# The Department of Obstetrics and Gynecology
# 35TH ANNUAL RESEARCH DAY

## 13 MAY 2022

### Lister Hall, University of Alberta, Main Campus

**UNIVERSITY OF ALBERTA**

# Chair's Welcome

Welcome to our 35th annual Obstetrics and Gynecology Research Day.

I am excited that we have a hybrid event this year as we celebrate the amazing work of our department members and women's health researchers.

I am hopeful that perhaps in the next year we will be able to reconnect and rebuild after the challenges of the past 2 years.

I am grateful to our research day planning committee led by Dr. Christy Cooke, Dr. Denise Hemmings and Rebecca Reif. Also thanks to the work of our administrative team Stephanie Russell, Meaghan Lien, Sophia Ho, Rebecca Royan, Jessica Naidoo, and Chelsey Konowalyk for their support in organizing this event.

A warm welcome to our invited J Ross Vant memorial lecture key note speaker Professor Tim Caulfield. Timothy Caulfield is a Canada Research Chair in Health Law and Policy, a Professor in the Faculty of Law and the School of Public Health, and Research Director of the Health Law Institute at the University of Alberta. His interdisciplinary research on topics like stem cells, genetics, research ethics, the public representations of science and public health policy has allowed him to publish over 350 academic articles. He has won numerous academic and writing awards and is a Fellow of the Royal Society of Canada and the Canadian Academy of Health Sciences. He contributes frequently to the popular press and is the author of two national bestsellers: The Cure for Everything: Untangling the Twisted Messages about Health, Fitness and Happiness (Penguin 2012) and Is Gwyneth Paltrow Wrong About Everything?: When Celebrity Culture and Science Clash (Penguin 2015). His most recent book is Relax, Dammit!: A User's Guide to the Age of Anxiety (Penguin Random House, 2020). Caulfield is also the host and co-producer of the award winning documentary TV show, A User's Guide to Cheating Death, which has been shown in over 60 countries, including streaming on Netflix in North America.

Also, we welcome as our guest judge Dr. Kara Nernberg. Dr. Kara Nerenberg is an Associate Professor and Clinician-Scientist at the University of Calgary working in the areas of General Internal Medicine and Obstetric Medicine. Dr. Nerenberg's clinical and research interests focus prevention of cardiovascular diseases in women after common pregnancy complications, mainly the hypertensive disorders of pregnancy. Her research is supported by CIHR and Heart & Stroke's Women's Heart and Brain Health Mid-Career Research Chair through which she founded and leads the Canadian Postpregnancy Clinical Network.

Enjoy the day as we celebrate our amazing talent and scholarly work.


- **Dr. Jane Schulz**

# Acknowledgements

We would like to thank the co-chair moderators, judges, committee members and department staff for their help in making the 35th Annual Research Day a success.

| | | |
|---|---|---|
| Tarek Motan | Jeanelle Sabourin | Christy-Lynn Cooke |
| Sophia Pin | Yuliya Fakhr | Cathy Flood |
| Rebecca Rich | Amy Wooldridge | Jannatul Nawa |
| Meghan Riddell | Ariadne Daniel | Sue Chandra |
| Laura Reyes Martinez | Nayara Gabriela Lopes | Lina Roa |
| Floortje Spaans | Annick Poirier | Murilo Graton |
| Maryam Adesunkanmi | Ashley Zubkowski | Sue Ross |
| Dan Hodges | May Sanaee | Denise Hemmings |
| Venu Jain | Miranda Brun | Jane Schulz |
| Kara Nerenberg | Christa Aubrey | Rebecca Reif |
| May Sanaee | Tona Pitt | Sophia Ho |
| Stephanie Russel | Chelsey Konowalyk | Meaghan Lien |

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# Timothy Caulfield

Timothy Caulfield is a Canada Research Chair in Health Law and Policy, a Professor in the Faculty of Law and the School of Public Health, and Research Director of the Health Law Institute at the University of Alberta. His interdisciplinary research on topics like stem cells, genetics, research ethics, the public representations of science and public health policy has allowed him to publish over 350 academic articles. He has won numerous academic and writing awards and is a Fellow of the Royal Society of Canada and the Canadian Academy of Health Sciences.

He contributes frequently to the popular press and is the author of two national bestsellers: The Cure for Everything: Untangling the Twisted Messages about Health, Fitness and Happiness (Penguin 2012) and Is Gwyneth Paltrow Wrong About Everything?: When Celebrity Culture and Science Clash (Penguin 2015). His most recent book is Relax, Dammit!: A User's Guide to the Age of Anxiety (Penguin Random House, 2020). Caulfield is also the host and co-producer of the award winning documentary TV show, A User's Guide to Cheating Death, which has been shown in over 60 countries, including streaming on Netflix in North America.

## The title of his talk is:
## Battling Bunk: Evidence-Based Strategies to Counter Misinformation

**Objectives:**

1. Understand the scope and nature of the "infodemic" and the primary sources of COVID-19 misinformation;

2. Identify the harms associated with the spread of misinformation in this context;

3. Analyze the arguments for and against debunking misinformation; and

4. Utilize effective debunking strategies.

# Dr. Kara Nerenberg

Dr. Kara Nerenberg is an Associate Professor and Clinician-Scientist at the University of Calgary working in the areas of General Internal Medicine and Obstetric Medicine. Dr. Nerenberg's clinical and research interests focus prevention of cardiovascular diseases in women after common pregnancy complications, mainly the hypertensive disorders of pregnancy. Her research is supported by CIHR and Heart & Stroke's Women's Heart and Brain Health Mid-Career Research Chair through which she founded and leads the Canadian Post pregnancy Clinical Network.

## The title of her talk is:
## IMPROVING cardiovascular health after pregnancy – Made in Alberta Research

**Objectives:**

1. Understand the impacts of pregnancy related disorders on a female's future cardiovascular health.

2. Identify simple postpartum clinical management best practices to improve a female's future health.

3. Describe models of care for postpartum follow-up by highlighting Alberta Research.

# Department of Obstetrics and Gynecology University of Alberta 2022 Research Day Presentation Schedule

| | | |
|---|---|---|
| **7:15 – 7:45 am** | **REGISTRATION AND BREAKFAST** | |
| **7:45 – 8:00** | **Dr. Brenda Hemmelgarn**<br>Dean, FoMD<br>**Dr. Jane Schulz**<br>Department Chair | **Opening Remarks and Keynote Speaker Introduction** |
| **8:00– 9:00** | **Keynote Speaker: Timothy Caulfield**<br>**Battling Bunk: Evidence-Based Strategies to Counter Misinformation** | |
| **SESSION I**<br>**ORAL PRESENTATIONS**<br>**Moderators: Ashley Zubkowski and May Sanaee** | | |
| 9:00 – 9:15 | **Jennifer Mateshaytis**,<br>*Brawner M, Steed H, Pin S* | Improving the Rate of Same-Day Discharge in Gynecologic Oncology Patients with Endometrial Cancer undergoing Minimally Invasive Robotic Surgery – a Quality Improvement Initiative |
| 9:15 – 9:30 | **Shezel Muneer**,<br>*Xu W, Fang X, Chemtob S, Olson DM* | Targeting IL-6-Mediated Inflammation with Novel Therapeutic HSJ633 in Human Fetal Membranes |
| 9:30 – 9:45 | **Rose He**,<br>*Kaur A, Hornberger LK, Crawford S, McBrien A, Boehme C, Eckersley L* | Risk of Major Congenital Heart Disease in Pre-Gestational Maternal Diabetes is Modified by A1C |
| 9:45 – 10:00 | **Lauren Higa**,<br>Reif R, Mitran CJ, Yanow SK, Hemmings DG | Expression of Syndecan-1, a Receptor for Plasmodium Falciparum Infected Red Blood Cells, may be Determined by the Sex of the Placental Syncytiotrophoblast |
| 10:00 – 10:30 am | **MORNING BREAK/PHOTOS** | |

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## SESSION II
## POSTER PRESENTATIONS
## ROOM A: 10:30 – 11:40 am
## Moderators: Dan Hodges and Amy Wooldridge

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|---|---|---|
| 10:30 – 10:35 | **Bethan Wilson,** *Shannon M, Beristain A, Riddell M* | Transcriptomic Analysis of Human Decidual Endothelial Cells Identifies Gestational Age Dependent Changes and TGF-ß1-Endothelial Cell Ligand Interactions |
| 10:38 – 10:42 | **Bruno Svajger,** *Steed H, Chapelsky S, Pin S* | Preoperative Weight Loss in Women with Obesity and Low-Grade Endometrial Pathology |
| 10:46 – 10:51 | **Roberto Villalobos,** *Liu R, Spaans F, Sáez T, Quon A, Cooke C-LM, Davidge S* | Placenta-derived Extracellular Vesicles from Women with Preeclampsia Induce Endothelial Dysfunction via LOX-1 Activation |
| 10:54 – 10:59 | **Tania Rodenzo,** *Sosa Alvarado C, Leimert KB, Olson DM* | Increased Leukocyte Migration at Term Parturition is Conserved Across Mammalian Species |
| 11:02 – 11:07 | **Skye Russell,** *Regan S, Simone K, Parkman J, Sanaee M* | Fatigue and Non-Urgent Paging in Obstetrics and Gynecology Residents at the University of Alberta |
| 11:10 – 11:15 | **Sumaiyah Shaha,** *Frerichs H, Kwong J, Panahi S, Riddell M* | Atypical Protein Kinase C's Regulate Cell Column Trophoblast Progenitor to Extravillous Trophoblast Differentiation by Regulating Notch1 Trafficking |
| 11:18 – 11:23 | **Amy Wooldridge,** *Pasha M, Kirschenman R, Spaans F, Davidge ST, Cooke C-LM* | Cardiac Adaptations to Pregnancy are Altered with Advanced Maternal Age |
| 11:26 – 11:31 | **Stuart Lau,** *Serrano-Lomelin J, Hicks M, Bartel R, James A, Cordingley C, Bradburn K, Ospina MB* | Neurodevelopmental Disorders among Métis Children in Alberta |

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|---|---|---|
| **SESSION II**<br>**POSTER PRESENTATIONS**<br>**ROOM B: 10:30- 11:40 am**<br>**Moderators: Lina Roa and Cathy Flood** | | |
| 10:30 – 10:35 | **Prabhpreet Hundal**,<br>*He R, Kao C, Hornberger L* | Impact of the Mode of Delivery on Perinatal Outcomes in Antenatally Diagnosed Fetal Congenital Heart Disease |
| 10:38 – 10:42 | **Juliana Lasso-Mendez**,<br>*Hornberger LK, Davenport M, Brislane A, Littlefair, S, Haughian B, Windram J, Khurana R, Wahab N, Cooke C-LM, Riddell M, Chan S* | Vascular Dysfunction in Maternal Heart Disease and its Contribution to Adverse Pregnancy Outcomes |
| 10:46 – 10:51 | **Sarah Shamiya**,<br>*Goetz V, Aubrey C* | Exploring the Hidden Curriculum in the University of Alberta Postgraduate Obstetrics and Gynecology Residency Training Program |
| 10:54 – 10:59 | **Marina Bianchi Lemieszek**,<br>*Siegers G, Quilty D, Jewer M, Findlay S, Vincent K, Fu YX, Postovit L-M* | Elucidating the Function of the Epithelial Splicing Regulatory Protein 1 (ESRP1) in Breast Cancer |
| 11:02 – 11:07 | **Nicole Rodriguez**,<br>*Kozyrskyj A* | Is Neurodevelopment Influenced by Atopy in the Mother or Infant? |
| 11:10 – 11:15 | **Nataliia Hula**,<br>*Pasha M, Spaans F, Quon A, Kirschenman R, Cooke C-LM, Davidge S* | Prenatal Hypoxia Alters Coronary Artery Function of Adult Offspring in a Sex-specific Manner |
| 11:18 – 11:23 | **Alexa Thompson**,<br>*Plitt SS, Charlton CL* | Evaluating the Prevalence and Demographic Associations of Hepatitis B Virus (HBV), Human Immunodeficiency Virus (HIV), and Hepatitis C Virus (HCV) in the Alberta Prenatal Population |
| 11:26 – 11:31 | **Vaishvi Patel**,<br>*Sydora BC, Ross S* | Assessing Menopause Knowledge in University Students to Improve Quality of Life in Menopausal Women |
| 11:34 – 11:38 | **Proscovia M Mugaba**,<br>*Moray A, McBrien A, Eckersley L, Joynt C, Stryker T, Hornberger LK* | Diagnostic Accuracy of Fetal Echocardiography for Predicting Congenital Heart Disease Likely to Need Immediate Postnatal Intervention for Stabilization |

