scans is limited, and in some jurisdictions, it involves monthslong wait times. To overcome these challenges, we propose an AI-based tool that analyzes the quality of ultrasound images captured by lightly trained users and provides diagnostic suggestions for images of sufficient quality. Methods: In this study, we proposed a novel AI-based technology, convolutional neural network (CNN) and autoencoder to automatically segment and classify the bony regions from ultrasound (US) images. The proposed model predicts the segmentation contour points directly from raw US images. This is a more sample-efficient approach that learns a low-dimensional representation of the input image and uses this information to reconstruct the bone boundaries as a set of key points rather than generating a segmentation mask. Manually identifying these key points is much simpler than precisely segmenting the entire bony region. After that, the original US image and the corresponding segmentation mask are passed inside another CNN architecture (VGG-16) to detect the fracture or tendon tears. We aim to create a precise and dedicated segmentation method that can be applied to various clinical and research contexts. Since this unique approach depends on landmark points, generating the manual ground truth segmentation for this method is considerably more straightforward than segmenting the entire bony region. Results: The study was performed on the dataset acquired from 200 patients. Our proposed segmentation method achieved an average Dice coefficient (DC) of 94.2% and a Hausdorff Distance (HD) of 2.8 mm, outperforming the UNet model, which yielded 90.5% for the DC and 6.8 mm for the HD. After the segmentation, a classification network, VGG-16 achieved 85.0% accuracy in bone fracture detection and shoulder rotator cuff tendon tear identification from US images. Conclusion: Segmenting relevant structures in ultrasound (US) images is challenging due to noise and artifacts, making AI integration crucial for enhancing ultrasound's effectiveness. AI-driven US technology could potentially assist healthcare providers to detect bone fractures or tendon tears via simple handheld ultrasound, reducing costs and patient wait times for care. Our combined approach, integrating segmentation and classification, not only improves accuracy but also enhances the explainability of results, providing a foundation upon which we can help build trust in AI for the clinicians and patients involved. Importantly, AI is designed to complement, not replace the healthcare professionals. This automated tool could be used by lightly trained users in pediatric care settings like family physician clinics and emergency rooms, ensuring faster and more accurate diagnoses for children.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 314
Presenter: Ren Wang
Supervisor: Field, Catherine
Title: Splenocyte ex vivo cytokine production is sex-dependent in young Wistar rats
Authors: Ren Wang, Susan Goruk, Catherine J. Field

Theme: Children's health and wellbeing

Introduction: Obesity is associated with an increased risk of various health concerns, including pathogen infection and impaired immune function. Early life is a critical period for immune system development and long-chain polyunsaturated fatty acid (LCPUFA) supplementation in this period shows its potential to prevent obesity-related immune dysfunction. However, few studies have explored the sex difference in immune response and whether these sex differences can alter the effects of diets on immune function. Methods: Wistar dams (n=6) were fed a high-fat diet (20% w/w fat, 1% arachidonic acid (ARA) and 1% docosahexaenoic acid (DHA) of the fat) during suckling. At 3 weeks, offspring were randomized to one of the following high-fat diets (20% w/w fat, n=12/group, 1:1 sex ratio): control diet (0%DHA, 0%ARA), 1%DHA diet (1%DHA, 1%ARA), 2%DHA diet (2%DHA, 1%ARA) or fish oil diet (1%DHA, 1%ARA, 1% eicosapentaenoic acid (EPA)). At 10 weeks (corresponds to the developmental stage in humans from childhood through adolescence and early adulthood), the pups were killed to collect the spleen. Isolated splenocytes were incubated with either lipopolysaccharide (LPS), phorbol-myristate-acetate and ionomycin (PMAi) or without any stimuli for 48 hours and the supernatant was collected to measure the ex-vivo cytokine production by ELISA. Data were compared by 2-way ANOVA followed by Tukey post-hoc analysis to explore the effects of sex and the interaction with diet. Results: At 10wks, female Wistar pups had lower body weight (female 236±7g vs. male 400±5g) and spleen weight (female 0.64±0.02g vs. male 1.02±0.03g) than males (both $P<0.001$). Compared to male Wistar pups, females had a lower IL-6 production by LPS-stimulated splenocytes ($P=0.002$), a higher IL-17 production by LPS-stimulated splenocytes ($P=0.021$) and a higher IL-10 production by splenocytes in all conditions (LPS-stimulated $P=0.004$, PMAi-stimulated $P=0.001$, unstimulated $P=0.002$). There were no interactions with diet found. Summary: Compared to males, splenocytes from female Wistar rats had a less inflammatory response (IL-6) to an ex vivo immune challenge, possibly due to a higher T regulatory (IL-10 and IL-17) response. These sex differences might influence the interpretation of how LCPUFA diets modulate obesity-related immune dysfunction. The next step of this study will focus on exploring the diet effects in a sex-specific manner to better understand their potential in modulating obesity-related immune dysfunction.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 317
Presenter: Silvia Cardani
Supervisor: Pagliardini, Silvia
Title: Can a progestin-based drug rescue breathing in a rodent model of central hypoventilation syndrome? Comparison between female and male rats.
Authors: Silvia Cardani, Ryadd Asif, Tara A. Janes, Silvia Pagliardini

