

## Chair's Welcome

Welcome to our 33<sup>rd</sup> annual Obstetrics and Gynecology Research Day.



Today I am excited as we celebrate the amazing work done by members of our department and researchers in women's health. The past year has been like nothing we have ever experienced, and everyone has been impacted personally and professionally. I wish to thank you all for your resilience, adaptability, and your dedication to teaching, research, clinical care, and administrative work. I am truly grateful for all you do. Thank-you to our research day planning committee led by Dr. Christy Cooke, Dr. Denise Hemmings, and Yuliya Fakhr. Also, thanks for the work of our administrative team, Darlene Stewart, Rebecca Royan and Jessica Naidoo for their support in organizing the logistics of our first virtual research day.

A warm welcome to our invited visiting professor Dr. Roxanna Geoffrion from the Division of Urogynecology and Reconstructive Pelvic Surgery, Department of Obstetrics and Gynecology, University of British Columbia. We are profoundly grateful for her adaptability to accommodate our COVID changes and look forward to hearing her keynote lecture on "Mind over scalpel: The optimization of mental health prior to surgery".

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

*Jane Schulz MD FRCSC  
Interim Chair  
Department of Obstetrics and Gynecology  
Faculty of Medicine and Dentistry  
University of Alberta*

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

*Christy-Lynn Cooke  
Denise Hemmings  
Yuliya Fakhr  
Jessica Naidoo  
Jane Schulz  
Rebecca Royan  
Darlene Stewart  
Sandra Davidge  
Sue Ross  
Meghan Riddell  
Rebecca Rich  
Sneha Menon*

*Cathy Flood  
Jeanelle Sabourin  
Rahim Janmohammed  
Venu Jain  
Lucas Vasas  
Tamara Saez Gutierrez  
Ashley Zubkowski  
Saloni Koshti  
Chesceri Mason Gafuik  
Nataliia Hula  
Roxana Geoffrion*

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## J. Ross Vant Visiting Professor



### **Dr. Roxana Geoffrion**

*Associate Professor and Program Director, Advanced Training Urogynecology and Female Pelvic Floor Reconstructive Surgery, Department Obstetrics and Gynecology, Faculty of Medicine UBC*

Dr. Roxana Geoffrion is an associate professor at UBC, director of the UBC fellowship in Female Pelvic Medicine and Reconstructive Surgery and chair of the Obstetrics and Gynecology residency research committee. She values high teaching standards and guides trainees towards academic careers through combined clinical and research mentorship. Dr Geoffrion constantly strives to improve her teaching methods. She initiated randomized controlled trials and built low-fidelity simulation models for teaching and evaluation of surgical skills in gynecologic surgery. Dr Geoffrion's research interests also include surgical optimization, and patient outcomes following pelvic floor surgeries. She has co-authored many SOGC best practice guidelines in urogynecology. More recently, she has started producing innovative whiteboard animation videos of pelvic floor health, for patient education and knowledge translation based on these guidelines

The titles of her two talks are:

1. Research: Why, when, how? (resident talk)
2. Mind over scalpel: The optimization of mental health prior to surgery (keynote)

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**Department of Obstetrics and Gynecology Annual Research Day**  
**University of Alberta**  
**May 7 2021**  
**Presentation Schedule**