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## SESSION II
## POSTER PRESENTATIONS
## ROOM C: 10:30 – 11:40 am
## Moderators: Nayara Gabriela Lopes and Christy-Lynn Cooke

| Time | Presenter | Title |
|------|-----------|-------|
| 10:30 – 10:35 | **Yuliya Fakhr,** *Koshti S, Habibyan YB, Hemmings DG* | Piezo1: A Novel Mechanosensory Mediator of Placental Physiology and Pathology |
| 10:38 – 10:42 | **Atoosa Golfar,** *Olson J, Obeng-Nkansah E, Biju H, Olson DM* | Screening and Interventions for Intimate Partner Violence in Pregnancy by Obstetricians: The Patients Perspective |
| 10:46 – 10:51 | **Maryam Paraktoon,** *Chen Y, Mandhane P, Moraes T, Simons E, Turvey S, Subbarao P, Scott J, Kozyrskyj A* | Impact of emergency cesarean birth on *Bifidobacterium* levels in infant gut microbiota |
| 10:54 – 10:59 | **Linn Moore,** *Hicks A, Kozyrskyj A, Chari R, Rosychuk R, Ducharme F, Ospina MB* | Maternal Morbidity During Pregnancy is Associated with Poor Asthma Control Among Preschoolers |
| 11:02 – 11:07 | **Nayara Lopes,** *Wiley C, Patel V, Serrano-Lomelin J, Fang X, Falkenberg E, Soltanpour N, Metz GAS, Olson DM* | The effects of social isolation on gestational length and inflammatory profile of rats: a model for COVID isolation stress |
| 11:10 – 11:15 | **Scott Bennett,** *Hornberger LK, Eckersley LG, Fruitman D, Kaur A* | Impact of Socioeconomic Status and Remoteness of Residence on Fetal Outcomes in Major CHD |
| 11:18 – 11:23 | **Sana Amjad,** *Bartel R, Colman I, James A, Ospina MB* | Pregnancy, breastfeeding, and COVID-19 vaccination perspectives among Métis in Alberta |
| 11:26 – 11:31 | **Yasaman Habibyan**, *Koleva P, Elahi S* | The role of CD71+ erythroid cells in the establishment of microbiome in newborns |
| 11:34 – 11: 38 | **Julia Parkman** *Steed H, Capstick V, Pin S* | Utility of Pre-Operative Computed Tomography Imaging in Management of Primary Endometrial Carcinoma |
| 11:40 – 12:30 pm | **LUNCH** | |

| 12:30 – 1:30 pm | **Guest Speaker: Dr. Kara Nerenberg**<br>**IMPROVING cardiovascular health after pregnancy – Made in Alberta Research** | |
|---|---|---|
| | **SESSION III**<br>**ORAL PRESENTATIONS**<br>**Moderators: Yuliya Fakhr and Jeanelle Sabourin** | |
| 1:30 – 1:45 | **Maryam Adesunkanmi,**<br>*Al-Shamalo H, Salami B, Ospina MB* | Experiences of Racial Discrimination and Maternal, Perinatal and Neonatal Outcomes: a Systematic Review |
| 1:45 – 2:00 | **Sabrin Bashar,**<br>*Tun HM, Mandhane P, Moraes TJ, Simons E, Turvey S, Subbarao P, Scott J, Kozyrskyj A* | Impact of Prolonged Hospitalization on the Development of the Infant Gut Microbiome at 3 Months and 12 Months of Age |
| 2:00 – 2:15 | **Mazhar Pasha,**<br>*Kirschenman R, Wooldridge A, Spaans F, Cooke C-LM, Davidge ST* | Tauroursodeoxycholic acid (TUDCA) as an Intervention to Improve Pregnancy outcomes and Vascular Function in a Rat Model of Advanced Maternal Age |
| 2:15 – 2:30 | **Sarah Shamiya,**<br>*Sabourin J* | Effects of Minimally Invasive versus Open Surgical Approach for Treating Cervical Cancer in Edmonton, Alberta: A Retrospective Analysis |
| 2:30 – 2:45 | **COFFEE BREAK** | |
| | **SESSION IV**<br>**ORAL PRESENTATIONS**<br>**Moderators: Venu Jain and Murilo Graton** | |
| 2:45 – 3:00 | **Christina Yang,**<br>Lee D, Poirier A, Yaskina M, Hyakutake M, Schulz J | Evaluation of Patient Satisfaction and Perspectives of Virtual Care in Urogynecology during the COVID-19 Pandemic |
| 3:00 – 3:15 | **Jasmine Nguyen,**<br>*Patel K, Shaha S, Panahi S, Riddell M* | Atypical Protein Kinase C Isoforms Regulate Syncytiotrophoblast Apical Surface Structure and Permeability |

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| | SESSION IV<br>ORAL PRESENTATIONS<br>Moderators: Venu Jain and Muliro Graton | |
|---|---|---|
| 3:15 – 3:30 | **Alicia Long,**<br>*Kaur P, Lukey A, Allaire C, Kwon J, Yong P, Gillian H* | Reoperation and pain related health services utilization after hysterectomy for endometriosis with bilateral, unilateral or no oophorectomy |
| 3:30 – 3:40 | **Dr. Sandy Davidge** | **WCHRI Message** |
| 3:40 – 3:45 | **Dr. Christy-Lynn Cooke** | **Closing remarks and thank you** |
| 5:30 – 6:30 | **Peter Lougheed Hall**<br>**Cocktail Hour** | |
| 6:30- 8:30 | **DINNER** | |
| 8:30 – 9:30 | **AWARDS CEREMONY**<br>• **Presentation of Research Day Awards**<br>• **OB/GYN Graduate Student and Post Doctoral Fellow Recognition**<br>• **Chief Resident Farewell**<br>• **Presentation of Clinical Teaching Awards**<br>• **Closing Remarks** | |
| 10:00 | **LAST CALL** | |

**Improving the Rate of Same-Day Discharge in Gynecologic Oncology Patients with Endometrial Cancer undergoing Minimally Invasive Robotic Surgery – a Quality Improvement Initiative**

**Jennifer Mateshaytis**, MD, MSc[c, d] Marina Brawner, NP[a, b] Helen Steed, MD [a, b] Pin, MD[a, b] [a]Obstetrics and Gynecology, University of Alberta, Edmonton, AB, Canada [b]Cross Cancer Institute, Edmonton, AB, Canada [c]Tom Baker Cancer Center, Gynecologic Oncology, Calgary, AB, Canada [d]Gynecologic Oncology, University of Calgary, Calgary, AB, Canada

**Background**: Same-day discharge (SDD) in patients with endometrial cancer undergoing minimally invasive surgery (MIS) is safe and feasible, with multiple patient and healthcare system benefits. Despite this, our local rate of SDD was only 29.4%. Several studies have suggested methods to improve rates of SDD, but few have evaluated the application of such methods. The objectives of our Quality Improvement (QI) initiative were two-fold: 1) to increase the rate of SDD in eligible endometrial cancer patients undergoing MIS to 70%, and 2) to evaluate the implementation of methods to improve rates of SDD.

**Methods**: At our centre, QI diagnostics were conducted, and root causes identified. Four interventions were introduced: 1) setting SDD as the default discharge plan, 2) ensuring a physician order for discharge was on the chart, 3) removing the foley catheter in the OR, and 4) introducing pre- and postoperative patient education documents. A time-series design was used; rate of SDD was tracked using baseline data and continuous post-intervention monitoring. Process measures (for each intervention) and balancing measures were defined and tracked.

**Results:** At the conclusion of our QI initiative the average rate of SDD was 78.3%—exceeding our aim of 70%. This was achieved without compromising patient satisfaction (98.2%) or significantly impacting rates of readmission or presentations to the Emergency Department (ED).

**Conclusions:** Our initiative demonstrated the application of simple interventions that resulted in a substantial increase in our rate of SDD in the population of interest, without causing negative impacts on the defined balancing measures. These interventions were non-specific to gynecologic oncology and could easily be applied across surgical disciplines.

# TARGETING IL-6-MEDIATED INFLAMMATION WITH NOVEL THERAPEUTIC HSJ633 IN HUMAN FETAL MEMBRANES

**Muneer S[1]**, Xu W[1], Leimert KB[1], Fang X[1], Chemtob S[2], Olson DM[1]
1. Department of Obstetrics and Gynecology, University of Alberta
2. Department of Pediatrics, Ophthalmology, and Pharmacology, CHU Sainte-Justine Research Center, Montreal, QC, Canada.

**Objective/Hypothesis:** Preterm birth (PTB) often occurs due to 'silent' intrauterine inflammation, and interleukin (IL)-6 is implicated in its pathogenesis, possibly in response to damage-associated molecular patterns (DAMPs). HSJ633, an allosteric antagonist to the IL-6 receptor (IL-6R), has shown efficacy in animal/cellular models but has not been tested in human tissues. Our objective was to demonstrate HSJ633's efficacy in inhibiting IL-6-mediated inflammation stimulated by DAMPs in human fetal membranes (hFMs). We hypothesized that stimulating IL-6 production with high-mobility group box 1 (HMGB1) would stimulate other pro-inflammatory cytokines and that HSJ633 attenuates this.

**Methodology:** Eight placentas delivered by elective C-section were collected from consenting term-non-labouring women at the Royal Alexandra Hospital, and 12 mm tissue punches were used to obtain hFM explants. Explants were acclimated for 48 hours and then treated with 0, 50, 100, and 200 ng/mL HMGB1 with or without HSJ633 ($10^{-6}$ M) for 24 hours at $37^{\circ}$C. Changes in mRNA abundance of chemokines/cytokines in explants were analysed using RT-qPCR, and multiplex assays measured chemokine/cytokine release into explant supernatants. Results were analysed using two-way ANOVA, $p < 0.05$.

**Results:** Increasing concentrations of HMGB1 stimulated increases in IL-6 ($p < 0.05$) and CXCL10 ($p < 0.0001$) mRNA expression. HSJ633 co-treatments significantly decreased IL-6 expression ($p < 0.05$). There were no significant changes in IL-6R, CCL2, CXCL8, and MMP9 gene expression. HMGB1-treated explants demonstrated significant concentration-dependent increases in cytokine/chemokine outputs for IL-6 ($p < 0.001$), IL-1 ($p < 0.0001$), TNF- ($p < 0.0001$), and CCL15 ($p < 0.001$). CXCL1 and CCL24 increases did not reach significance. HSJ633 co-treatment significantly decreased output of IL-6 ($p < 0.01$), IL-1 ($p < 0.05$), TNF- ($p < 0.05$), CCL15 ($p < 0.05$), and CXCL1 ($p < 0.001$).

**Conclusion:** Our *ex vivo* model demonstrates that IL-6 is a key mediator of sterile inflammation in hFMs. HSJ633's ability to decrease IL-6 expression and output shows that IL-6 stimulates its own production in a positive feed-forward loop. HSJ633 efficacy in inhibiting IL-6-mediated inflammation makes it a promising PTB therapeutic.

# RISK OF MAJOR CONGENITAL HEART DISEASE IN PRE-GESTATIONAL MATERNAL DIABETES IS MODIFIED BY A1C

Rose He[1], Amanpreet Kaur[1], Lisa K Hornberger[1], Susan Crawford[2], Angela McBrien[1], Cleighton Boehme[1], Luke Eckersley[1]

Division of Cardiology, Department of Pediatrics, Women's & Children Health Research Institute, University of Alberta, Edmonton, Alberta, Canada
Alberta Perinatal Health Program.

**Introduction:** The association between pre-gestational maternal diabetes (MD) and risk of congenital heart disease (CHD) is well-recognized; however, the contribution of poor glycemic control based on hemoglobin A1C (A1c) is less clear.

**Objectives:** To determine the incidence of major CHD (mCHD) among those with MD and gestational diabetes and the effect of glycemic control on mCHD risk.

**Methods**: We determined the incidence of mCHD, defined as requiring operation in the first year of life or resulting in termination of pregnancy or fetal demise, among registered births in Alberta from 2008-2018. Linkage of diabetes status and maximum A1c prior to 16 weeks gestation and other potential covariates was performed using the Alberta Perinatal Health Program registry. Adjusted Risk ratios (aRR) were calculated using log-binomial modelling (StataIC 14.2)

**Results:** Of 1412 cases of mCHD in 594,755 Alberta births in the study period (2.3/1000), mCHD was present in 48/7449 births with MD (6.4/1000, RR 2.8 (95%CI 2.1, 3.7, p<0.001)). mCHD was present in 95/39,141 births with gestational diabetes (2.4/1000 births, RR 1.03 (95%CI 0.84, 1.27), p=0.73). Maternal age (aRR 1.03, 95%CI1.02-1.04, p<0.0001), and multiple gestations (aRR 1.37 (95%CI 1.3 – 2.1, p<0.001) were also associated with mCHD risk, whereas maternal pre-pregnancy weight >91kg was not. The stratified risk for mCHD associated with A1c ≤6.1%, 6.1% - 8.0% and ≥8.0% were 4.2/1000, 6.8/1000, 17/1000 births respectively. The risk ratio for mCHD associated with pre-existing diabetes and an A1c ≥8.0% was therefore 7.34 (95%CI 4.35, 12.4). Compared to MD with a A1c<6.1%, A1c>8% was associated with increased risk (aRR 4.4 (95% CI 2.3, 8.8, p<0.001). **Conclusion:** MD is associated with a risk ratio for mCHD of 2.8, which increased to 9.9 in those with HbA1c>8.5%. This data may allow refinement of referral indications for high-risk pregnancy screening.

# ADDRESSING GAPS IN PERINATAL RESOURCES FOR NEWCOMERS AND REFUGEES IN EDMONTON, ALBERTA

**Sarah Scratch**[1], Jennifer Gelfand[1] , Uilst Bat –Erdene[2], Maria Ospina[3], Sue Chandra[3]
1 Faculty of Medicine and Dentistry University of Alberta
2 Department of Family and Community Medicine, University of Toronto
3 Department of Obstetrics and Gynecology University of Alberta

**Objective:** Immigrant and refugee women have higher rates of adverse pregnancy outcomes compared to Canadian born women, including increased rates of low birth weight infants, operative delivery and postpartum depression. This is partially due to barriers in accessing healthcare resources which are culturally sensitive and available in languages beyond French and English. Our objective is to explore the experiences of immigrant and refugee women in accessing perinatal resources in Edmonton to inform the development of a perinatal information website.