Theme: Lifelong women's health

Rhythmic breathing movements are generated in the brain, which sends impulses to the respiratory muscles. The O2 and CO2 concentration in the blood is closely monitored by central and peripheral sensors that stimulate the brain to maintain gas homeostasis. Defects in these sensors cause hypoventilation syndromes, which are difficult to manage pharmacologically. Remarkably, a serendipitous discovery found that a progestin contraceptive containing etonogestrel restored CO2-sensitivity in two female patients affected by Congenital Central Hypoventilation Syndrome. It is well known that sex hormones may influence respiration, and progesterone is a female hormone known as powerful breathing stimulant. However, its mechanisms and sites of actions remain unknown and the experimental use of synthetic progestins in patients and animal models have been met with mixed respiratory outcomes. In our recent work (Janes et al., 2024) we demonstrated that chronic etonogestrel treatment improved CO2 chemosensitivity selectively in female rats with moderate chemoreflex impairment. Since the progesterone receptor is widely expressed in both the male and female brains, in this study we investigate whether etonogestrel-induced CO2 chemoreflex recovery also in males. Methods: A rat model of central chemoreflex impairment was created by ablating key CO2-sensing neurons in the adult brainstem of females and males rats using a selective toxin (saporin). Minute ventilation, breath frequency, tidal volume and O2/CO2 metabolism were measured by whole body plethysmography before, and 2 weeks after toxin injection in room air and during inhalation of high levels of CO2 (5%, 7%). Rats were then implanted with etonogestrel for 4 weeks; controls received sham surgery. Respiratory measurements were made once per week; tissues were collected at the end of the protocol for molecular analyses. Results: in our female rat model we demonstrate that (I) Lesioning RTN Nmb+ CO2-sensing neurons causes dose-dependent impairment of the CO2-chemoreflex; (II) ETO treatment restores ventilation in rats with moderate lesion (Janes et al., 2024). In males we show that, similar to female rats, CO2-chemoreflex impairment is lesion size-dependent and, although with a reduced potency, etonogestrel improves their respiratory function. Conclusions: These data support our hypothesis that etonogestrel can "rescue" CO2-sensing in a rat model of central chemoreflex impairment and are consistent with previous clinical observations. Importantly, these results suggest that the brain can compensate for the loss of primary CO2-sensing neurons and similar mechanisms operate in females and males rats. Future studies to identify these brain regions and the mechanisms of recovery hold promise for targeted pharmacological interventions that are currently lacking for CCHS patients. Finally, elucidating the mechanisms by which progesterone affects neural function is fundamentally important as this hormone is predicted to have diverse roles in health and disease.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 318
Presenter: Daniel McClement
Supervisor: Wine, Eytan
Title: Predicting clinical remission in pediatric Crohn Disease patients following exclusive enteral nutrition
Authors: Daniel McClement, Ricardo Suarez, Eytan Wine