<b>7.00-8.00</b>	<b>Dr. Roxana Geoffrion</b> <i>Associate Professor and Program Director, Advanced Training Urogynecology and Female Pelvic Floor Reconstructive Surgery, Department Obstetrics and Gynecology, Faculty of Medicine UBC</i>	<b>Invited Speaker Trainee Talk (residents, fellows, graduate and undergraduate students)</b> <b>RESEARCH: WHY, WHEN, HOW?</b>
<b>8.00-8.15</b>	<b>Dr. Jane Schulz</b> <i>Department Chair</i> <b>Dr. Christy-Lynn Cooke</b> <i>Research Day Committee</i> <b>Dr. Sandra Davidge</b> <i>WCHRI Executive Director</i>	<b>Opening Remarks</b>
<b>8.15-9.30</b>	<b>SESSION I</b> <b>ORAL PRESENTATIONS</b> Co-Chaired by Jane Schulz and Saloni Koshti	
8.15-8.30	<b>Yuliya Fakhr,</b> <i>Koshti S, Webster K, Hemmings DG</i>	<b>Inflammatory Factors Disrupt Placental Syncytial Function Through Lipid Mediators</b>
8.30-8.45	<b>Ricky Liu,</b> <i>Hula N, Pasha M, Quon A, Kirschenmann R, Spaans F, Cooke CLM, Davidge ST</i>	<b>The Effect of Prenatal Hypoxia on Coronary Artery Function in Adult Male and Female Offspring</b>
8.45-9.00	<b>Stephan Macumber,</b> <i>Singh A, Robinson J, Smyczek P, Sklar C, Gratix J, Rathjen L</i>	<b>Incidence and Outcomes of Jarisch-Herxheimer Reactions Following Treatment for Infectious Syphilis in Late Pregnancy 2015-2020.</b>
9.00-9.15	<b>Mazhar Pasha,</b> <i>Kirschenmann R, Wooldridge A, Spaans F, Davidge ST, Cooke CLM</i>	<b>Maternal Aging Impacts Vascular Adaptations to Pregnancy</b>
9.15-9.30	<b>Brittany A. Matenchuk,</b> <i>Rosychuk RJ, Rowe BH, Metcalfe A, Chari R, Crawford S, Jelinski S, Serrano-Lomelin J, Ospina MB</i>	<b>A Retrospective Cohort Study of Emergency Department Visits During the Postpartum Period in Alberta</b>
<b>9.30-9.45</b>	<b>MORNING BREAK</b> Theme Breakout Rooms	
<b>9.45-10.30</b>	<b>SESSION II</b> Flash Talks	

<b>Breakout Room 1: Co-Chaired by Jeanelle Sabourin and Ashley Zubkowski</b>		
9.45-9.50	<b>Alannah M Smith,</b> <i>Wright RC, Partovi N, Levy RD, Campbell S, Ross S</i>	<b>Fertility Considerations with Lung Transplantation, A Scoping Review</b>
9.50-9.55	<b>Japji Randhawa,</b> <i>Sydora B, Agyapong V, Ross S</i>	<b>Development of Supportive Text Messages for an Online CBT-Based Intervention for Menopausal Women</b>
9.55-10.00	<b>Khushali Patel,</b> <i>Zubkowsky A, Riddell M</i>	<b>Atypical Protein Kinase C Isoforms Regulate Placental Microvilli Structure</b>
10.00-10.05	<b>Ali Poonja,</b> <i>Samji R, Bandali M, Ilnitsky S</i>	<b>Clinical Pregnancy Success Rates Post Fallopian Tube Recanalization: A Retrospective Cohort Study in Edmonton, Alberta</b>
10.05-10.10	<b>Prabhpreet Kaur Hundal,</b> <i>Valani R, Quan C, Assaie-Ardakany S, Sharma T, Abou-Seido M, Salehi L, Amin Q, Luca S</i>	<b>Causes and Predictors of Early Postpartum Complications that Result in Visits to the Emergency Department</b>
10.10-10.15	<b>Zelei Yang,</b> <i>Tang X, McMullen TPW, Brindley DN, Hemmings DG</i>	<b>Human Cytomegalovirus Infection of Fibroblasts and Breast Cancer Cells is Enhanced by PDGFR<math>\alpha</math> Resulting in Increased Inflammation</b>
10.15-10.20	<b>Marina Bianchi Lemieszek,</b> <i>Jewer M, Siegers G, Quilty D, Findlay S, Vincent K, Fu Y, Postovit LM</i>	<b>Elucidating the Function of the Epithelial Splicing Regulatory Protein 1 (ESRP1) in Breast Cancer</b>
10.20-10.25	<b>Jesus Serrano-Lomelin,</b> <i>Matenchuk BA, Smith GN, Davidge ST, Chari R, Riddell M, Crawford S, Bakal JA, Ospina MB</i>	<b>Pre-Pregnancy Overweight and Diabetes, and their Relationship with Gestational Hypertension and Preeclampsia: A Mediation Analysis Approach</b>
10.25-10.30	<b>Yuliya Fakhr ,</b> <i>Saadat S, Ravichandran K, Hornberger LK, Eckersley L, Hemmings DG</i>	<b>Maternal Doxycycline Treatment Results in Fetal Cardiac Dysfunction and Placental Abnormalities in Mice Through Decreased Endothelin-1 Expression</b>
<b>Breakout Room 2: Co-Chaired by Cathy Flood and Tamara Sáez</b>		
9.45-9.50	<b>Lucas Vasas,</b> <i>Mancuso M, Hanson B, Sanaee M, Flood C</i>	<b>The Gender Clinic: A Descriptive Observational Study Describing a Novel Perioperative Gender-Affirming Clinic</b>
9.50-9.55	<b>Wooldridge AL,</b> <i>Pasha M, Kirschenmann R, Spaans F, Davidge ST, Cooke CLM</i>	<b>Uterine Artery Adaptations to Pregnancy are Impaired by Advanced Maternal Age</b>
9.55-10.00	<b>Lina Roa,</b> <i>Caddell L, Choksi N, Menon S, Pyda J, Boatin AA, Shrimme M</i>	<b>Optimizing Rates and Access to Caesarean Sections in India: A Cost-Effectiveness Analysis</b>
10.00-10.05	<b>Mackenzie Brandon-Coatham,</b> <i>Xu Z, Zhang G, Liu J, Su E, Dieters- Castator D, Lajoie G, Vizeacoumar F, Hirst M, Lee CH, Postovit LM</i>	<b>Aggressive Dedifferentiated Endometrial Cancer can be Recapitulated from Cell Line Models with Chromatin Remodeling Protein SMARCA4 Deficiency and Treated with Synthetic Lethality Approaches</b>