**Methods:** Surveys were administered to 33 brokers from Multicultural Healthcare Brokers(MCHB) , an organization that works with immigrant and refugee newcomers to Edmonton. Surveys included open and closed ended questions, with the main question asking about resources, or lack thereof, for their pregnant clients. Main themes and sub themes were manually extracted by researchers, analyzed using NVivo software, and compared to increase validity of results.

**Results:** 33 MCHB filled out these surveys, representing 25 languages. 23 (69.7%) brokers reported they were somewhat, moderately or extremely concerned about their clients' knowledge about perinatal health. Language barriers was the major impediment to accessing resources, with pregnancy being the main topic clients wished to discuss. Multilingual resources (13) and take home- resources, including text and video (9), were the most reported items that MCHB wanted access to for their clients. Videos were a preferred delivery method of information, therefore videos about perinatal health have been developed and published onto the website. Due to language barriers being a major theme, translators were recruited to translate website information into Arabic, Spanish, Russian , Farsi, Punjabi and Somali .

**Conclusion:** Language barriers pose a significant impediment to immigrant and refugee ability to accessing information about perinatal care . Additional Focus groups are being conducted to ensure that the website contains culturally sensitive resources, with an emphasis on video content.

\* Due to unforeseen circumstances this abstract was not presented

# TRANSCRIPTOMIC ANALYSIS OF HUMAN DECIDUAL ENDOTHELIAL CELLS IDENTIFIES GESTATIONAL AGE DEPENDENT CHANGES AND TGF-ß1-ENDOTHELIAL CELL LIGAND INTERACTIONS

**Bethan Wilson[2]** , Matthew Shannon[4,5], Alexander Beristain[4,5] and Meghan Riddell[1,2,3]
Department of Obstetrics and Gynecology, University of Alberta 1
Department of Physiology, University of Alberta 2
Women and Children's Health Research Institute 3
Department of Obstetrics and Gynecology, University of British Coloumbia 4
The British Columbia Children's Hospital Research Institute 5

**Introduction:** Conversion of endometrial lining into decidua is essential for blastocyst implantation and pregnancy progression. Decidualization requires expansion and remodelling of endometrial vasculature via angiogenesis. Decidual defects are associated with placental malformation, an increased risk of infertility and pregnancy complications. Mouse models show decidualization defects in advanced age pregnancy (AAP). Endothelial cell (EC) aging and poor angiogenic response is a driver of organ ageing, but whether similar patterns of EC ageing are observed in AAP remains elusive. We hypothesize EC intrinsic ageing may be a feature of AAP. We will use single cell RNA sequencing (scRNA seq) of human decidual tissue to examine differences in EC gene expression and cell-cell interactions in young versus AAP across the first trimester.

**Methodology:** Isolated first trimester decidual cells (gestational age (GA) 4–12 weeks) are scRNA sequenced using 10X genomics. Bioinformatic processing is performed in RStudio. CD31 positive decidual EC (n=3, 9-10 week; n=4, 12 week) scRNA-seq dataset was created using the Vento-Tormo et al library and differentially regulated EC genes were identified (maternal age unknown). NicheNet computational method for interactome analysis was performed on the dataset (GA 6-13).

**Preliminary Results:** Dataset analyses revealed 388 differentially expressed genes between 9-10 and 12 week EC (e.g. DLK1, EGFL6, and oxygen transport genes HBG2, HBG1, HBA2). NicheNet analysis revealed TGF-β1/ TGF-β receptor 2 (TGFBR2) pathway as the dominant ligand/receptor acting on decidual EC, with TGF-β1 being produced by extravillous trophoblasts (EVT) and uterine natural killer cells (uNK).

**Conclusion:** Analyses demonstrated that EC adapt their transcriptomes with advancing gestation, and EVT and uNK are key regulators of EC in the human decidua. Further scRNA seq data will be generated to examine AAP-related effects on decidualization for in-depth analysis between young and AAP, and to provide insight into the impact of EC on ageing pregnancies.

# PREOPERATIVE WEIGHT LOSS IN WOMEN WITH OBESITY AND LOW-GRADE ENDOMETRIAL PATHOLOGY

**Svajger B[1]** , Steed H[1,2], Chapelsky S[1] , Aubrey C[.1,2 ,] Pin S[1,2]
Department of Obstetrics and Gynecology, University of Alberta 1
Cross Cancer Institute 2

**Background/Introduction:** Endometrial cancer is the most common gynecologic malignancy with most instances presenting early and undergoing surgical treatment. Obesity is the greatest risk factor with risk proportionally increasing with body mass index (BMI). Additionally, obesity impacts surgical feasibility and contributes to an increase in perioperative complications. Studies in other surgical fields demonstrate benefit in preoperative weight loss for patients with obesity; however, preoperative weight loss has not been actively studied in patients with gynecologic pathologies.

**Objective/Hypothesis:** Preoperative weight loss in patients with obesity and endometrial pathology will reduce perioperative complications.

**Methods:** Prospective cohort study of patients with obesity (BMI > 40kg/m 2 ; n=60) and either atypical endometrial hyperplasia or grade 1 endometroid adenocarcinoma who are referred to a weight reduction clinic after initial gynecologic oncology consultation. A preoperative weight reduction program is initiated with weekly monitoring. Post-operative follow-up occurs at eight weeks and one-year. Data is collected in a REDCap database.
Anticipated Results/Progress: 64 patients have been recruited, and 40 have undergone surgery (target n=81). Average weight loss after program intervention is 9.95 ± 8.20kg, 13 patients had a reduction in BMI to < 40. A significantly greater proportion of patients with BMI < 40 had minimal blood loss (< 100mL; p=0.023) and underwent sentinel lymph node sampling (p=0.046) compared to patients with BMI > 40. Additionally, a greater proportion had same-day discharge (p=0.058) and avoided perioperative complications (p=0.052).

**Significance/Relevance:** This study aims to investigate the feasibility and benefits of preoperative weight loss in women with obesity and endometrial pathology. Ultimately these findings can contribute to reducing perioperative morbidity, improve physician-to-patient counselling capability, and enable patients to have active engagement in their treatment.

# Placenta-derived extracellular vesicles from women with preeclampsia induce endothelial dysfunction via LOX-1 activation

**Roberto Villalobos-Labra[1,3]**, Ricky Liu[1,2,3], Floor Spaans[1,3], Tamara Sáez[1,3], Anita Quon[1,3], Christy-Lynn M. Cooke[1,3], Sandra T. Davidge[1,2,3]
1 Department of Obstetrics and Gynecology, 2 Department of Physiology, 3 Women and Children's Health Research Institute, University of Alberta, Edmonton, AB, Canada.

**Introduction:** Preeclampsia (PE) is a pregnancy complication affecting ~5% of all pregnancies worldwide, characterized by new-onset hypertension during pregnancy and end-organ damage. The pathogenesis of PE remains unclear, but it is thought that maternal vascular/endothelial dysfunction plays a key role and may result from the release of syncytiotrophoblast-derived extracellular vesicles (STBEVs) into the maternal circulation by a dysfunctional placenta. STBEVs from normal pregnancies induce vascular dysfunction via activation of the Lectin-like oxLDL receptor 1 (LOX-1). However, STBEVs from PE (PE-STBEVs) differ in composition to NP-STBEVs, and whether PE-STBEVs induce vascular dysfunction via LOX-1 is not known. We hypothesized that PE-STBEVs induce vascular dysfunction via LOX-1.

**Methods**: PE-STBEVs were isolated from PE placentas (n=4) by perfusion, and pooled. Human umbilical vein endothelial cells (HUVECs from normal pregnancies; n=5) were pre-incubated (30 min) ± TS20 (LOX-1 blocking antibody) and then ± PE-STBEVs (100μg/mL, 30 min). LOX-1 activation was evaluated by the phosphorylation of the downstream kinases ERK1/2 by Western blotting. Mesenteric arteries isolated from pregnant rats on gestational day 20 (term=21 days; n=7-9) were incubated overnight ± TS20 and PE-STBEVs (100μg/mL). Endothelium-dependent vasodilation to methylcholine [MCh] was evaluated by wire myography. Data are presented as mean±SEM; assessed by one-way ANOVA with Sidak's posthoc test; $p < 0.05$ was significant.

**Results:** PE-STBEVs increased ERK1/2 phosphorylation in HUVECs (2.8±0.2 fold, p=0.0043), which was prevented by TS20 (p=0.0077). PE-STBEVs reduced maximal vasodilation to MCh in mesenteric arteries compared to non-treated vessels (%max. vasodilation: non-treated=96.4±0.9 vs PE-STBEVs=84.1±2.3; $p < 0.0001$), which was prevented by co-incubating the vessels with TS20 (%max. vasodilation: PE-STBEVs=84.1±2.3 vs TS20+PE-STBEVs=93.0±0.9; p=0.0011).

**Conclusion/Significance:** Our data showed that PE-STBEVs activate LOX-1 in endothelial cells and impair vascular function via LOX-1. This study expands on the mechanisms leading to vascular dysfunction in PE and proposes LOX-1 as a potential target to prevent vascular dysfunction and ameliorate PE-related adverse outcomes.

# NCREASED LEUKOCYTE MIGRATION AT TERM PARTURITION IS CONSERVED ACROSS MAMMALIAN SPECIES

**Rodezno Antunes T[1]** , Sosa Alvarado C [2], Leimert KB[2] , Olson DM[1,2]
1 Department of Physiology
2 Department of Obstetrics and Gynecology
University of Alberta

**Objective/Hypothesis:** Birth at term is characterized by leukocyte infiltration into the uterus where several pro-inflammatory mediators are released to cause uterine activation for labour. Leukocyte extravasation from capillaries and migration into uterine tissues is stimulated by chemotactic factors (CF) released from myometrial, decidual, and/or fetal membrane tissues. The rate of leukocyte migration increases shortly before delivery. We developed a leukocyte migration assay (LMA) to assess the rate of leukocyte migration. It consists of a CF isolated from uterine or fetal membrane tissues and peripheral leukocytes. We have developed LMAs for humans, mice, rats, and guinea pigs with remarkably similar characteristics. The intriguing question is how similar are the CF and the responsiveness of leukocytes of each species? To address this we compared the ability of CF from various species to attract human term pregnancy leukocytes and the attraction of mouse term pregnancy leukocytes to human fetal membrane CF. We hypothesized that CF from various species attracted cells from other species.

**Methods:** CF was extracted by homogenizing fetal membranes, cotyledons, and/or lower uterus from mouse (n=10), sheep (n=4), cow (n=4), pig (n=3) and human (n=15) in PBS (100mg/mL). Leukocytes were isolated from human (n= 15) and murine (n=4) blood samples using Hetasep. Leukocyte migration was assessed via LMA. Data were analyzed by GraphPad Prism one-way Anova and Tukey post-hoc testing, significance was determined at $p < 0.05$.

**Results:** Peripheral leukocytes from pregnant women at term migrated in response to cow, pig and sheep fetal membrane CF ($p < 0.05$) and mouse lower uterus CF ($p < 0.01$). Human fetal membrane CF stimulated mouse white blood cells to migrate ($p < 0.01$).

**Significance/Relevance:** The data confirm that the leukocyte migration mechanisms at term delivery are similar in several mammalian species. Increased CF production is a universal mechanism for signaling the end of pregnancy and initiation of labour.

# FATIGUE AND NON-URGENT PAGING IN OBSTETRICS AND GYNECOLOGY RESIDENTS AT THE UNIVERSITY OF ALBERTA

**Regan, S., Russell, S**., Simone, K., Parkman, J., Sanaee, M.
Department of Obstetrics and Gynecology
University of Alberta

**Objective:** Fatigue is a common concern in medical education with long work hours. Prolonged sleep deprivation and increased work hours increase fatigue and associated medical errors. There is limited knowledge of resident reported fatigue within Obstetrics and Gynaecology and the role of the number, urgency or acuity of pages. This study aims to determine the baseline fatigue level and the contributing role of non-urgent pages in fatigue management.

**Methods:** Two surveys were administered to all Obstetrics and Gynaecology residents. The first assessed fatigue, sleeping hours, and barriers to sleep. The second recorded pages received and classified them based on urgency. Data was analyzed using mixed methods; quantitative data compared junior residents (PGY1/2) to senior residents (PGY3/4/5) and low-risk shifts to high-risk shifts. Qualitative analysis was performed with two study members identifying themes and conflicts resolved by a third.

**Results:** The response was 67% (n=21). Junior residents had less sleep on average than senior residents with 60% of juniors sleeping 6 hours per night and 81.8% of seniors sleeping 7 hours per night. The most reported reason for inhibited sleep was academic responsibilities, which were cited more often by seniors in comparison to juniors (p=0.0116). Post-call habits were not different between senior and junior residents. In general, senior residents tend to get more sleep on-call than junior residents though this was non-significant. The number of non-urgent pages was cited by 45.6% of residents as a key barrier to sleep on call and by 76.2% as the priority area for intervention. Of 358 pages over 18 shifts (retention 81%), 38.4% of high-risk and 43.75% of low-risk pages were classified as non-urgent.

**Conclusion:** While the ability to sleep before and during on-call shifts differs by PGY year, both groups identify non-urgent pages as a significant source of fatigue and key area for intervention.