Theme: Children's health and wellbeing

Introduction Exclusive enteral nutrition (EEN) is a first line therapy for the induction of remission in luminal pediatric Crohn Disease (pCD), achieving a remission rate of around 80%. However, patients who are unresponsive to EEN often endure significant physical, mental, and financial burden and spend weeks consuming an unpalatable diet before being switched to an alternative treatment regimen. Using a robust, national dataset, the aims of this study are twofold. First, we identify predictors of EEN non-response from clinical data routinely collected at the time of diagnosis to allow for more personalized treatment plans. Second, we use this same clinical data to look for predictors of sustained disease remission one year following EEN to help predict patients' prognoses. Methods A prospectively-followed cohort of pediatric patients, who were prescribed EEN as their first treatment after being diagnosed with CD (n=308), was collected through the Canadian Children Inflammatory Bowel Disease Network (CIDsCaNN) inception cohort (2013-2020). Patients with weighted Pediatric Crohn Disease Activity Indexes (wPCDAI) collected after at least 4 weeks on EEN were compiled into a dataset (n=114). Patients were labelled as EEN responders if their wPCDAI after EEN induction was < 12.5, indicating successful remission [non-responders n=42 (37%), responders n=72 (63%)]. A second dataset of patients with wPCDAI scores collected one year post-EEN induction was compiled (n=206). Patients were labelled as achieving sustained clinical remission if all wPCDAI scores withing one year after EEN induction were < 12.5 [sustained remission n=119 (58%), flared n=87 (42%)]. The dataset contained the following clinical data collected at baseline and the end of EEN induction: blood test results (Hgb, ESR, CRP, Alb, Htc, Plt), Paris Classifications, demographic information (height and weight z-scores, age, sex), as well as wPCDAI, SES-CD (simple endoscopic score, CD), PGA (physician global assessment), and Mayo scores. Pediatric Ulcerative Colitis Activity Indexes (PUCAI) were also included to serve as a surrogate measure of colonic CD. Odds ratios were calculated to determine whether any features correlated with response to EEN induction therapy. Results PGA scores were found to be predictive of response to EEN induction. An increase in baseline PGA score (e.g. moving from "mild disease" to "moderate disease") was the feature most strongly correlated with an increased likelihood of EEN failure (Odds Ratio 2.7, 95% CI [1.5,4.8], p=0.001). Male sex and baseline SES-CD, wPCDAI, PUCAI scores were also significantly correlated with EEN failure. Being prescribed Infliximab was the feature most strongly associated with sustained clinical remission (Odds Ratio of flaring 0.2, 95% CI [0.1,0.5], p=0.00002). Dual therapy with a biologic and immunomodulator, lower wPCDAI, PGA, weight z-score and ESR values post-EEN induction were also correlated with a reduced chance of flaring. Conclusions We have identified several significant predictors of patient response to pCD induction and maintenance therapy. Notably, several standardized scores such as wPCDAI, PUCAI, SES-CD, and PGA already in use might be useful for predicting patients' response to treatment.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 319
Presenter: Tenisha Brar
Supervisor: Kassiri, Jay
Title: Disparities in the Management of Female Adolescents with Epilepsy: A Single-Center Retrospective Study.
Authors: Tenisha Brar, Catherine Sheppard, MD, Jonathan Liu, BSc (Hon), Barry Sinclair, MD, FRCPC; Simone Lebeuf, MD,FRCPC; Janani Kassiri, MD, PhD, FRCPC.

Theme: Children's health and wellbeing

Background: Epilepsy is the most prevalent neurological condition during adolescence, affecting 1.5% to 2% of the population. The complex interplay among hormones, antiseizure medications, and seizures is particularly significant for adolescent females with epilepsy. This study aimed to evaluate the management of female adolescents diagnosed with epilepsy at a single center. Methods: A retrospective chart review was conducted on female patients aged 11-18 years diagnosed with epilepsy at the University of Alberta's Comprehensive Epilepsy Program. Patients with neurodevelopmental delays were excluded. Data collected included patient demographics, seizure history, ICD diagnostic codes, comorbidities, access to primary care providers, contraceptive usage, and counseling information regarding medication side effects, birth control education, and folate supplementation. Results: The study included 518 adolescent female patients with epilepsy (382 from 2015-2019 and 136 from 2021-2022). Idiopathic generalized epilepsy was the most common diagnosis (34%), with valproic acid being the most frequently prescribed medication. Comorbidities were present in 61.5% of patients, with mental health concerns such as ADHD, anxiety, and depression observed in 52%. Reproductive and hormonal concerns were documented in 8% of patients. While 97% of patients received counseling on general side effects of anti-epileptic medications, only 17% were counseled on reproductive concerns, including birth control and folate intake. Conclusion: This large single-center study highlights significant gaps in the management of normally developing female adolescents with epilepsy, particularly regarding reproductive health counseling. The findings underscore the need for a multidisciplinary specialized clinic to address the unique concerns surrounding female adolescent epilepsy and its associated comorbidities.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 320
Presenter: Ismail Babale
Supervisor: Pagliardini, Silvia
Title: Long-Term Effects of Perinatal THC Exposure on Sleep and Breathing in Rats
Authors: Ismail Babale, Neeharika Reddy, Vivian Biancardi, Gregory Funk, Silvia Pagliardini