10.05-10.10	<b>Shauna Regan,</b> <i>Almas S, Hagerman C, Sanaee M</i>	<b>Development of a Surgical Bundle Targeted to Reduce Urinary Tract Infections in Urogynecologic Surgery</b>
10.10-10.15	<b>John Christy Johnson,</b> <i>Johnson PA, Mardon AA</i>	<b>Childbearing and Cannabis for Canada: A Review</b>
10.15-10.20	<b>Laura Sevick,</b> <i>Pihelgas A, Rathwell S, Pelinska G, Sia W</i>	<b>Postpartum Preeclampsia Clinic on Behavioral Change and Longterm Outcomes: A Case-Control Study</b>
10.20-10.25	<b>Rebecca Reif,</b> <i>Shaha S, Fakhr Y, Mitran C, Wiebe M, Yanow S, Hemmings DG</i>	<b>Optimization of a Tissue-Based Assay to Measure Adherence of Plasmodium Falciparum Infected Erythrocytes (iRBC) to Placental Cells</b>
10.25-10.30	<b>Bethan Wilson,</b> <i>Riddell M</i>	<b>Progesterone Receptor Positive Uterine Endothelial Cell Dependent Regulation of Angiogenic Tip Cell Selection</b>
<b>Breakout Room 3: Co-Chaired by Rahim Janmohamed and Nataliia Hula</b>		
9.45-9.50	<b>Lindsay Drummond,</b> <i>Black K, Jain V, Ross S, Sagle M</i>	<b>Effectiveness of a Podcast for Education Among Obstetrics and Gynecology Clerkship Students</b>
9.50-9.55	<b>Rachel Wang,</b> <i>Kaarid K, Sanaee M</i>	<b>Trends in Public Funding for Surgical Innovation in Canada</b>
9.55-10.00	<b>Peter Anto Johnson,</b> <i>Johnson JC, Mardon AA</i>	<b>Shedding Light on the Effects of Maternal Sunlight Exposure on Offspring Health: A Scoping Review</b>
10.00-10.05	<b>Sarah Shamiya,</b> <i>Sabourin S</i>	<b>Effects of Minimally Invasive Versus Open Approach for Treating Early Cervical Cancer In Edmonton, Alberta: A Retrospective Analysis</b>
10.05-10.10	<b>Brittany Schroeder,</b> <i>Black KA, Felske-Durksen C, Flood C, Rich R</i>	<b>Understanding the Perspectives of Indigenous Medical Students as they Approach Opportunities for Postgraduate Medical Training</b>
10.10-10.15	<b>Saloni Koshti,</b> <i>Fakhr Y, Habibyan YB, Hemmings DG</i>	<b>Exploring Mechanosensation: A Novel Regulator of Placental Dysfunction in Preeclampsia</b>
10.15-10.20	<b>Anneline Slabbert,</b> <i>Rich R, Crawford S</i>	<b>Among Rural-Dwelling Women in Alberta Canada, What Patient, Location, and System Factors Influence Location of Delivery?</b>
10.20-10.25	<b>Roberto Villalobos-Labra,</b> <i>Spaans F, Sáez T, Quon A, Cooke CL, Davidge ST</i>	<b>Placental Syncytiotrophoblast-Enriched Extracellular Vesicles from Normal and Preeclamptic Pregnancies have a Distinct Impact on Nitrate Stress in Human Umbilical Vein Endothelial Cells (HUVECs)</b>
10.25-10.30	<b>Sana Amjad,</b> <i>Chojecki D, Osornio-Vargas A, Ospina MB</i>	<b>Wildfire Exposure During Pregnancy and the Risk of Adverse Birth Outcomes: A Systematic Review</b>
10.30-10.35	<b>Kimia Sorouri,</b> <i>Roa L, Chen S, Al Hinai A, Chong L, Foster S, Hirt-Walsh C, Falk R, Iglesias S, Flood C, Saleh A</i>	<b>A Curriculum for Training General Surgeons to Provide Essential Operative Obstetrical Care in Low-Resource Settings</b>
<b>10.45-11.45</b>	<b>SESSION III</b> <b>MIND OVER SCALPEL: THE OPTIMIZATION OF MENTAL HEALTH PRIOR TO SURGERY</b> <b>Invited Speaker Lecture</b>	