# ATYPICAL PROTEIN KINASE C'S REGULATE CELL COLUMN TROPHOBLAST PROGENITOR TO EXTRAVILLOUS TROPHOBLAST DIFFERENTIATION BY REGULATING NOTCH1 TRAFFICKING

**Sumaiyah Shaha**[1,3], Haley Frerichs[1], Josiah Kwong[1], Sareh Panahi[2], Meghan Riddell[1,2,3]
Department of Physiology, University of Alberta 1
Department of Obstetrics and Gynecology, University of Alberta 2
Women and Children's Health Research Institute 3

**Introduction:** Extravillous trophoblasts (EVT) are invasive placental cells that remodel uterine spiral arteries to establish placental blood flow. EVT are non-proliferative and develop from cell column cytotrophoblasts (CCT). Thus, CCT maintenance and proliferation importantly determines the number of differentiated EVT. Poor EVT development has been linked to common pregnancy disorders like preeclampsia. Thus, understanding CCT maintenance is crucial. The Notch1 signalling pathway is important for CCT maintenance. In other systems, the intracellular trafficking of the Notch1 signalling pathway is controlled by atypical protein kinase Cs (aPKCs). In humans, there are two isoforms of aPKC: aPKC-ι and aPKC-ζ. APKCs are known to regulate stem cell differentiation and proliferation, but whether they regulate CCT to EVT differentiation remains elusive. Therefore, we hypothesize aPKCs regulate CCT maintenance by controlling Notch1 trafficking.

**Methods:** First trimester human placental tissue was stained for aPKC-ι, aPKC-ζ, and HLA-G (EVT marker) localization. EVT outgrowth assays were performed using six-week placental explants +/- aPKC inhibitor. Primary isolated human CCT were cultured +/- aPKC inhibitor and Notch1 localization was assessed. EdU proliferation assays were similarly performed. Students t-test was performed (n≥3) for all experiments.

**Results:** Strong aPKC-ι and aPKC-ζ signal was seen CCT but decreased in EVT. Total aPKC inhibition increased EVT outgrowth from cell columns by 3-fold (p&lt;0.01). In primary CCT, aPKC inhibition led to a significant decrease in Notch1 nuclear localization (p=0.0007) and proliferation (p=0.012).

**Conclusions:** Our data suggests aPKC isoforms regulate CCT maintenance through modulation of Notch1 trafficking. Future directions are to identify isoform specific aPKC functions in Notch1 regulation and the mechanism through which aPKC's control Notch1 intracellular trafficking. Our work delineating mechanisms of CCT maintenance will help identify novel pathways that may be disrupted during placental malformations and could lead to the development of treatments for these disorders.

# CARDIAC ADAPTATIONS TO PREGNANCY ARE ALTERED WITH ADVANCED MATERNAL AGE

**Wooldridge AL[1,3]**, Pasha M[1,2,3], Kirschenman R[1,3], Spaans F[1,3], Davidge ST [1,2,3], Cooke C-LM[1,3]
1 Department of Obstetrics and Gynecology and 2 Department of Physiology
3 Women and Children's Health Research Institute
University of Alberta

**Background/Introduction:** Pregnancies at advanced maternal age (>35 years) have a greater risk of pregnancy complications. Healthy pregnancies require massive hemodynamic adaptations, including increased cardiac output. Growing evidence indicates that aging impairs cardiovascular adaptations, however, little is known about alterations in maternal cardiac function specifically due to advanced maternal age. We hypothesized that cardiac adaptations to pregnancy are impaired with advanced maternal age.

**Methodology:** To control for life-style confounders, we used a rat model, and compared pregnant young (4 months) and aged (9 months; ~35 years in humans) rats on gestational day 19 (term=22 days) with age-matched non-pregnant rats (n=8-10/group). Two-dimensional echocardiographic images were obtained using ultrasonography (Vevo 2100, VisualSonics). Left ventricle (LV) short-axis images were used to assess structure and function. Transmitral Doppler signals were used to assess ventricular diastolic function. Myocardial performance index (MPI) = [isovolumic relaxation time (IVRT) + isovolumic contraction time (IVCT)] / ejection time (ET). Statistics: two-way ANOVA with Sidak post-hoc test; significance at $p < 0.05$.

**Results:** LV mass was greater in aged pregnant than young pregnant or aged non-pregnant rats (both $p < 0.05$). During systole, LV anterior wall thickness was greater in aged compared to young non-pregnant rats ($p < 0.05$). LV wall thickness was not different between the other groups. IVCT increased with pregnancy in young and aged rats (overall effect $p < 0.05$), however, IVRT and ET did not differ with pregnancy. Although ET was greater in aged compared to young pregnant dams ($p < 0.01$), IVRT and IVCT did not differ with age. MPI was lower in aged than young pregnant rats ($p < 0.05$).

**Conclusion/significance:** Lower MPI in aged dams suggests altered cardiac adaptations to pregnancy with age. Greater LV wall thickness in aged rats before pregnancy potentially indicates increased LV work. Impaired cardiac adaptations may contribute to adverse outcomes in advanced maternal age pregnancies.

# NEURODEVELOPMENTAL DISORDERS AMONG MÉTIS CHILDREN IN ALBERTA

**Stuart Lau**[1], Jesus Serrano-Lomelin[1], Matthew Hicks[2], Reagan Bartel[3], Ashton James[3],
Claire Cordingley[3] , Kelsey Bradburn[3], Maria B. Ospina1
1 Department of Obstetrics &amp; Gynecology, University of Alberta; 2 Department of Pediatrics,
University of Alberta; 3 Métis Nation of Alberta, Edmonton, Canada

**Objective/Hypothesis:**Métis people are distinct Indigenous people in Canada. The epidemiology of neurodevelopmental disorders (NDDs) among Métis children have not been previously evaluated. NDDs are associated with negative consequences on long-term health and well-being. This study assessed the incidence of NDDs among Métis children compared to non-Métis children in Alberta, Canada.

**Methods:** A population-based retrospective cohort study of singleton births in Alberta from 2006-2016 was conducted using data linkage between the provincial perinatal registry (Alberta Perinatal Health Program), the Métis Identification Registry and administrative health datasets. Children born from Métis mothers (n = 7,875) and a random sample of children from non-Métis mothers (ratio 1:4; n= 31,184) were compared for the incidence of NDDs over the first ten years of life. NDDs were identified using ICD-10/9 case-finding algorithms and categorized into six domains: Motor, Speech-Language Communication, Learning-Cognition, Reciprocal Social Interaction (social), and Behavioral-Emotional. Incidence rates (IR) with 95% confidence interval (CI) of NDDs between children of Métis and non-Métis mothers were compared using incidence rate ratio (IRR) with 95%CI adjusted for maternal age at delivery and sex of the baby. Results for the social domain are presented.

**Anticipated Results/Progress:** 26 (0.33%) Métis children and 140 (0.45%) non-Métis children had NDDs affecting the social domain. There were no significant differences in the IR of NDs for the social domain between Métis children (33.6 cases per 100,000 person-years; 95% CI = 22.9, 49.4) and non-Métis children (44.6 cases per 100,000 persons-year; 95% CI = 39.5, 55.0) during the first 10 years of life (adjusted IRR = 0.75; 95%CI = 0.49, 1.14).

**Significance/Relevance:** No differences in the incidence of NDDs affecting the social domain were found between Métis and non-Métis children. The proportion of Métis children identified to have an NDD affecting the social domain is lower than previously reported proportions among Albertans.

# IMPACT OF THE MODE OF DELIVERY ON PERINATAL OUTCOMES IN ANTENATALLY DIAGNOSED FETAL CONGENITAL HEART DISEASE

**Hundal P[1]** , He R[2] , Kao C[3], Hornberger L[2]

1 Department of OBGYN, University of Alberta
2 Department of Pediatric Cardiology, University of Alberta
3 Department of OBGYN, Maternal Fetal Medicine, University of Alberta

**Objective/Hypothesis:** Previous studies suggest that the duration of labour appears to impact perinatal outcomes in infants with congenital heart disease (CHD). This study is aimed to determine whether the mode of delivery (spontaneous vaginal, induced vaginal or caesarean section) impacts the perinatal outcomes in neonates with antenatally diagnosed CHD.

**Methods:** This is a retrospective review of the electronic medical records of singleton pregnancies with antenatal diagnosis of CHD at the University of Alberta Paediatric Cardiology Program between the years of 2008 and 2021. Critical CHD lesions are included with an estimated sample size of approximately 250 neonates. A control group of singleton pregnancies matched by gestational age from 2008 to 2021 will be obtained from the Alberta Perinatal Health Program. Data including pregnancy history, obstetrical factors, and fetal outcomes will be collected. Descriptive statistics are calculated for all study variables. The Student's t test will be used for comparing continuous variables and Pearson's chi-squared tests for comparing categorical variables between CHD and controls.

**Anticipated Results and Progress:** The primary outcome of this project is correlating the duration of labour with cord blood gases to determine if a fetus with CHD is at an increased risk of acidosis at delivery. The secondary outcome includes a composite neonatal morbidity index outcome composed of one of severe outcomes defined by previous studies.

**Significance/Relevance:** The findings of this study will help to guide delivery planning for pregnancies complicated by critical congenital heart disease in the fetus to optimize clinical outcomes.

# VASCULAR DYSFUNCTION IN MATERNAL HEAT DISEASE AND ITS CONTRIBUTION TO ADVERSE PREGNANCY OUTCOMES

**Juliana Lasso-Mendez[1]**, Lisa K. Hornberger[1], Margie Davenport[2], Áine Brislane[2],
Shauna Littlefair[3], Brendan Haughian[1] , Jonathan Windram[4], Rshmi Khurana[3,4] , Nazneem Wahab[4],
Christy-Lynn Cooke[3] , Meghan Riddell[3] , Suzanne Chan[5].
1 Department of Pediatrics, 2 Department of Physical Education,
3 Department of Obstetrics &amp; Gynecology, 4 Department of Medicine, 5 Department of Pathology & Laboratory Medicine, Women's Children's Health Research Institute, University of Alberta

**Objective/Hypothesis:** Four percent of pregnancies are complicated by maternal heart disease (MHD) which will increase as children with HD reach adulthood. These pregnancies have a high risk of obstetrical and fetal/neonatal complications including many previously linked to underlying vascular dysfunction in otherwise healthy pregnancies. We hypothesize that poor vascular adaptation and inadequate ventricular-arterial (VA) coupling in MHD contributes to maternal and fetal complications.

**Objectives/Methods:** In this prospective longitudinal case-control study, 105 pregnancies without and 105 with congenital/acquired MHD will be recruited to assess cardiovascular health through gestation. Case-controls will be matched by age, BMI and parity. Vascular and cardiac assessments will be performed in the late 1st, 2nd, and 3rd trimesters of pregnancy and at 4-6 months postpartum (as baseline). Cardiac and uterine-placental-fetal parameters will be obtained through maternal and fetal echocardiograms, respectively. Echocardiograms at 4-6 months after delivery will also help assess the effects of MHD on the infant's cardiovascular health. Biomarkers of placental dysfunction will be assessed at first visit. Physical activity information will also be gathered through questionnaires and actigraph recordings. Evolution of cardiac, vascular, and VA coupling parameters will be compared between patients with gestation and will be compared between MHD and controls. Relationships between maternal cardiac output/function, vascular function, VA coupling, and the uterine-placental-fetal circulation, complications in pregnancy, and fetal/neonatal/infant health will be studied.

**Anticipated Results and Progress:** We anticipate that MHD will be associated with inadequate vascular adaptation and poor VA coupling contributing to obstetrical and fetal/neonatal complications in pregnancy.

**Significance/Relevance:** The results will help us determine contributing factors to complications in pregnancy, fetal and neonatal health which will allow for optimized risk stratification as well as preconception counseling. It may also prompt evolution of preventative measures to aid women before/during their pregnancies which will benefit the mother and the child's health.

# EXPLORING THE HIDDEN CURRICULUM IN THE UNIVERSITY OF ALBERTA POSTGRADUATE OBSTETRICS AND GYNECOLOGY RESIDENCY TRAINING PROGRAM.

**Sarah Shamiya[1],** Virginia Goetz[1], Christa Aubrey[1,2,3]
[1]Department of Obstetrics and Gynecology
[2]Division of Gynecologic Oncology Institute
[3]University of Alberta, Cross Cancer Institute

**Objective/Hypothesis:** Following the Royal College accreditation of the University of Alberta Obstetrics and Gynecology residency training program, concerns regarding the informal teaching environment, known as the "hidden curriculum" (HC) were identified. The ongoing research aims to identify, understand, and rectify the HC through positive change within the Department of Obstetrics and Gynecology.

**Methods:** The project utilizes a mixed-methods approach through an initial department-wide survey, followed by a qualitative focused ethnographic study of resident and staff physicians. A series of resident (cohort-based) and faculty-based focus groups (FG) within the program were undertaken. Focus groups were audio recorded, transcribed verbatim and uploaded into qualitative software (Quirkos 2.3 TA), They were analyzed through inductive iterative approach using latent content analysis, concurrent with data collection. A secure online database (REDCap) was used to collect survey data from faculty and staff on HC and was used to inform the focus group discussions. Thematic analysis is being triangulated between co-investigators.

**Anticipated Results and Progress:** Resident FG have been analyzed thus far, and four common themes arose: 1) tension between service and learning, 2) practice culture, 3) feedback, and 4) positive co-resident relationships. Junior cohorts were more affected by hierarchy and senior learners by hidden expectations. Nursing culture emerged as a unique component of HC within OBGYN when compared to published literature from other residency programs. Staff FG have been conducted, and will be analyzed and compared to resident data to further elucidate HC themes among all stakeholders.

**Significance/Relevance:** Results of the current study will be used to inform the annual resident research retreat agenda. Identified HC themes will be used to guide curriculum improvement initiatives. Other residencies may use the published findings to review and improve HC in their programs.