Theme: Children's health and wellbeing

Introduction: substance use disorders during pregnancy are a significant public health concern, posing risks to child development, increasing the demand for social and healthcare services, and resulting in financial burdens. Cannabis is commonly abused during pregnancy, particularly in the first trimester due to its antiemetic effects. Cannabis can cross the maternal placental barrier and enter the fetal bloodstream, potentially altering fetal endocannabinoid signaling pathways during development and leading to long-lasting effects. The endocannabinoid system plays a critical role in fetal neurodevelopment. This research aims to evaluate the effects of perinatal THC exposure on sleep and breathing in adult rats and to assess any long-term effects. Methods: Adult female and male rats perinatally exposed to THC at a dose of 1 mg/kg/day using an osmotic pump from gestational day 5 to postnatal day 14 were instrumented with cortical and hippocampal electrodes to monitor sleep/wake cycles and respiratory muscle activity. Sleep and breathing recordings were made in a whole-body plethysmograph, allowing assessment of sleep function, ventilation and metabolic activity. Results: Preliminary results showed no significant changes in sleep onset latency, total sleep time, or sleep efficiency in perinatally THC-treated rats compared to controls. Although not statistically significant, a decrease in respiratory frequency and tidal volume was observed during NREM sleep in the THC-treated male rats compared to the vehicle. Analysis of adult female rats is currently ongoing. Conclusion: Perinatal THC exposure did not result in significant changes in the sleep characteristics of adult male rats, although a decrease in respiratory frequency and tidal volume was observed.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 322
Presenter: Chuanyi Foo
Supervisor: Davenport, Margie
Title: Sleep position in the second and third trimester of pregnancy
Authors: Chuanyi Foo, Sushmita Pamidi, Tamara Cohen, Rshmi Khurara, Craig Steinback, Margie H. Davenport, Brittany A. Matenchuk.

Theme: Pregnancy and developmental trajectories

Introduction: Late pregnancy supine sleep has been associated with an increased risk of stillbirth, potentially due to decreased blood flow through the aorta and inferior vena cava. Other complications include reduced fetal growth, low birth weight, and pre-eclampsia. As such, pregnant individuals are instructed to sleep on their left side after 28 weeks gestation. A supine sleep position may also increase the risk and severity of sleep-disordered breathing (SDB). SDB arises in approximately 25% of pregnancies by the third trimester and may reduce oxygen availability to the fetus. This study aims to compare time spent in different sleep positions in early (second) and later (third trimester) pregnancy. Methods: This prospective longitudinal cohort study recruited participants between 20-25 weeks gestation and assessed sleep position using the activPAL3 (PAL Technologies Ltd.) accelerometer, which provides measurements of device inclination every 15 seconds, at study entry and again at 28-36 weeks gestation. Participants did not work shift work and were free of known cardiovascular disease at the start of the study. Those diagnosed with a sleep disorder or using sleep-aid medication or devices were excluded. Participants were instructed to wear the accelerometer continuously for seven days and completed a sleep log. A program created in R was used to assess the amount of time spent in each position during sleep periods. Paired t-test and Chi2 were used to describe and compare sleep positions between the two time points. Results: In this study, we collected longitudinal data from 21 individuals (33.4 ± 3.8 years old) in the second (TM2; 22.2 ± 1.4 weeks gestation) and third (TM3; 33.0 ± 1.8 weeks gestation) trimesters of pregnancy. The average number of valid recorded days at TM2 and TM3 were 6.3 and 6.2, respectively. Most participants slept in a combination of supine, right, and left positions in TM2 (supine = 27.8 ± 15.2%, right = 38.3 ± 15.5%, left = 27.2 ± 11.2%) and TM3 (supine = 25.8 ± 18.8%, right = 34.0 ± 15.8%, left = 31.2 ± 14.1%). There was no difference in the average amount of time spent in each position between TM2 and TM3 for all sleeping positions ($p>0.05$). In TM3, the predominant sleep position was supine in 5 participants (24%), right in 10 participants (48%), and left in 6 participants (29%). In TM2 and TM3, 14 (67%) and 15 (71%) participants, respectively, spent less than 1/3 of the night in the supine position. Conclusion: This study found that the proportion of time in each sleep position was not different between the second and third trimesters of pregnancy in 21 pregnant individuals. Additionally, the majority of participants spent less than one-third of the night in the supine position. It is unknown whether there is a dose-response relationship between the duration of supine sleep and pregnancy complications. While self-reported, retrospective studies have found a relationship between maternal supine sleep position and complications, there is a lack of information on the risks associated with intermittent periods of supine rest during sleep in pregnancy.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 323
Presenter: Areeha Mahal
Supervisor: Kelly, Erin
Title: A survey of cannabis use for analgesia in women with chronic pelvic pain
Authors: Areeha Mahal, Joren Manz, Erin Kelly, Momoe Hyakutake