	<b>Dr. Roxana Geoffrion, M.D.C.M, F.R.C.S.C</b> <i>Associate Professor and Program Director, Advanced Training Urogynecology and Female Pelvic Floor Reconstructive Surgery, Department Obstetrics and Gynecology, Faculty of Medicine UB</i>	
<b>11.45-12.15</b>	<b>LUNCH BREAK</b>	
<b>12.15-1.30</b>	<b>SESSION IV ORAL PRESENTATIONS</b> Co-Chaired by Venu Jain and Lucas Vasas	
12.15-12.30	<b>Tamara Sáez,</b> <i>Pagée A, Kirschenmann R, Spaans F, Davidge ST</i>	<b>Impaired Endothelium-Dependent Vascular Function in Female Mice with a History of a Pregnancy Complicated by Dyslipidemia</b>
12.30-12.45	<b>Kristen Simone,</b> <i>Aziz K, Gleddie M, Frenette P, Robinson H, Chandra S</i>	<b>Optimizing Antenatal Corticosteroid Administration for Women at Risk of Preterm Birth: A Quality Improvement Project</b>
12.45-1.00	<b>Yale Tang,</b> <i>Xue C, Kruger P</i>	<b>Retrospective Analysis of Satisfaction, Quality of Life, and Perioperative Complications in a Cohort of Women Undergoing Laparoscopic Sacrocolpopexy using an Ultra-Lightweight Polypropylene Mesh (ULWPM)</b>
1.00-1.15	<b>L. Alexa Thompson,</b> <i>Charlton CL</i>	<b>Demographic Risk Factors Associated with Prenatal Hepatitis C (HCV) Infections in Alberta</b>
1.15-1.30	<b>Sumaiyah Shaha,</b> <i>Saadat S, Riddell M</i>	<b>Development of a Physiologically Oriented Placenta Organoid Model</b>
<b>1.30-2.00</b>	<b>CONCLUDING SESSION</b>  <i>1:30-1:35 : Graduate Program Awards &amp; Graduation - Dr. Denise Hemmings</i> <i>1:35-1:40: Medical Student Awards - Dr. Peggy Sagle</i> <i>1:40-1:45: Resident Awards - Dr. Valerie Capstick</i> <i>1:45-1:50: Resident Farewell Slide shows - Dr. Capstick</i> <i>1:50: Closing Remarks Dr. Christy-Lynn Cooke &amp; Dr. Jane Schulz</i>  <i>Presenter Awards will be provided at a later date</i>	