# ELUCIDATING THE FUNCTION OF THE EPITHELIAL SPLICING REGULATORY PROTEIN 1 (ESRP1) IN BREAST CANCER

**Marina Bianchi Lemieszek**[1], Gabrielle Siegers[2], Douglas Quilty[2], Michael Jewer[2], Scott Findlay[2], Krista Vincent[2], YangXin Fu[1,2], Lynne-Marie Postovit[1,2]
[1]Department of Obstetrics and Gynecology, University of Alberta
[2]Department of Oncology, University of Alberta

**Objective/Hypothesis:** Breast cancer (BC) is the most common cancer among Canadian women. The Luminal A molecular subtype is associated with the best prognosis. However, luminal A is only subtype presenting a steady decline in survival over a 20 year-period. Therefore, it is vital to identify prognostic markers that could be related to BC progression. ESRP1 is an RNA-binding protein that regulates an epithelial specific splicing program. The Postovit laboratory determined that high ESRP1 expression correlates with poor overall and disease-free survival of patients with BC in the cancer genome cancer atlas (TCGA) data set and BreastMark validation set. Also, ESRP1 is highly expressed in primary BC when compared to normal breast tissue. We hypothesize that ESRP1 can induce a tumorigenic splicing program in BC cells and that ESRP1 copy number variation (CNV) predicts BC metastatic progression.

**Methods:** CRISPR/Cas9 gene editing and short interference RNA were used to knockout and knockdown, respectively, ESRP1 expression in luminal A BC cell lines, followed by functional studies. RNA extracted from the CRISPR clones was sent for RNA sequencing. In the future, we will determine *ESRP1* copy number in breast cancer patients' samples with Real-time PCR.

**Anticipated Results and Progress:** EMT markers gene expression showed significant upregulation of the transcription factor Slug ($p < 0.05$) after ESRP1 knockdown compared to control cells when the cells were treated with TGF-β. CRISPR clones showed clonal heterogeneity in functional assays. Also, MCF7 and T47D cell lines showed increased *ESRP1* copy number.

**Significance/Relevance:** Determining ESRP1 biological function in BC cell lines may help to understand this disease better. RNA sequencing will help to determine the extent of alternative splicing changes after ESRP1 knockout.

# Is neurodevelopment influenced by atopy in the mother or infant?

**Nicole Rodriguez** and Anita Kozyrskyj

**Background:** Sensitization to food or other allergens during critical windows of infant development may adversely affect neurodevelopmental milestones. However, additional research is needed to further test this association.

**Methods:** We determined associations between atopic (any food or aeroallergen) or food sensitization (specific to egg, soybean, peanut, and milk) at age 1 year and neurodevelopment up to 2 years of age in the national CHILD Cohort Study. Sensitizations were assessed by skin prick tests (SPT) at 1 year, with neurodevelopment assessed using the cognitive, language, motor, and social-emotional subscales of the Bayley Scales of Infant Development (BSID-III) at 1 and 2 years of infant age. Regression analysis tested the relationship between maternal prenatal atopy and infant ND scores at 1 year and 2 years.

**Results:** Atopic sensitization was present among 16.4% of infants, while 13.4% had food sensitizations. Among the neurodevelopmental scores, only socioemotional scores reached statistical significance. Sensitizations at 1 year of age were associated with lower social-emotional scores at that age. These findings were only observed among boys, among whom social-emotional scores were lowered by 5 points if atopic sensitization was present (-5.22 [95%CI: - 9.96, -0.47], p=0.03) or if food sensitization was present (-4.85 [95%CI: -9.82, 0.11], p=0.06). Prenatal depression lowered male infant motor scores at 2 years by approximately 10 points (-9.58 [95%CI: -18.03, -1.13], p=0.03).

**Conclusion:** We found an inverse, cross-sectional association between infant atopic and food sensitization status, and social-emotional development scores in males but not females. Moreover, prenatal depression negatively influences male infants' motor scores at 2 years.

# PRENATAL HYPOXIA ALTERS CORONARY ARTERY FUNCTION OF ADULT OFFSPRING IN A SEX-SPECIFIC MANNER

Hula N[1,2,3], Pasha M[1,2,3], Spaans F[2,3], Quon A[2,3] , Kirschenman R[2,3] , Cooke C. M[2,3], Davidge S. T.[1,2,3]
1 Department of Physiology, 2 Department of Obstetrics and Gynecology, 3 Women and Children's Health Research Institute, University of Alberta, Edmonton, Alberta, Canada

**Introduction:** Fetal hypoxia is a common consequence of complicated pregnancies that is linked to the development of offspring cardiovascular (CV) dysfunction. We showed an impaired cardiac function in adult prenatal hypoxia offspring, however, the mechanisms are not known. Coronary artery endothelial dysfunction has been shown to contribute to the development of cardiac dysfunction, however, whether endothelial function is impaired in coronary arteries of prenatal hypoxia offspring is unknown. We hypothesize that prenatal hypoxia leads to impaired coronary artery endothelial function in adult male and female offspring.

**Methodology:** Pregnant Sprague-Dawley rats were exposed to normoxia (21% $O_2$ ) or hypoxia (11% $O_2$ ; p-Hyp) on gestational days 15-21 (term=22 days). Male and female offspring were aged to 9-9.5 months. Left anterior descending coronary arteries were isolated (n=5-7/group) and endothelium-dependent vasodilation to methylcholine (MCh) and endothelium-independent vasodilation to the nitric oxide (NO) donor sodium nitroprusside (SNP) were assessed by wire myography. To assess mechanisms for endothelium-dependent vasodilation, MCh-induced responses were assessed with inhibitors of nitric oxide (NO) synthase (L-NAME), prostaglandin H synthase ([PGHS]; meclofenamate), or endothelial-derived hyperpolarization (EDH; apamin and TRAM-34). Data were compared by two-way ANOVA (Sidak`s post hoc test); p&lt;0.05 was significant.

**Results**: Mch-induced vasodilation was decreased in p-Hyp males (p<0.01) and females (p<0.05) compared to Norm groups. L-NAME inhibited vasodilation in Norm and p-Hyp male and female offspring (p<0.0001). In p-Hyp females only, meclofenamate increased vasodilation (p<0.05), while apamin and Tram-34 decreased MCh sensitivity (p<0.05), compared to Norm. SNP responses were not different.

**Conclusions:** Our data suggest that prenatal hypoxia leads to coronary artery endothelial dysfunction in male and female offspring. Endothelium-dependent vasodilation was predominantly mediated via NO in male and female offspring. However, in females, prenatal hypoxia increased EDH contribution to vasodilation, and PGHS-dependent vasoconstriction. Our data suggest that prenatal hypoxia alters offspring coronary artery function in a sex-dependent manner.

# EVALUATING THE PREVALENCE AND DEMOGRAPHIC ASSOCIATIONS OF HEPATITIS B VIRUS (HBV), HUMAN IMMUNODEFICIENCY VIRUS (HIV), AND HEPATITIS C VIRUS (HCV) IN THE ALBERTA PRENATAL POPULATION

Alexa Thompson[1], Sabrina S. Plitt[2], Carmen L. Charlton[1,3,4].
[1]Department of Laboratory Medicine and Pathology, University of Alberta, Edmonton, AB
[2]School of Public Health, University of Alberta, Edmonton, AB
[3]Alberta Precision Laboratories, Edmonton, AB
[4]Li Ka Shing Institute of Virology, Edmonton, AB

**Objective/Hypothesis:** Hepatitis B virus (HBV), human immunodeficiency virus (HIV), and Hepatitis C virus (HCV) are bloodborne pathogens that can be transmitted from mother to infant during pregnancy. Pregnant women in Alberta are currently tested for these viruses through communicable disease screening in their first trimester. We aimed to evaluate the prevalence and demographic associations of HBV, HIV, and HCV in the prenatal population.

**Methods:** HBV, HIV, and HCV prenatal testing is centralized to the public health laboratory and test results are uploaded into their laboratory information system. Results from February 28, 2020-February 28, 2021 were extracted for prenatal women (n=53,921) and analyzed for prevalence, defined as the proportion of patients with viral positivity out of all women screened. Multivariable logistic regression was used to determine associations between demographic characteristics (age, geographic region, and socioeconomic status) and viral positivity.

**Results:** The prevalence of HBV, HIV, and HCV in the prenatal population was 0.14% (76/53,921), 0.05% (29/52,986), and 0.10% (53/53,921), respectively. There were 935 patients (1.73%) that declined HIV testing. Age was not significantly associated with positivity for HBV (p=0.10), HIV (p=0.80), or HCV (p=0.93). Those living in metropolitan regions were significantly more likely to be positive for HBV (AOR 6.35, p=0.002) and HIV (AOR 6.96, p=0.048) compared to women residing in rural regions, but the opposite result was found for HCV positivity (AOR 0.49, p=0.03). Patients of the lowest income quintile were at significantly higher odds to be positive for HBV (AOR 2.85, p=0.012) and HCV (AOR 2.49, p=0.03), but not HIV (AOR 1.99, p=0.18).

**Conclusion/Significance:** Our findings highlight the differences in prevalence and demographic associations for each virus and can be used for targeted prevention efforts, such as increasing HBV vaccination rates in mothers and infants and promoting harm reduction measures in women of child-bearing age to reduce HIV and HCV infection.

# ASSESSING MENOPAUSE KNOWLEDGE IN UNIVERSITY STUDENTS TO IMPROVE QUALITY OF LIFE IN MENOPAUSAL WOMEN

**Vaishvi Patel**, Beate C Sydora, Sue Ross
Department affiliation –Department of Obstetrics and Gynecology
Institute affiliation –Women and Children's Health Research Institute
University of Alberta

**Objectives/ hypothesis:** Women undergoing menopause often deal with menopause-related symptoms on their own. Social support and education have been shown to reduce negative menopausal experiences and improve quality of life (QoL).
Through this study, we hope to assess young adults' knowledge about menopause and to create interventions to target any knowledge gaps. We postulate that there is a general lack of knowledge about menopause and its symptoms in young adults specifically in those who do not possess a health science background.

**Methods:** We created an electronic questionnaire to assess the menopause knowledge levels. The questions were pilot tested on clinicians, young adults, and menopausal women to collect feedback for questionnaire improvement. The final questionnaire included demographic questions, menopause knowledge-based questions, and opinion and introspective questions. It was distributed to University of Alberta students through student digest newsletters and answers were collected anonymously.

**Anticipated Results and Progress:** Descriptive statistics were applied to characterize participants and to compare knowledge levels between different groups. Out of 930 survey respondents, 746 (73 graduate and 673 undergraduate) completed the survey and responses were received from participants of all faculties and of various backgrounds. Our preliminary analysis indicates female gender as well as a connection to menopausal women positively affect the degree of menopause knowledge in young adults, with individuals in these demographics scoring on average higher in the questionnaire than their counterparts. We intend to explore our results in further detail using descriptive statistics, student's t-test and mean differences with confidence intervals.

**Significance/Relevance:** We aim to identify specific knowledge gaps that can be addressed through targeted educational programming. This will serve to increase social support and awareness in a cost-effective and sustainable manner, reducing stigma and mitigating complications, to improve QoL in menopausal women and help prepare younger women for their future menopausal journey.

# DIAGNOSTIC ACCURACY OF FETAL ECHOCARDIOGRAPHY FOR PREDICTING CONGENITAL HEART DISEASE LIKELY TO NEED IMMEDIATE POSTNATAL INTERVENTION FOR STABILIZATION

**Proscovia M. Mugaba**[1], Amol Moray[1], Angela McBrien[1], Luke Eckersley[1], Chloe Joynt[1], Trina Stryker[2] and Lisa K Hornberger[1]
Department affiliation: Department of Pediatrics[1]; Department of Obstetrics & Gynecology[2]
Institute affiliation: Fetal & Neonatal Cardiology Program, Division of Pediatric Cardiology, Division of Fetal-Maternal Medicine, University of Alberta

**Background**: Our institution uses fetal echocardiography (FE) to identify fetuses with heart disease considered "high risk" for requiring immediate postnatal intervention, and delivery by Caesarian section (C/s) in a pediatric cardiac operating room (PC OR), is then recommended. We evaluated our accuracy of using FE to predict an outcome of intervention/ECMO/death at <2 hours and <24 hours of delivery.

**Methods**: We reviewed FE and postnatal records of "high-risk' fetuses between 2011 and February 2022. A sub-analysis was performed of fetuses with d-transposition of the great arteries with intact ventricular septum (d-TGA/IVS) and hypoplastic left heart syndrome (HLHS), including those with d-TGA/IVS and HLHS considered "low-risk" for requiring immediate intervention.

**Results**: There were 41 "high-risk" fetuses including: dTGA/IVS (n=15) and HLHS with (n=7) with restrictive atrial septum (RAS), absent pulmonary valve syndrome (n=4), obstructed anomalous pulmonary veins (n=3) and 12 others. C/s in the PC OR occurred for 34/41(83%). The 7 others delivered elsewhere including 5 dTGA/IVS with RAS who delivered vaginally at the Lois Hole Women's Hospital following early labour onset, and 2 HLHS who opted for vaginal delivery one of who was put on ECMO at <2 hours and died at <24 hours and another who died at <2 hours. For all diagnoses, FE had a positive predictive value (PPV) of 51%(21/41) and 71%(29/41) for intervention/ECMO/death at <2 hours and <24 hours, respectively. Of "low risk" cases, only 6 of 46 with dTGA/IVS and none of the 39 HLHS had intervention/ECMO/death at <2 hours. The sensitivity, specificity, PPV and NPV for FE prediction for intervention/ECMO/death at <2 hours in TGA/IVS was 67%, 93%, 80%, 87% and for HLHS was 100%, 95% 71% and 100%.

**Conclusions**: FE predicted the need for immediate postnatal intervention in d-TGA/IVS and HLHS in the majority of pregnancies and in half of the entire cohort.