Theme: Lifelong women's health

Introduction: Chronic pelvic pain (CPP) is a debilitating and complex medical condition, marked as non-cyclical pelvic pain that persists for at least six months. CPP necessitates a multifaceted management approach, wherein pain modulators are needed to alleviate the pain experienced by affected individuals, including cannabinoids. In various studies, cannabis has been shown to reduce pain levels. Additionally, cannabis has illustrated effectiveness in treating chronic pain conditions and lowering the dosing and prescribing of other analgesics, including opioids. Unfortunately, there is currently little literature on the use and efficacy of cannabis in women with CPP. Methods: Patients at the CPP clinic either completed a survey during their clinic visit or were given the choice to complete it at their convenience. The survey questioned their experiences with pain, pain treatments and medications, and cannabis. Results: Of the 174 survey responses, 11.6% reported using cannabis for medical purposes once, 38.0% reported using cannabis for medical purposes more than once, and 50.4% reported never having used cannabis for medical purposes. Of the non-users, 58.5% reported wanting to try cannabis for medical purposes. Among cannabis users, 78.2% reported pain relief, 68.8% improved sleep, and 68.7% reported improved mood. 60.9% of respondents reported cannabis positively affecting their quality of life, with 7.8% reported a negative effect, and 31.3% reporting no effect. 37.5% of patients using cannabis reported decreasing their use of other medications. Of these respondents, 62.5% reduced their use of opioids, and 29.2% reported decreasing their use of non-opioid pain relievers. Conclusion: A significant number of women use cannabis to manage CPP and related symptoms. Benefits reported in the survey included improvements in sleep, chronic and acute pain, mood, social/family life, and general quality of life. Cannabis should be considered for women suffering from CPP and should be considered as a potential alternative to opioid and non-opioid pain relievers. Further research regarding this area is required and encouraged.

This research has been funded by the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 324
Presenter: Nishita Shukla
Supervisor: Bhavsar, Amit
Title: Breaking the silence: Investigating GGT5 as a potential therapeutic target in cisplatin-induced hearing loss
Authors: Nishita Shukla, Asna Latif, Dr. Amit P. Bhavsar

Theme: Children's health and wellbeing

Background: Cis-diamminedichloroplatinum(II), more commonly known as cisplatin, is a platinum-based compound that has been on the forefront of chemotherapeutic regimes since the 1960s. The antineoplastic properties of the drug extend to a variety of cancers, and has been particularly successful in the treatment of pediatric solid tumors. Unfortunately, the efficacy of the drug also carries severe off-target effects such as nephrotoxicity, peripheral neuropathy, and hearing loss (ototoxicity). Approximately 50% of children treated with cisplatin face ototoxicity. Cisplatin-induced ototoxicity involves irreversible damage to inner hair cells in a cochlear structure referred to as the Organ of Corti. The loss of hearing has been connected to multiple psychosocial deficiencies and decreased quality of life in children. While the mechanism of cell death in these sensory neurons is not yet fully elucidated, our lab investigates the linkage between the enzyme responsible for glutathione metabolism, gamma-glutamyl transferase (GGT), and downstream cisplatin conjugation. The toxic conjugate formed between cisplatin and GSH seems to be an essential step in neuronal death. In order to better design drugs to protect against cisplatin induced death in these cells, it is necessary to understand the role of GGT in this pathway and its propensity as a drug target. Methods: This project utilizes small hairpin RNA (shRNA) to selectively knockdown GGT at a genetic level. This is done in vitro in House Ear Institute-Organ of Corti 1 (HEI-OC1) cells, a murine hair cell model often used in drug toxicity experiments. Using viruses to carry the shRNA, HEI-OC1 cells are transduced to create a stable GGT-deficient cell line, which can then be used in cisplatin dose-responses to assess its role in toxicity. Results: A fluorescent lentiviral vector was used to optimize the transduction protocol in HEI-OC1 cells, demonstrating the success of this technique in this cell line. Using this, a stable GGT knockdown cell line using shRNA will be generated and used for cisplatin toxicity experiments. By comparing the severity of cisplatin-induced cell death in the control cells to the GGT knockdown cells, we can further understand the extent of GGT involvement in cisplatin-induced ototoxicity. If GGT is indeed responsible for the majority of CIO, then we should see increased cell viability in the knockdown line. Conclusion: Validating GGT as a target for otoprotectants will allow for the development of specialized adjunct chemotherapeutic medications to reduce cisplatin-induced ototoxicity and grant pediatric patients a higher quality of life.

This research has been funded by the Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute.