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## INFLAMMATORY FACTORS DISRUPT PLACENTAL SYNCYTIAL FUNCTION THROUGH LIPID MEDIATORS

**Fakhr Y**<sup>1,2</sup>, Koshti S<sup>1,2</sup>, Webster K<sup>1,2</sup>, Hemmings DG<sup>1,2,3</sup>

<sup>1</sup>Department of Obstetrics and Gynecology

<sup>2</sup>Women and Children's Health Research Institute

<sup>3</sup>Department of Medical Microbiology and Immunology  
University of Alberta

**Objective:** Preeclampsia is linked to poor trophoblast syncytialization into syncytium, the site of maternal-fetal exchange. In preeclampsia, elevated pro-inflammatory tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ) hinders syncytialization. TNF- $\alpha$  disrupts endothelial cell function by modulating levels of sphingosine 1-phosphate (S1P), a signaling lipid. It does this by activating and upregulating S1P's main synthesizing enzyme, sphingosine kinase 1 (SK1). The role of S1P in TNF- $\alpha$ -mediated effects in placenta remains unclear. Like TNF- $\alpha$ , S1P inhibits syncytialization and increases in preeclampsia. Whether SK1 levels change in preeclampsia is unclear.

**Hypothesis:** Placental SK1 is higher in preeclampsia. TNF- $\alpha$  disrupts syncytialization by activating SK1 in placental explants.

**Methods:** Differences in SK1 placental levels between healthy control and preeclamptic pregnancies (n=17, n=5) were quantified via immunofluorescence microscopy. Term placental explants were treated post-syncytial sloughing (day 4) with/without TNF- $\alpha$  (10 ng/mL) and/or SK1 inhibitor PF-543 (1  $\mu$ M). PF-543 (0-20  $\mu$ M) dose response was performed. Cell death and syncytium function were measured with lactate dehydrogenase (LDH) and chorionic gonadotropin (CG) assays (n=6). Analyses by one-way and two-way ANOVAs and student's t-test.

**Results:** Placental SK1 is localized in the villous core and syncytium and is predominantly cytoplasmic. SK1 levels were 2.65 $\pm$ 0.96-fold higher in the preeclamptic group compared to healthy controls (p=0.03). TNF- $\alpha$  increased LDH release by 37.96 $\pm$ 0.09% (48hrs, p=0.002). Inhibiting SK1 with PF-543 in the presence of TNF- $\alpha$  decreased LDH to untreated control levels (48hrs, p=0.07). The treatment interaction (48hrs, p=0.006) suggested that SK1 activation and TNF- $\alpha$  signaling belong to the same pathway. LDH was unaltered with PF-543 (1-20  $\mu$ M, 24-48hrs) treatment. No effect was observed with TNF- $\alpha$  and PF-543 on CG release.

**Conclusion/Significance:** Placental SK1 is higher in preeclamptic pregnancies, suggesting a disruptive role in placental function. Although inhibiting SK1 alone doesn't affect cell death or syncytium function, TNF- $\alpha$ -induced cell death was completely dependent on SK1 activation. Whether this interaction is mediated via S1P warrants further investigation.