# Piezo1: A Novel Mechanosensory Mediator of Placental Physiology and Pathology

**Y Fakhr**[1, 2]**,** S Koshti[1, 2], Y Bahojb Habibyan[1,2,3], DG Hemmings[1,2,3]
[1]Obstetrics and Gynecology, [2]Women and Children's Health Research Institute, [3]Medical Microbiology and Immunology

**Introduction:** Placental dysfunction in preeclampsia (PE) includes decreased syncytialization, increased inflammation and cell death. Mechanosensory channels like Piezo1 regulate these processes. Piezo1 has amassed scientific attention since its discovery, for which the Nobel Prize in Physiology was awarded in 2021. The research on Piezo1 roles in the placenta is in its infancy. However, activating Piezo1 stimulates inflammation in other tissues.

**Hypothesis:** Piezo1 activation will induce dose-dependent placental syncytialization, cell damage, and cytokine release.

**Methodology:** Piezo1 was measured in placentas from healthy and PE pregnancies by immunofluorescence and qRT-PCR. Syncytium was maximally shed from healthy placental explants by day 4 after which Yoda1 (0-10µM), a Piezo1 agonist, was added for 48 hours. Trophoblast syncytialization was assessed using beta human chorionic gonadotropin (β-hCG) and human placental lactogen (hPL) ELISAs and placental alkaline phosphatase (PLAP) activity assays. Cell damage was assessed using lactate dehydrogenase (LDH) assays. Cytokine secretion was assessed using 42-cytokine multiplex assays.

**Results:** Piezo1 levels were higher in placentas in PE (p=0.04). Activating Piezo1 with 1µM Yoda1 increased β-hCG release (p=0.03), hPL release (p=0.04) and syncytial PLAP activity (p=0.01) without affecting cell membrane damage. 10µM of Yoda1 increased LDH release (p=0.01). Yoda1 (10 µM) also amplified IL-2 release (p=0.03) and release of cytokines elevated in PE:  IL-7 (p=0.01), IL-17 (p=0.01), IL-18 (p=0.03), IL-6 (p=0.02), IL-12p70 (p=0.04), IFN-α2 (p=0.05), IL-1β (p=0.05), and RANTES (p=0.06). Yoda1 (10µM) also increased the release of growth factors EGF (p=0.001), MDC (p=0.03) and Flt-3L (p=0.01).

**Conclusion:** Our study is the first to identify Piezo1 roles in the placenta. Activation of Piezo1 at low levels regulates physiological syncytial endocrine functions. At higher levels of activation, Piezo1 elicits pathological responses, like increased cell damage and inflammatory cytokine release and activates protective mechanisms through growth factor release. This could explain the higher levels of Piezo1 seen in placental tissue in PE.

# SCREENING AND INTERVENTIONS FOR INTIMATE PARTNER VIOLENCE IN PREGNANCY BY OBSTETRICIANS: THE PATIENT'S PERSPECTIVE

**Golfar A[1]**, Olson J[2], Obeng-Nkansah E[2], Biju H[2], Olson DM,[1]
[1]Department of Obstetrics and Gynecology, University of Alberta
[2]Faculty of Nursing, University of Alberta

**Objective/Hypothesis:** Intimate partner violence (IPV) is associated with adverse health outcomes. The incidence of IPV increases during pregnancy and its associations with adverse fetal, neonatal and maternal outcomes have been well established. Pregnancy provides a unique opportunity for women to be screened for IPV; however, many barriers prevent effective screening.  The objective of this study is to learn from survivors of IPV how obstetrical healthcare providers can better screen for and intervene regarding IPV during pregnancy. Using women as experts in their own care, their experience will assist in identifying the best methods of screening and intervention.

**Methods:** Approximately 50 women who have faced IPV in pregnancy will be recruited via Facebook ads to an anonymous survey. Quantitative and qualitative analysis of data will result in descriptive findings from multiple choice answers and themes from the written answers.

**Anticipated Results:** To date, we received 16 survey responses. Although only 6/16 were screened for IPV, all 16 participants believed obstetricians should screen for IPV and 12/16 believed that obstetricians do not adequately screen for IPV. 5/6 of those screened for IPV were not offended and understood this was standard protocol. The most common barrier to disclosure was not knowing how to bring up the topic. Interventions identified as most beneficial included: resources for mental health support and an increased number of follow up visits. More participants are needed to increase the confidence in findings from this survey research.

**Significance:** We will 1) better understand the experience of women who face IPV during pregnancy; 2) overcome current barriers in screening for IPV, 3) identify opportunities for violence prevention and intervention 4) help in development of future educational tools for healthcare providers 5) help integrate standardized protocols and 6) improve patient care and pregnancy outcomes.

# Impact of emergency cesarean birth on *Bifidobacterium* levels in infant gut microbiota

**Maryam Paraktoon**, YuanYao Chen, Piushkumar Mandhane, Theo Moraes, Elinor Simons, Stuart Turvey, Padmaja Subbarao, James Scott, Anita Kozyrskyj

**Presenting author affiliation:** MSc student, Department of Pediatrics, University of Alberta, Edmonton, Canada

**Introduction:** Pre-eclampsia affects up to 8% of pregnancies, leading to significant maternal-fetal morbidity, including fetal distress, abnormal fetal heart rate and placental abruption. These conditions also place pre-eclamptic women at risk of emergency cesarean prior to a trial of labour. Critical gut microbiota and immune system interactions can be affected by microbial dysbiosis following cesarean birth. Therefore, the aim of our study was to determine the impact of emergency cesarean section (CS) delivery without labour on levels of key microbiota, *Bifidobacterium*, in the infant gut.

**Methods:** From 1279 term infants in the CHILD COHORT STUDY, data on delivery mode, labour duration, and maternal body-mass-index (BMI) and intrapartum antibiotic prophylaxis (IAP) were derived from hospital records. Breast-feeding status was obtained from maternal questionnaire. Infant fecal samples, collected at 3-4 months of age, were profiled by qPCR for levels of total *Bifidobacterium*. Delivery mode associations were determined from multivariable linear regression after Box-Cox transformations of the absolute quantity of *Bifidobacterium*.

**Results**: Compared to the reference of vaginal delivery without IAP and adjusting for pre-pregnancy BMI, emergency CS without labour was associated with reduced levels of *Bifidobacterium* (adjustedβ: -1.60, $p<0.05$). Following emergency CS with labour, *Bifidobacterium* too was depleted but to a lesser extent (adjustedβ: -1.22, $p<0.05$). Moreover, *Bifidobacterium* was most depleted in the gut microbiota of infants fully formula-fed at 3-4 months (adjustedβ: -2.98, $p<0.05$), followed by infants exclusively breastfed and born by emergency CS without labour (adjustedβ: -2.38, $p<0.05$). No associations with bifidobacterial levels were seen within mixed-fed infants born by emergency CS without labour.

**Conclusion:** Our study finds evidence for lowered *Bifidobacterium* levels in gut microbiota of young infants, even those breastfed, following emergency CS without labour. Their mothers likely had pre-eclampsia, which we intend to confirm in the next stage of our analyses.

# MATERNAL MORBIDITY DURING PREGNANCY IS ASSOCIATED WITH POOR ASTHMA CONTROL AMONG PRESCHOOLERS

Moore L[1,a], Hicks A[1,a], Kozyrskyj A[1,a], Chari R[1,a], Rosychuk R[1,a], Ducharme F[3], Ospina MB[1,a]
Department affiliations: [1]Department of Obstetrics and Gynecology, Faculty of Medicine and Dentistry, University of Alberta; [2]Department of Pediatrics, Faculty of Medicine and Dentistry, University of Alberta; [3]Department of Pediatrics, Faculty of Medicine, University of Montreal
Institute affiliation: [a]Women and Children's Health Research Institute, University of Alberta

**Introduction:** Understanding the link between pregnancy events and asthma control in childhood could aid in identifying modifiable early-life exposures as potential targets for intervention. The objective of this study was to explore the relationship between maternal prenatal morbidity and asthma control in early childhood.

**Methodology:** Children born in Alberta, Canada 2010-2012, with asthma diagnosed before age five, and their mothers were retrospectively identified using linkage between the provincial perinatal registry and administrative health data (n=7,206). Associations between maternal prenatal morbidity (active asthma, atopy, gestational diabetes [GDM], preeclampsia) and offspring asthma control trajectories (controlled, out-of-control, worsening, improving, fluctuating) the two years following diagnosis were assessed using multinominal logistic regression. Results are adjusted for maternal age, antibiotic use, smoking, and socioeconomic status.

**Results:** Following asthma diagnosis, 3,728 (52%) children had controlled asthma, 355 (5%) out-of-control, 494 (7%) worsened, 1718 (24%) improved, and 911 (13%) had fluctuating control. Both maternal asthma and GDM increased the risk for out-of-control (aRR: 1.58, 95% Cl: 1.14, 2.19, and aRR: 1.84, 95% CL: 1.28, 2.64, respectively) compared to controlled asthma. Maternal atopy reduced the risk of both worsening (aRR: 0.76, 95% Cl: 0.58, 0.99) and improving asthma control (RR: 0.82, 95% Cl: 0.70, 0.96) compared to having asthma consistently controlled. Preeclampsia increased the likelihood of improving asthma control (aRR: 1.56, 95% Cl: 1.02, 2.38).

**Conclusion/significance:** Children to mothers with active asthma during pregnancy or GDM are at increased risk of poor asthma control and may benefit from further support in their asthma management. Children of mothers with atopy are less likely to have changing asthma control. The likelihood of improved control among children to mothers with preeclampsia is an indicator of poor asthma control that is later well-managed. Together, these findings suggest that improving maternal prenatal health may have beneficial therapeutic implications for asthma control in children.

# The effects of social isolation on gestational length and inflammatory profile of rats: a model for COVID isolation stress

**Nayara A. Lopes[1,2]**, Camille Wiley[1], Vaishvi Patel[1], Jesus Serrano-Lomelin[1], Xin Fang[1], Falkenberg E[3], Nasrin Soltanpour[3], Gerlinde A.S. Metz[3,*], David Mark Olson[1,2*]-

[1]Physiology and OB/GYN, U Alberta, Edmonton, AB, Canada; [2]Pediatrics, U Alberta, Edmonton, AB, Canada; [3]Neuroscience, U Lethbridge, Lethbridge, AB, Canada.

**Introduction:** Maternal stress before and during pregnancy has been linked with adverse perinatal outcomes, such as preterm birth. Evidence shows that social isolation (SI) stress is detrimental to physical and mental health. During the COVID-19 pandemic, enforced SI exacerbated the isolation already present in our society. We hypothesized that pre-pregnancy and gestational SI would increase PTB risk and alter uterine inflammatory and stress marker profiles in rats.

**Methods:** Female F0-F3 rats (n=4-12) were assigned to SI or control groups. SI involved housing dams alone for two weeks before breeding and then during pregnancy. F1-F3 generations were randomly split into transgenerational (TG) or multigenerational (MG) stress groups. Maternal uterine tissues were collected 21 days after they gave birth. We measured mRNA levels of uterine inflammatory and stress markers involved with parturition using RT-qPCR. Data were analyzed by Kruskal-Wallis test, $p \leq 0.05$.

**Results:** Isolation stress reduced the gestational length of F0 stressed mothers compared to controls (Controls 530.06 h, F0 519.24 h; p<0.05). Stress doubled *Il1b* abundance in the F0 generation (p<0.05), and decreased expression in F1-F3 offspring in both TG/MG groups. Protein levels of IL1B were also decreased in the TG lineage. Recurrent stress upregulated *Il1r1* expression in the F3 generation (p<0.01). The *Crh* abundance was reduced in F3-TG animals (p<0.01), while the *Crhr1* expression decreased in the F0 (p<0.01) and tripled in the F2-TG generation (p<0.01). Isolation stress increased *Hsd11b2* expression in F1 daughters of the TG group (p<0.001).

**Conclusions:** Preconception and gestational SI stress resulted in shorter pregnancy lengths, and elevated *Il1b* expression in F0 stressed dams. Stress affected the F0-F3 uteri gene expression in a generation-specific manner. The effects of SI stress were more pronounced in the parental generation than their offspring, suggesting that the progeny might be more resilient to chronic SI.

# Impact of Socioeconomic Status and Remoteness of Residence on Fetal Outcomes in Major CHD

**Scott Bennett**, Lisa K. Hornberger, Luke G. Eckersley, Deborah Fruitman, Amanpreet Kaur

Division of Paediatric Cardiology; Stollery Children's Hospital; University of Alberta; Edmonton, AB Principal Investigator; Fetal and Neonatal Cardiology Program, Echocardiography Laboratory, Department of Pediatric Cardiology, Stollery Children's Hospital, WCM 4C2, 88440 112th St, Edmonton, AB T6G 2B7, Canada; Division of Cardiology; Department of Pediatrics, Stollery Children's Hospital; University of Alberta; Edmonton, AB; Division of Cardiology; Department of Pediatrics, Alberta Children's Hospital; University of Calgary; Calgary, AB Division of Cardiology; Department of Pediatrics, Stollery Children's Hospital; University of Alberta; Edmonton, AB

**Background:** Social determinants of health impact outcomes in congenital heart disease (CHD), specifically increased remoteness of residence (RoR) and lower socioeconomic status (SES) are associated with later prenatal diagnosis. Timing of prenatal diagnosis may affect parental decision-making regarding continuation of pregnancy. We explored the impact of RoR and SES on termination of pregnancy (TOP), adjusting for syndromic diagnoses and gestational age at time of prenatal diagnosis (GADx).