Participant #: 325
Presenter: Anissa Viveiros
Supervisor: Eckersley, Luke
Title: Utility of Echocardiography to Prognosticate Fetal High Cardiac Output States
Authors: Anissa Viveiros, Lisa K. Hornberger, Angela McBrien, Luke Eckersley

Theme: Pregnancy and developmental trajectories

Introduction Fetal anemia can lead to high cardiac output (CO) failure, fetal hydrops and fetal demise. Intrauterine transfusion (IUT) is the standard of care, but carries risks of premature delivery and fetal death; therefore, it is critical to identify the most affected fetuses prior to intervention. Elevation of the peak systolic velocity in the middle cerebral artery (MCA-PSV) is routinely used to indicate intervention; however, the reported false positive rate is as high as 12 to 14%. We aimed to assess whether measured CO by fetal echocardiography (FE) can be used as a complementary screening tool to predict fetal anemia. Methods: We identified all pregnancies referred for FE from 2009-2023 with suspected fetal anemia (n=49). We reviewed FEs (n=88) to measure ventricular function, combined CO (aortic and pulmonary outflows), and measured ventricular dimensions. Percentiles for CO were used based on published normative data. The MCA-PSV was measured and reported as multiples of the median (MoM). Where available, pre-transfusion fetal hemoglobin (Hb) readings were reported as a MoM, with temporally matched FE studies performed prior to IUT included for analysis (n=8). Results: Overall, MCA-PSV was positively associated with left ventricular (LV) CO, but not with right ventricular (RV) or combined (CCO) (LV CO p=0.037, RV CO p=0.790; CCO p=0.290). The LV CO correlated with z-scores for LV and RV end diastolic dimensions (EDD) (LVEDD p<0.001; RVEDD p=0.018). The RV CO and CCO also were positively associated with LVEDD (p=0.004 and p<0.001, respectively), and RVEDD (p=0.009 and p=0.003, respectively). However, the MCA-PSV did not correlate with ventricular dimensions (LVEDD p=0.524 and RVEDD p=0.689). Fetal Hb was negatively correlated with the MCA-PSV, which approached statistical significance (Figure 1B). Fetal Hb negatively correlated with the LV CO (Figure1C), but not with RV CO or CCO (Figure 1D). Conclusion: Preliminary results suggest that fetal LV CO may confer additive value to current MCA-PSV measurement in predicting the severity of fetal anemia. Larger studies are warranted to explore the relationship of fetal LV CO and MCA-PSV with fetal Hb and prognosis in high output cardiac failure.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 326
Presenter: Nicholas Cheung
Supervisor: Davenport, Margie
Title: Characterization of vascular function and physical activity in maternal heart disease during the mid-trimester of pregnancy
Authors: Nicholas K.Y. Cheung, Juliana Lasso-Mendez, Lisa K. Hornberger, Shauna Littlefair, Lily Lin, Jonathan Windram, Margie H. Davenport

Theme: Pregnancy and developmental trajectories

Purpose:Maternal heart disease (HD) in pregnancy is associated with adverse pregnancy outcomes. Some of these outcomes, including preeclampsia, preterm birth and spontaneous abortion are linked to vascular dysfunction in non-HD pregnancies. Vascular dysfunction is common in certain HD subpopulations, including those at greater risk for pregnancy complications. Exercise training during pregnancy is associated with improved endothelial function in healthy pregnancies. This prospective case-control study sought to examine endothelial function and physical activity in pregnancies complicated by maternal HD with comparison to healthy pregnancies. Study:Maternal HD (clinical) pregnancies were recruited through local high-risk obstetrical services and controls through local clinics and by word of mouth. Endothelial function was assessed using flow-mediated dilation (FMD). Physical activity was recorded for 7 days using accelerometry. Groups were compared using Wilcoxon Rank Sum test or student's T-Tests if appropriate. Participant numbers meeting current exercise guidelines (2150 min/week) was compared using Fisher's exact tests. Comparisons across mWHO severity were compared using ANOVA. Results: Thirty-three clinical pregnancies were recruited, 28 congenital and 5 acquired HD, and a modified World Health Organization (mWHO) risk category of I(23%), II(36%), or II-III(36%) Compared to 30 control pregnancies, age (31±4 vs controls 31±3 years, p=0.56), gestational age(21.0±2.1 vs 20.7±2.0 weeks, p=0.64) and body mass index(27.5±3.5 vs 25.3±7.0kg/m 2 , p=0.12) did not differ. No differences were identified in systolic(106±7 vs 104±10mmHg, p=0.64) or diastolic(68±7 vs 67±7mmHg, p=0.58) blood pressures or resting brachial artery diameter(3.53±0.33 vs 3.40±0.49mm, p=0.21). FMD (0.32±0.17 vs 0.38±0.19mm, p=0.16) and relative FMD(9.5±5.3 vs 10.9±5.2%, p=0.30) were not different between groups or across mWHO severity(p=0.73, p=0.40 respectively). Physical activity data was collected in 36 participants (1 8/group). Moderate to vigorous physical activity was not different between 129±73 vs 157±79min/week, p=0.318) and the number of mothers meeting exercise guidelines was not different(22% vs 39%, p=0.47). Conclusion:Pregnant mothers with HD in the mid-trimester did not show evidence of reduced endothelial function and were similarly physically active when compared to controls. Relationship of these variables to birth outcomes is part of an ongoing longitudinal study.