**Funding/Acknowledgments:** CIHR, FOMD and FGSR Studentships.

# Oral Presentation Session I

## THE EFFECT OF PRENATAL HYPOXIA ON CORONARY ARTERY FUNCTION IN ADULT MALE AND FEMALE OFFSPRING

Ricky Liu<sup>1,3</sup>, Nataliia Hula<sup>1,2,3</sup>, Mazhar Pasha<sup>1,2,3</sup>, Anita Quon<sup>2,3</sup>, Raven Kirschenman<sup>2,3</sup>, Floor Spaans<sup>2,3</sup>, Christy-Lynn Cooke<sup>2,3</sup>, Sandra T. Davidge<sup>1,2,3</sup>

<sup>1</sup>Department of Physiology, University of Alberta, Edmonton, Canada

<sup>2</sup>Department of Obstetrics and Gynaecology, University of Alberta, Edmonton, Canada

<sup>3</sup>Women and Children's Health Research Institute, University of Alberta, Edmonton, Canada

**Objective/Hypothesis:** Fetal hypoxia during complicated pregnancies is linked to cardiovascular dysfunction of the offspring later in life. We previously showed that adult offspring exposed to prenatal hypoxia have impaired cardiac function. The coronary circulation is essential in maintaining cardiac oxygenation and thus plays an essential role in cardiac function. In the systemic circulation of adult prenatally hypoxic offspring, changes in nitric oxide and endothelin-1(ET-1)-mediated vascular responsiveness were reported, but whether the coronary vasculature is impacted is unknown. We hypothesize that coronary vascular function is impaired in adult offspring exposed to prenatal hypoxia, via endothelial nitric oxide and endothelin-1 [ET-1]-dependent mechanisms.

**Methods:** Pregnant Sprague-Dawley rats were exposed to normoxia (21% O<sub>2</sub>) or hypoxia (11% O<sub>2</sub>) on gestational days 15-21 (term=22 days). Left anterior descending coronary artery function was assessed in 4-month-old male and female offspring (n=4-6/group) with wire myography. Endothelium-dependent (methacholine; MCh) vasodilation, and ET-1-mediated vasoconstriction in the presence/absence of antagonists of ET-1 receptors ET<sub>A</sub>R and ET<sub>B</sub>R (BQ-123 or BQ-788, respectively) were assessed. Data were compared by two-way ANOVA; p<0.05 was significant.

**Results:** Coronary artery sensitivity to MCh (pEC<sub>50</sub>) was lower in females compared to males (p=0.046) and prenatal hypoxia tended to decrease MCh sensitivity compared to normoxia controls (p=0.058). ET-1 responses were similar between the groups, and BQ-123 did not affect ET-1-induced vasoconstriction. However, BQ788 reduced sensitivity to ET-1 (pEC<sub>50</sub>) in normoxic males, while ET-1 sensitivity was increased by BQ-788 in the prenatally hypoxic males (interaction: p=0.01), with no effect in females.

**Conclusion/Significance:** We demonstrated a trend towards endothelium-dependent coronary artery dysfunction in adult offspring exposed to prenatal hypoxia. In addition, in male offspring, ET<sub>B</sub>R activation by ET-1 may have opposite effects depending on the prenatal exposure. These data will provide more insight into the mechanisms of developmental programming of coronary artery dysfunction.

### Funding Acknowledgement

This study was funded by a Canadian Institutes of Health Research Foundation grant and by the generosity of the Stollery Children's Hospital Foundation and the Alberta Women's Health Foundation through the Women and Children's Health Research Institute. RL is supported by an Alberta Innovates Summer Research Studentship. NH was supported by a Stefan and Pelagia Wychowanec Graduate Scholarship and a Motyl Graduate Studentship in Cardiac Sciences from the University of Alberta.

Oral Presentation  
Session I



## INCIDENCE AND OUTCOMES OF JARISCH-HERXHEIMER REACTIONS FOLLOWING TREATMENT FOR INFECTIOUS SYPHILIS IN LATE PREGNANCY 2015-2020.