**Methods:** We retrospectively identified all fetal cases of major CHD (mCHD) in Alberta from 2008-2021. We determined Chan index SES, and RoR from closest fetal cardiology unit. We categorized outcomes as TOP or intention to continue pregnancy (live birth, intrauterine fetal demise, still birth). We analyzed direct and indirect effects on outcome overall and stratified by presence of syndromes (mCHD+/-syn). Analysis was done with structured equation modelling and statistical mediation analysis.

**Results:** 1097 pregnancies with a prenatal diagnosis of major CHD. 56 of 268 +syn (20.9%) and 147 of 823 -syn (17.9%) resulted in TOP. If GADx was before 22 weeks TOP rate was 27.9%, if GADx was after 22 weeks TOP rate was 8.8% ($p<0.0001$). mCHD+syn: ROR ($p=0.025$) and SES ($p=0.007$) associated with later GADx. RoR: RoR was associated with later GADx ($p=0.017$) with no direct effect on outcome. GADx completely mediated the impact of RoR on outcome overall and in mCHD+synd. SES: Lower SES trended towards later GADx ($p=0.063$) with no direct effect on outcome. GADx trended toward complete mediation of SES on outcome overall, and showed complete mediation of SES on outcome in mCHD+synd.

**Conclusion:** We found that later GADx is a mediator of the impact of RoR and potentially SES on pregnancy choice. The effect of SES and ROR on gestation was most apparent in those with mCHD+syn. Further investigations are needed to determine how to reduce barriers to equitable care prior to 22 weeks gestation.

# Title: Pregnancy, breastfeeding, and COVID-19 vaccination perspectives among Métis in Alberta

**Sana Amjad[1]**, Reagan Bartel[2], Ian Colman[3], Ashton James[2], Maria B. Ospina[1]
1 Department of Obstetrics & Gynecology, University of Alberta
2 Métis Nation of Alberta
3 School of Epidemiology & Public Health, University of Ottawa

**Background:** People with SARS-Cov infection during pregnancy are at an increased risk of experiencing severe morbidity and adverse pregnancy outcomes such as pregnancy loss and preterm delivery. Evidence has accumulated for the safety and effectiveness of COVID-19 vaccines to prevent serious illness, hospitalizations, and pregnancy complications. In collaboration with the Métis Nation of Alberta (MNA), we explored perspectives of Métis individuals towards COVID-19 vaccination during pregnancy and breastfeeding.

**Methods:** We analyzed data from the final iteration of a repeated-measure COVID-19 survey conducted among Métis people in Alberta between November to December 2021 (n=795). Community recruitment was conducted using a multimodal strategy. Participants were asked about their attitudes towards COVID-19 vaccination during pregnancy and breastfeeding. Open ended text data was entered on a Research Electronic Data Capture (REDCap) database. Thematic analysis using a coding system was conducted using NVivo 12.

**Results:** A total of 397 participants provided their perspectives about COVID-19 vaccination during pregnancy and breastfeeding. Conflicting perspectives about COVID-19 vaccination during pregnancy and breastfeeding were offered. For some, vaccines are critical to protect pregnant and breastfeeding individuals while others believed vaccine safety has been seldom examined in this population. We grouped our main thematic categories as: factors enhancing COVID-19 vaccine uptake which included the perceived benefits of vertical transmission of protective antibodies from the pregnant person to the fetus and vaccine recommendation by trusted healthcare providers; factors linked with vaccine hesitancy which included concerns over side effects, lack of long-term safety data and historical distrust of healthcare programs rooted in the trauma of forced experimentation and medical segregation; and lastly perception of vaccination as a "doctor-patient" decision and a "personal choice."

**Conclusion:** Multifactorial determinants influence COVID-19 vaccine decision-making for pregnant and breastfeeding Métis individuals. Community centered, culturally sensitive, and equity-focused approaches may help enhance vaccine confidence among Métis and other Indigenous populations.

# The role of CD71+ erythroid cells in the establishment of microbiome in newborns

**Yasaman Bahojb Habibyan**[1], Petya Koleva[1], Shokrollah Elahi[1,2,3]
[1]Department of Dentistry, [2]Department of Oncology, Faculty of Medicine and Dentistry, University of Alberta. [3]Women and Children's Health Research Institute.

**Introduction:** Mounting preclinical and clinical evidence strongly support a crucial role for the gut microbiota in health. A dysbiosis of the microbiome, an imbalance of the microbial populations, may predispose newborns to developing various immune disorders later in life. We have found that CD71+ erythroid cells (CECs) are abundant in the cord blood, placenta, and periphery of human newborns. Similarly, CECs are expanded during pregnancy and they presence is associated with feto-maternal tolerance. Moreover, the removal of CECs from the intestinal tissues by the anti-CD71 antibody disrupts immune homeostasis and results in inflammation. This suggests an essential role for CECs in the adaptation of newborns to colonization with microbial communities.

**Methods:** CECs were depleted using the anti-CD71 antibody in Balb/c mice (3 days old); control mice were treated with the isotype control antibody. To examine the short-term effects of CECs on the microbiome, mice were sacrificed one day post-treatment. Bacterial genomic DNA was isolated from the small intestine for 16S rRNA gene amplicon sequencing. QIIME2 pipeline was used to analyze raw 16S rRNA sequences. Statistical analyses were performed using Graph Pad Prism v.9.0. Welch's T- test was used. P values < 0.05 were considered significant.

**Results:** In the treated pups there was an increase of *Lactobacillaceae* (< 0.0001) and *Staphylococcacae* (0.004), and a decrease of *Enterobacteriaceae* (<0.0001). Moreover, there was increased within sample diversity for the treated pups: Shannon's diversity (0.0161), Faith's diversity (0.00526), observed OTUs (0.0181). Finally, the weighted UniFrac PcOA plot indicated differential abundance of bacterial strains between the microbial communities.

**Conclusion:** The findings indicate that a short-term depletion of CECs in newborns results in a drastic dysbiosis of the microbial communities in the small intestine. This points to a critical role of CECs in pregnancy/newborns.

# UTILITY OF PRE-OPERATIVE COMPUTED TOMOGRAPHY IMAGING IN MANAGEMENT OF PRIMARY ENDOMETRIAL CARCINOMA

Parkman J[1], Steed H[1,2,3], Capstick V[1,2], Pin S[1,2,3]
[1]Department of Obstetrics and Gynecology, University of Alberta, Edmonton, AB
[2]Cross Cancer Institute (CCI), Alberta Health Services, Edmonton, AB
[3]Women and Children's Health Research Institute, Edmonton, AB

**Introduction:** The standard of care for the management of early-stage endometrial cancer is surgical staging in the form of total hysterectomy, bilateral salpingo-oophorectomy, with possible pelvic and para-aortic lymph node dissection, usually performed by laparoscopy or robotic-assisted laparoscopy. However, neoadjuvant therapy or other surgical procedures may be recommended depending on cancer stage and tumor factors. Therefore, local practice is to request computed tomography (CT) scans of the chest, abdomen, and pelvis for preoperative staging for selected histologic types of endometrial cancer, as results of this imaging could alter management recommendations. However, unnecessary imaging contributes to a backlog and limits timely access to CT for emergent reasons. The objective of this study is to determine if preoperative CT imaging changes management for patients presenting with primary endometrial cancer to the Cross Cancer Institute (CCI) in Edmonton, Alberta.

**Methodology:** Cases were identified from an endometrial cancer database and the Alberta Cancer Registry. Inclusion criteria consisted of patients with pre-operative pathology-confirmed endometrial carcinoma and a pre-operative CT scan presenting to the CCI between 2012 to 2019. Change in management related to preoperative CT imaging will be measured as a dichotomous variable (Yes/No). Chart review will be used to confirm that change in management was driven by preoperative imaging, and not by other factors such as patient co-morbidities.

**Anticipated Results/Progress:** It is expected that a change in management related to preoperative CT imaging will be significant only in some subtypes of endometrial cancer. Cases have been identified (284 from the endometrial cancer database and an additional 187 from the Alberta Cancer Registry), and data collection is in progress.

**Significance:** The results of this study will guide clinicians managing patients with primary endometrial cancer and encourage conservation of resources in Alberta's healthcare system, by identifying the patients most likely to benefit from preoperative CT imaging.

# EXPERIENCES OF RACIAL DISCRIMINATION AND MATERNAL, PERINATAL AND NEONATAL OUTCOMES: A SYSTEMATIC REVIEW

**Adesunkanmi M[1]**, Al-Shamali, H[2], Salami, B[3], and Ospina, MB[1]
[1]Department of Obstetrics & Gynecology, University of Alberta
[2]Department of Psychiatry, University of Alberta
[3]Faculty of Nursing, University of Alberta

**Introduction**: Maternal experiences of racial discrimination have been linked to adverse perinatal and neonatal outcomes. The aim of the systematic review is to identify and appraise existing studies on self-reported experiences of racial discrimination in different ethnic populations and the ensuing effects on maternal and perinatal outcomes.

**Methods**: Comprehensive searches for research studies published from database inception to November 2021 were conducted using Medline, CINAHL, Scopus, PsycINFO, Embase and ProQuest Theses and Dissertations. Studies were included if they were observational epidemiological studies in pregnant women who self-reported experiences of racial discrimination before and during pregnancy and any of the following outcomes: alterations in duration of gestation and fetal growth, hypertensive disorders of pregnancy, gestational diabetes, C-section, postpartum depression, and NICU admissions. Study screening, selection, data extraction and risk of bias assessment are being completed independently by two reviewers with discrepancies being resolved through consensus.

**Results**: Of the 3,228 studies screened, 52 studies met criteria for inclusion. Most of the studies were conducted in USA with non-Hispanic Black/African-American women being the most frequently analyzed racial group (40) followed by Hispanic women (8). Five studies were performed in Australia and New Zealand on Aboriginal and Maori populations respectively. Studies included were case-control (2), cross-sectional (14), retrospective cohort (14), or prospective cohort studies (20). The most common tools to measure racial discrimination were directly drawn or adapted from the Experiences of Discrimination Scale validated by Kreiger, N. in 2005. Majority of the studies examined outcomes relating to preterm birth (29), low birth weight (25), and postpartum depression (8).

**Conclusion**: Data observed suggests that majority of studies on this topic are on non-Hispanic Black women in the USA. Understanding the prevalence of racial discrimination will help target interventions to tackle systemic racism in perinatal care that leads to adverse birth outcomes.

# IMPACT OF PROLONGED HOSPITALIZATION ON THE DEVELOPMENT OF THE INFANT GUT MICROBIOME AT 3 MONTHS AND 12 MONTHS OF AGE

**Sabrin Bashar[1]**, Hein M Tun[2], Piyushkumar Mandhane[1], Theo J Moraes[3], Elinor Simons[4], Stuart Turvey[5], Padmaja Subbarao [6], James Scott [6], Anita Kozyrskyj[1]

[1] Department of Pediatrics, University of Alberta, Edmonton, Canada,[2] School of Public Health, The University of Hong Kong, Hong Kong, China, [3] Department of Pediatrics, University of Toronto, Toronto, [4] Department of Pediatrics and Child Health, University of Manitoba, Winnipeg, [5] Department of Pediatrics, University of British Columbia, Vancouver, Canada, [6] The Dalla Lana School of Public Health, University of Toronto, Toronto, Canada.

**Introduction**: Infants stay longer in hospital after birth promote hospital-acquired infection (HAI) with *Clostridium difficile, Enterococcus* spp. and species of the Proteobacteria. How prolonged exposure to a hospital environment affects infant gut microbial development is still unknown. The aim of the study was to assess the association between prolonged hospitalization following any delivery type and infant gut microbial composition at 3 and 12months of age.

**Methods:** This was a study of 1313 infants in the CHILD Cohort Study. Infant gut microbiota were characterized by Illumina 16SrRNA sequencing of fecal samples collected at 3 and 12months of age. The gut microbial profile of infants hospitalized for >1-day in vaginal-birth (VB) and ≥3-days in caesarean-delivery (CD) were compared to shorter-length hospitalization by Mann-Whitney U-test. Associations between prolonged hospitalization and gut microbiota composition were determined by logistic regression.

**Results:** Prolonged hospitalization after VB was associated with persistent enrichment of family Clostridiaceae, namely *Clostridium* and species of Proteobacteria: *Citrobacter* (p=<0.01, 3months) and *Sutterella* (p=<0.01, 12months). At 3 months, beneficial bacteria *Bacteroides* (p=0.03) were depleted in VB infants and *Bifidobacterium* (p=0.025) in CD infants. Already depleted in CD [median abundance=0.0008, IQR (0.0003 - 0.0056)] versus VB [median abundance=0.301, IQR (0.001-0.597)] at 3months (p=<0.01), prolonged hospitalization following CD further lowered the abundance of *Bacteroides* (0.47 [95% CI:0.28-0.80], p=<0.01) at 12months. In absence of intrapartum antibiotic exposure, VB infants with prolonged hospitalization were more likely to have higher abundance of *Enterococcus* (1.37 [95%CI:0.998-1.89], p=0.05) and Clostridiaceae family (1.52 [95%CI: 1.1-2.04], p=0.012) whereas lower abundance of the Bacteriodaceae family (0.74 [95% CI:0.53-1.01], p=0.058) in their gut at 3months of age.

**Conclusion:** Prolonged infant exposure to the hospital microbial environment after birth can lead to over-representation of gut microbiota associated with HAI, and the depletion of beneficial microbiota.