This research has been funded by the Stollery Children's Hospital Foundation and Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Participant #: 327
Presenter: Asna Latif
Supervisor: Bhavsar, Amit
Title: Use of novel small molecule inhibitors of glutathione metabolism to reduce ototoxicity in childhood cancer patients treated with cisplatin
Authors: Asna Latif, Dr. Rafael Dias Do Espirito Santo, Dr. Fred West, Dr. Amit P. Bhavsar

Theme: Children's health and wellbeing

Background Cisplatin is a commonly used chemotherapeutic that presents unique challenges in treatment brought upon by its associated toxicities. As a very effective anti-cancer agent and a relatively low-cost cancer treatment regimen in comparison to newer immunotherapies, the use of cisplatin in clinic is indispensable and mitigations are necessary to control for its side effects. Most pressing of its toxicities is cisplatin-induced ototoxicity, or irreversible hearing loss. Ototoxicity occurs in over 50% of pediatric cancer patients treated with cisplatin and leads to impaired socio-emotional development long-term. Currently, the mechanism of cisplatin-induced hearing loss is unknown. However, cisplatin is known to interact with glutathione, an anti-oxidative tripeptide that is typically involved in removing toxins from the cell. Some studies show that cisplatin can hijack this pathway to cause exacerbated toxicity in non-tumorigenic cells, suggesting that cisplatin may be metabolized to a more toxic byproduct in cochlear hair cells to cause irreversible damage. Several enzymes in this pathway can be targeted to demonstrate the role of glutathione-cisplatin metabolism in ototoxicity and identify drug targets for oto-protective therapy. One such enzyme, gamma-glutamyl transferase (GGT) presents as a particularly favourable drug target. Through this project, we aim to understand the role of glutathione metabolism in cisplatin-induced ototoxicity and develop small molecule inhibitors that are protective against inner ear cell death to improve long-term health outcomes of childhood cancer patients. Methods A mouse embryonic inner ear cell line, HEI-OC1, was used as a model of cisplatin-induced ototoxicity in pediatric patients. Several small molecule inhibitors of GGT were developed and screened for innate toxicity and protection against cisplatin-induced inflammation and cell death in HEI-OC1 cells. The efficacy of our small molecule inhibitors was also tested in pediatric cancer cell lines to ensure that they did not interfere with cisplatin's anti-cancer efficacy. Results Inhibition of GGT showed marked protection against cell death in-vitro, demonstrating the role of this pathway in cisplatin-induced ototoxicity. Drug screening of novel GGT inhibitors resulted in several promising candidate compounds with low intrinsic toxicity. Conclusions Cisplatin-glutathione metabolism presents as a rarely-studied pathway in cisplatin-induced ototoxicity. This work shows that it can contribute to toxicity and design of novel GGT inhibitors demonstrate the potential of this target in oto-protective therapy.

This research has been funded by the Stollery Children’s Hospital Foundation through the Women and Children’s Health Research Institute.

Participant #: 328
Presenter: Emitt York
Supervisor: Hornberger, Lisa
Title: Delayed Management in the Borderline Left Heart Provides additional insight into the Left Heart Potential
Authors: Emitt York, Luke Eckersley, Angela Mcbrien, Kim Haberer, and Lisa hornberger