Macumber S<sup>1</sup>, Singh A<sup>1</sup>, Robinson J<sup>1</sup>, Smyczek P<sup>2</sup>, Sklar C<sup>1</sup>, Gratrix J<sup>2</sup>, Rathjen L<sup>2</sup>

<sup>1</sup> University Of Alberta, Edmonton Alberta, Canada

<sup>2</sup> Alberta Health Services, Edmonton Alberta, Canada

**Objective:** In Alberta (Canada), infectious syphilis rose from 4:100,000 in 2014 to 52:100,000 in 2019 with a parallel rise in congenital syphilis. Treatment of pregnant women is highly efficacious but can precipitate the Jarisch-Herxheimer (JH) reaction. Symptoms of JH reaction are often transient but may include fever, uterine contractions, fetal heart rate abnormalities, and preterm labor. Because of these observations, many guidelines recommend hospitalization for fetal monitoring be considered. We sought to determine the incidence, and severity of JH reactions and the maternal and fetal outcomes following treatment.

**Methods:** Retrospective cohort study of pregnant women at >20 weeks gestation admitted to urban referral centers for treatment of infectious syphilis between 2015 and 2020. Data was extracted from a provincial database and supplemented by a review of medical records. Data collection was completed in March 2021.

**Results:** 39 women received benzathine penicillin G for the treatment of infectious syphilis in pregnancy. One mild JH reaction was identified in a patient with early latent syphilis. There were no serious maternal or fetal outcomes attributable to treatment. Average gestational age at treatment and delivery was 26 and 37 weeks respectively. Ten cases were staged as primary, 4 as secondary, and 25 as early latent syphilis. Five cases of confirmed congenital syphilis were identified. Further analysis of results is underway.

**Conclusions:** Data from our study challenges the recommendation for routine admission for the treatment of infectious syphilis in late pregnancy as no moderate or severe JH reactions were identified in our cohort. Further research is required to determine if a subgroup of women not identified in our cohort are at risk for moderate or severe JH reaction. These findings are timely given the global resurgence of infectious syphilis as inpatient resources continue to be strained by the ongoing COVID-19 pandemic.

**Funding/Acknowledgements:** None

Oral Presentation  
Session I

## MATERNAL AGING IMPACTS VASCULAR ADAPTATIONS TO PREGNANCY

**Pasha M**<sup>1,2,3</sup>, Kirschenman R<sup>2,3</sup>, Wooldridge A<sup>2,3</sup>, Spaans F<sup>2,3</sup>, Davidge S T<sup>1,2,3</sup>, Cooke CLM<sup>2,3</sup>

<sup>1</sup>Department of Physiology

<sup>2</sup>Department of Obstetrics and Gynecology

<sup>3</sup>Women and Children's Health Research Institute, University of Alberta, Edmonton, AB, Canada

**Objective/Hypothesis:** Advanced maternal age ( $\geq 35$  years) increases the risk of pregnancy complications, which may be due to vascular maladaptations to pregnancy. Aging is associated with vascular stiffness and endothelial dysfunction potentially via oxidative stress and reduced nitric oxide (NO) levels. However, whether these vascular changes alter vascular adaptations to pregnancy at an advanced age and contribute to endothelial dysfunction remains unknown. We hypothesize that maternal aging impairs vascular adaptations to pregnancy, via activation of NADPH oxidase (NOX) and NO-dependent mechanism.

**Methods:** Pregnant young (4 months) and aged (9.5 months;  $\sim 35$  year in humans) rats ( $n=6-10$ /group) were studied on gestational day 20 (term=22 days) and compared to age-matched non-pregnant rats. Blood pressure was measured (CODA tail-cuff system) and *ex vivo* vascular function was accessed (wire myography). Mesenteric artery endothelium-dependent relaxation to methylcholine (MCh) was assessed in the presence/absence of NO synthase inhibitor (L-NAME), or NOX inhibitor (Apocynin). Data were analyzed by two-way ANOVA with Sidak's post-test,  $p < 0.05$  was considered significant.

**Results:** Mean arterial pressure (MAP) was elevated only in aged non-pregnant rats ( $p < 0.001$ ) compared to all other groups. MCh-induced vasodilation responses were not different between groups. However, pre-treatment with L-NAME decreased maximum vasodilation ( $E_{max}$ ) in both young ( $p < 0.01$ ) and aged pregnant rats ( $p < 0.001$ ) but not in non-pregnant rats, indicating greater NO contribution in arteries from pregnant rats. Apocynin (which reduces superoxide production) increased MCh sensitivity only in aged non-pregnant rats ( $p < 0.01$ ).