# TAUROURSODEOXYCHOLIC ACID (TUDCA) AS AN INTERVENTION TO IMPROVE PREGNANCY OUTCOMES AND VASCULAR FUNCTION IN A RAT MODEL OF ADVANCED MATERNAL AGE

**Mazhar Pasha**[1,2,3], Raven Kirschenman[2,3], Amy Wooldridge[2,3], Floor Spaans[2,3], Christy-Lynn M. Cooke[2,3], Sandra T. Davidge[1, 2,3]

[1]Department of Physiology, [2]Department of Obstetrics and Gynecology, [3]Women and Children's Health Research Institute, University of Alberta, Canada

**Objective:** Advanced maternal age (AMA; ≥35 years) increases the risk of pregnancy complications. Endoplasmic reticulum (ER) stress is linked to vascular dysfunction in aging, and adverse pregnancy outcomes in complicated pregnancies. The ER stress inhibitor tauroursodeoxycholic acid (TUDCA) was shown to improve embryo development *in vitro*. However, whether treatment with TUDCA can improve vascular function/pregnancy outcomes in AMA pregnancies is not known. We hypothesize that TUDCA treatment will improve pregnancy outcomes and vascular function in a rat model of AMA.

**Methods:** Pregnant young (4 months) and AMA (9.5 months; ~35 years in humans) rats were either control/TUDCA-treated (in drinking water; 150 mg/kg/day calculated dose from gestational day [GD]0 to GD20). On GD20, blood pressure (tail cuff plethysmography) and pregnancy outcomes were recorded. In uterine arteries, endothelium-dependent relaxation (methacholine; MCh) was assessed (wire myography), in the presence/absence of nitric oxide (NO) synthase inhibitor (L-NAME). In mesenteric arteries, ER stress markers (GRP78, P-eIF2α, & CHOP) were quantified (Western blotting). Statistics: two-way ANOVA with planned contrasts/Sidak's *post-hoc* test, $p<0.05$ was significant.

**Results:** Mean arterial pressure (MAP) was reduced in AMA TUDCA-treated rats ($p=0.02$) compared to all other groups. Fetal body weights were reduced in AMA ($p=0.017$), but increased by TUDCA-treatment ($p=0.03$). Maximum relaxation to MCh was reduced in AMA dams ($p=0.047$), which tended to be increased by TUDCA-treatment (interaction: $p=0.058$). No differences in NO contribution were observed. Mesenteric artery P-eIF2α and CHOP expression were reduced only in the TUDCA-treated AMA dams ($p=0.04$), without changes in GRP78 expression.

**Conclusion:** TUDCA-treatment reduced MAP, concomitant with a reduced expression of mesenteric artery ER stress markers. The increased fetal body weight and improved uterine artery function (via NO-independent pathway) suggests a potential benefit of TUDCA on pregnancy outcomes. Our data indicate that TUDCA has the potential to improve pregnancy outcomes in AMA, but future studies are warranted.

# Effects of Minimally Invasive versus Open Surgical Approach for Treating Cervical Cancer in Edmonton, Alberta: A Retrospective Analysis

**Sarah Shamiya**, Jeanelle Sabourin

**Background:**
Cervical cancer is the leading cause of death among gynecologic cancers worldwide. In Alberta, most cervical cancers are diagnosed at stage I. Surgical management via radical hysterectomy is the standard of care for treatment of early cervical cancer. Minimally invasive surgery (MIS) is the most common approach for treatment of gynecologic cancers given shorter hospital stays and less intra- and postoperative complications. MIS approach for treatment of cervical cancer has been the standard of care in Edmonton since 2010. In 2018, two key studies presented data demonstrating MIS, compared to open approach, is associated with a lower survival and higher recurrence rate. However, there is some ambiguity about the mechanism of increased recurrence rates and mortality with MIS.

**Method:** In this study, we are reviewing charts of all patients diagnosed with early cervical cancer treated with radical hysterectomy or trachelectomy between 2008-2016 at the Royal Alexandra Hospital, and comparing outcomes based on surgical approach. Primary outcome was recurrence rate. Secondary outcomes include the use of adjuvant treatments, and overall survival. This data will be incorporated in a Canadian nationwide study.

**Results:** A total of 132 patient charts were reviewed; 89 were treated with MIS and 43 with open surgery. Most patients had Stage 1B1 disease. Of the MIS group, 6 patients (7%) had disease recurrence compared to 2 patients (5%) from the open surgery group. 16 patients treated with MIS required adjuvant treatment versus 5 from the open surgery group. Open surgery was associated with a lower overall survival rate.

**Conclusion:** Based on local data, open and MIS approaches had similar disease recurrence rates among women with early-stage cervical cancer. This, in addition to data from other Canadian centres will be paramount in counselling patients regarding surgical options for treatment of early cervical cancer.

# EXPRESSION OF SYNDECAN-1, A RECEPTOR FOR PLASMODIUM FALCIPARUM INFECTED RED BLOOD CELLS, MAY BE DETERMINED BY THE SEX OF THE PLACENTAL SYNCYTIOTROPHOBLAST

**Lauren Higa[1,2]**, Rebecca Reif[1,2,4], Catherine J. Mitran[1,3], Stephanie K. Yanow[1,3,4], and Denise Hemmings[1,2,4]

[1]Department of Medical Microbiology and Immunology, [2]Department of Obstetrics and Gynecology, [3]School of Public Health, [4]Women and Children's Health Research Institute, University of Alberta

**Introduction:** Placental malaria occurs when *P. falciparum* infected red blood cells (RBCs) sequester in the placenta, leading to adverse health outcomes for the mother and fetus. This is mediated by the binding of parasite antigens on the RBC to chondroitin sulfate A (CSA) glycosylated syndecan-1 (SDC-1) on the placental syncytiotrophoblast. SDC-1 can also be unglycosylated. Studies suggest that female placentas may be at higher risk of placental malaria infection, but the mechanism behind this is unknown. We hypothesized that female placentas express higher levels of SDC-1, leading to increased infected-RBC adherence.

**Methods:** Placental biopsies from full-term, uncomplicated pregnancies delivered by caesarean section were collected. Fetal sex was blinded until analysis was completed. We evaluated SDC-1 mRNA and protein levels from whole placental lysates by RT-PCR and western blot (n=23 male, 30 female). Both glycosylated and unglycosylated SDC-1 were detected by western blot. We performed immunofluorescence assays to quantify SDC-1 expression in the syncytiotrophoblast, defined using placental alkaline phosphatase (PLAP) (n=7 male, 12 female). Student's t-tests were used to assess significance at $p<0.05$.

**Results:** There were no significant sex differences in SDC-1 mRNA (p=0.76). Immunofluorescent staining of SDC-1 showed significantly higher expression in female syncytiotrophoblast (p=0.038) with noticeable variability within and between placental samples. To capture this variability, we tested three biopsies from each placenta by western blot. There were no significant sex differences in expression of glycosylated SDC-1 (p=0.69), unglycosylated SDC-1 (p=0.98), or total SDC-1 (p=0.49).

**Conclusion**: Although SDC-1 staining showed significant sex differences, these findings were not supported by other methodologies that examined whole placental biopsies. This may be due to the variability in SDC-1 expression we observed. Further investigation of this variability is needed to determine whether there are sex-dependent differences in expression.

# EVALUATION OF PATIENT SATISFACTION AND PERSPECTIVES OF VIRTUAL CARE IN UROGYNECOLOGY DURING THE COVID-19 PANDEMIC

**Christina Yang**, Delia Lee, Annick Poirier, Maryna Yaskina, Momoe Hyakutake, Jane Schulz
Department of Obstetrics and Gynecology
Women and Children's Health Research Institute
University of Alberta

**Background:** The urogynecology clinic at the Lois Hole Hospital provides multidisciplinary care for women with pelvic floor disorders, conditions that affect urinary and reproductive health and negatively impact wellbeing. The COVID-19 pandemic resulted in an abrupt transition to virtual visits with nurses, physiotherapists, and physicians.

**Objectives/Hypothesis:** This study aimed to identify limitations to virtual care access and satisfaction with care received during the pandemic. We hypothesized that decreased satisfaction would be experienced with virtual care compared to in-person, corresponding to worsened self-reported pelvic floor health symptoms.

**Methods:** Women with appointments (via phone, Zoom, or in-person) from September 2020 onwards completed an online survey using REDCap. The survey used rating scale and open-ended questions to assess patients' views of their care and collected demographic information. Pelvic floor symptoms were assessed with a validated questionnaire. A sample size of 402 produces a two-side 95% CI with a width equal to 0.10 when the sample proportion is 0.50.

**Results:** To date, 212 survey responses have been collected. Average age is 59.8 years (SD 15.3). 51.9% of survey respondents had in-person appointments, 44.7% had phone appointments, and 3.4% had Zoom appointments. For patients who had in-person appointments, 96.3% felt safe attending the clinic and only 3.7% would have preferred a phone call appointment instead. For patients with phone appointments, 79.5% felt it was appropriate to meet their needs and 25.8% specifically felt that an in-person visit would be better. There is no correlation with their pelvic floor distress symptoms. 58% of patients felt comfortable using a video platform, and Zoom was the most preferred (42%), followed by Facetime (27.8%).

**Conclusion/Significance:** Given the ongoing COVID-19 pandemic, a hybrid approach of in-person and carefully selected phone or video appointments will optimize care in urogynecology patients.

# ATYPICAL PROTEIN KINASE C ISOFORMS REGULATE SYNCTIOTROPHOBLAST APICAL SURFACE STRUCTURE AND PERMEABILITY

**Jasmine Nguyen**[1], Khushali Patel[2], Sumaiyah Shaha[1], Sareh Panahi[1,2], Meghan Riddell[1,2]
Department of Physiology, University of Alberta
Department of Obstetrics and Gynecology, University of Alberta

## Background

Placental dysfunction is associated with pregnancy complications like preeclampsia. Critically, inflammation is often involved in placental pathogenesis. Loss of microvilli from the syncytiotrophoblast (ST) apical membrane is an understudied feature of preeclampsia. Maintenance of cell polarity is vital for microvillar structure, but the mechanisms regulating ST microvilli are unknown. Atypical protein kinase C (aPKC) isoforms are evolutionarily conserved polarity regulators and control microvilli via actin in other tissues. Therefore, we hypothesized that aPKC isoforms maintain ST microvilli.

## Methods

9-12 week and term human placental explants were cultured +/- 5µM aPKC pseudosubstrate inhibitor and incubated with high-molecular weight dextran Texas Red or fixed for phalloidin (F-actin) staining and scanning electron microscopy (SEM). 9-12 week and term explants and primary cultured ST were treated with TNF-α (0-10ng/mL) and collected for western blotting (anti-aPKC isoforms) or fixed and stained as above.

## Results

Term and first trimester ST had a 60% decrease in apical F-actin following aPKC inhibitor treatment ($P<0.005$, n=3-4) and a near complete loss of microvilli was seen with SEM. Additionally, SEM revealed pore-like structures in the ST membrane with inhibitor treatment and increased apical permeability was confirmed with a 4-fold increased uptake of dextran ($P=0.0065$, n=4). TNF-α exposure led to isoform-specific decrease in aPKC expression ($P<0.01$, n=3-4), reduced F-actin ($P<0.05$, n=3-4), and a 5-fold increase in ST dextran uptake ($P=0.0445$, $P=0.0177$, n=3).

## Conclusion

Our data show that aPKC isoforms regulate ST apical surface structure and permeability. Additionally, TNF-α leads to decreased aPKC isoform expression and profound disruption of ST apical integrity. The loss of ST apical integrity in both conditions resembles pyroptotic cell death, suggesting the ST undergoes this pro-inflammatory type of death. Hence, we have identified a pathway that may be central to placental inflammatory response with implications for the pathogenesis of pregnancy complications like preeclampsia and pre-term birth.

# Reoperation and pain related health services utilization after hysterectomy for endometriosis with bilateral, unilateral or no oophorectomy

**Long, Alicia**[1,2]; Kaur, Paramdeep[1]; Lukey, Alexandra[1]; Allaire, Catherine[1]; Kwon, Janice[1]; Yong, Paul[1]; Hanley, Gillian[1]
Affiliations: 1) University of British Columbia, 2) University of Alberta

**OBJECTIVE:** To evaluate pain-related health services use after hysterectomy for endometriosis with conservation of both ovaries, vs unilateral salpingo-oophorectomy (USO), vs bilateral salpingo-oophorectomy (BSO) with respect to rates and types of reoperation, physician visits, and subsequent opioid and hormonal prescriptions.

**METHODS:** A population based retrospective cohort study of people aged 19-50 in British Columbia, Canada, undergoing hysterectomy for endometriosis between 2001 and 2016. Primary outcome was rate and type of reoperation. Secondary outcome was usage of pain-related health services, at 3-12 months and 1-5 years after hysterectomy, including physician visits for endometriosis and pelvic pain, prescriptions filled for opioids, hormonal suppression medications and hormone replacement therapy (HRT).

**RESULTS:** Reoperation rates were low across all groups, with 89.5% of all patients remaining reoperation free by the end of follow-up. Patients undergoing hysterectomy alone were more likely to undergo at least one reoperation compared to those with hysterectomy with BSO (13% vs 5%, p<0.0001), most commonly oophorectomy and adhesiolysis. A sensitivity analysis removing oophorectomy as a reoperation attenuated the difference between the groups. Moreover, the groups were very similar with respect to postoperative rates of physician visits for endometriosis or pelvic pain and the number of days of opioid prescriptions filled. Similarly, usage of hormonal suppression medications were similar between the groups, while the rate of use of prescriptions for HRT after hysterectomy with BSO was low.

**CONCLUSION:** Strong consideration should be given to ovarian conservation at the time of hysterectomy for endometriosis, as concurrent BSO was not clearly associated with reduced use of pain-related health services, and HRT use for surgical menopause was low.

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