Theme: Children's health and wellbeing

Introduction: Prediction of successful biventricular(BiV) outcome following a fetal diagnosis of borderline left heart (BLH) can be challenging. Attempting BiV repair in those with an insufficient left heart(LH) can result in death; however, putting a newborn through single ventricle(SV) palliation surgery whose BLH is sufficient to sustain a normal circulation adds higher morbidity and mortality risk than BiV repair. Considering the perinatal transition with falling pulmonary vascular resistance potentially augmenting LH filling, in 2008 our center initiated a postnatal algorithm of delaying interventional decisions in an effort to understand the LH growth potential. We review our experience, examining changes in LH dimensions and clinical outcomes using this algorithm. Methods: We identified all fetal BLH cases encountered in our institution from 9/2008-4/2024 with neonatal management and a repeat postnatal preintervention echo available. BLH was defined as a left ventricular end diastolic dimension(LVEDd) and/or mitral valve(MV) diameter (4 chamber) z score of <-2 at last fetal echo. Pre and postnatal medical records were reviewed. Z-scores of LVEDd, MV and aortic valve(AoV) diameters and LV end diastolic volume indexed to body surface area(LVEDVi)) were compared between initial neonatal echo and either last echo before intervention or at <6 weeks in those without intervention. Findings were also compared between those with versus without a successful BiV outcome. Results: Forty-eight fetuses/neonates with a BLH were included. Mean gestational age at last fetal echo was 35.2±2.4 weeks and at birth 38.3±2.0 weeks, and birth weight was 3.0±0.7Kg. Successful BiV outcome occurred in 42(87.5%), 35 following neonatal intervention (31 with coarctation/arch repair +/- ventricular septal defect repair),whereas, 4(8.3%) required SV palliation and 2(4.2%) others had failed BiV repairs with early death in 1 and transplant in a second. At initial (day 1) study, LH structures were significantly smaller in those requiring SV palliation or with failed BiV outcomes compared to those with successful BiV outcomes (SV z scores LVEDd -5.6+/- 1.5, MV -4.2+/- 1.0, AoV -4.0+/-0.5, LVEDVi -6.9+/-3.0 vs BiV LVEDd -3.9+/- 1.4, MV -2.8+/-1.2, AoV -2.6+/-0.8, LVEDVi -4.1+/-1.3, all p<0.05). At serial study (SV 5.7+/-5.4 vs BiV 12.8+/-11.9 days), there was no significant change in LH dimensions in those requiring SV palliation (z scores: LVEDd -5.1+/-1.5, MV -4.1+/- 0.8, AoV -3.4+/-0.3, LVEDVi -5.9+/- 2.2, p>0.05), whereas, there was a significant increase in LH dimensions in those with successful BiV outcomes (z scores LVEDd -1.7+/-1.9, MV -1.7+/-1.2, AoV -1.5+/-1.2, LVEDVi -1.7+/-1.7, all p<0.05). When comparing BiV neonates with surgical intervention who had a comparable interval to the second study as the SV/failed BiV neonates (6.7±3.7days, p<0.05), findings remained unchanged. All but 1 BiV infant (noncardiac death at 5 months), survived with mean age at last follow-up of 6.0±4.4years. Conclusions: Delayed decision making confers valuable data about the LH potential in the BLH newborn. Smaller initial LH dimensions and little or no change with delayed intervention may be useful in identifying those who should undergo SV palliation.

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Title: Evidence-based interventions for youth with concurrent mental health and substance use disorders: A scoping review
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Theme: Children's health and wellbeing

Background Mental health and substance use disorders typically onset during youth and commonly co-occur. Integrated (i.e., simultaneous) treatment of two or more concurrent mental health and substance use disorders (i.e., concurrent disorders) is becoming increasingly common in real-world clinical settings; however, the extent to which this has been studied and what is considered best-practice is unclear. Objectives This scoping review aimed to identify, map and summarize peer-reviewed studies of interventions that aim to treat concurrent disorders in youth. Methods Six electronic health databases were systematically searched, in addition to a hand search of the reference lists of relevant systematic reviews. Only peer-reviewed studies of interventions treating concurrent disorders (i.e., simultaneous treatment of two or more disorders) in youth (10-29 years old) were eligible. Two independent reviewers conducted screening and data extraction. Results were charted according to studies employing pharmacological and non-pharmacological interventions. Results Thirty peer-reviewed studies were included, 19 (63.3%) were randomized controlled trials (RCTs). Most studies enrolled participants with an unspecified substance use disorder (n=17, 56.7%), while alcohol use was the primary substance disorder in seven (23.3%) studies, and cannabis use disorder in six (20%) studies. The most common interventions aimed at treating mood disorders (e.g., depression, dysthymia) 15 (50%) studies, followed by nine (30%) behavioural disorders (e.g., ADHD) and five (16.7%) unspecified psychiatric disorders. Eighteen (60%) studies (n=1,699 participants) investigated the effectiveness of various non-pharmacological interventions, while 12 studies examined pharmacotherapies (n=765 participants). Conclusion Although several RCTs were identified, substantial clinical and methodological heterogeneity was evident among the studies (e.g., patients with multiple disorders, and multi-faceted interventions). Smaller systematic reviews focused on specific interventions (e.g., behavioural therapies) and concurrent disorders (e.g., depression and substance use) may be warranted, but due to considerable heterogeneity, more RCTs are needed prior to conducting larger systematic reviews or meta-analyses.

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