**Conclusion/Significance:** In non-pregnant aged rats, increased NOX activity may enhance scavenging of NO leading to a constrictive systemic vasculature, which could contribute to increased MAP. We speculate that in 'healthy' aged vasculature, pregnancy confers vascular protection, as NO contribution to vasodilation was increased by pregnancy. However, maternal aging in humans is often associated with clinical co-morbidities, thus future studies that include a 'second-hit' in our aging rat model, are warranted.

**Funding/Acknowledgements:** This study was funded by a Canadian Institutes of Health Research (CIHR) Foundation grant and by the generosity of the Stollery Children's Hospital Foundation and the Alberta Women's Health Foundation through the Women and Children's Health Research Institute (WCHRI). Mazhar Pasha is supported by a WCHRI Graduate Studentship award.

## A RETROSPECTIVE COHORT STUDY OF EMERGENCY DEPARTMENT VISITS DURING THE POSTPARTUM PERIOD IN ALBERTA

**Brittany A. Matenchuk**<sup>1</sup>, Rhonda J. Rosychuk<sup>2</sup>, Brian H. Rowe<sup>3</sup>, Amy Metcalfe<sup>4</sup>, Radha Chari<sup>1</sup>, Susan Crawford<sup>5</sup>, Susan Jelinski<sup>5</sup>, Jesus Serrano-Lomelin<sup>1</sup>, Maria B. Ospina<sup>1</sup>.

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<sup>5</sup>Alberta Health Services, Alberta, Canada

**Introduction:** Women in the postpartum (PP) period represent a high-risk group of frequent visitors to the emergency department (ED). Yet, patterns and contributors to ED use in the PP are not well defined. The objective of this study was to evaluate the frequency and characteristics of ED visits during the PP and identify the socioeconomic and clinical factors associated with presentation.

**Methods:** A population-based retrospective cohort study of all pregnancies in Alberta resulting in a live delivery between April 1, 2011 and March 31, 2017 was conducted. We calculated age-standardized ED visit rates and used negative binomial regression models to generate rate ratios (RR) and 95% confidence intervals (CI) for the outcome of any ED visit during PP and the sociodemographic and clinical factors associated with presentation.

**Results:** Data on 255,929 pregnancies involving 193,965 women were analyzed. During the study period, 44.7% of postpartum periods had one or more ED visits, with 29.7% of visits occurring within six weeks of delivery. An obstetric diagnosis was identified in 17% at ED discharge, while 10.6% of obstetric ED visits resulted in hospital admission. Increased ED visits in the PP were associated with remote (RR:2.8; 95% CI:2.6,2.9) or rural (RR:2.3; 95% CI:2.3,2.4) residence, younger age (<20 vs 25-29 [RR:2.5; 95% CI:2.4,2.6], 20-24 vs 25-29 [RR:1.6; 95% CI:1.6,1.6]), mental (RR:1.6; 95% CI:1.6,1.7) or major/moderate health conditions (RR:1.6; 95% CI:1.5,1.6), and caesarean delivery (RR:1.4; 95% CI:1.4,1.4).

**Conclusion:** Almost one third of ED visits in the PP occurred in the 6 weeks immediately following delivery. A higher incidence of visits was associated with area of residence, younger maternal age and physical and mental health comorbidities. These findings highlight the need for innovative programs to mitigate ED presentations focused on new mothers under the age of 25.

**Acknowledgements:** This research was funded through the Women and Children's Health Research Institute and the Canadian Institutes of Health Research.

# Oral Presentation Session I

## FERTILITY CONSIDERATIONS WITH LUNG TRANSPLANTATION, A SCOPING REVIEW

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<sup>1</sup>Department of Obstetrics and Gynecology, University of Alberta

**Background/Objective:** Thirty two percent of lung transplants occur in patients during childbearing ages. The improved survival of transplant recipients has led to an increased focus on quality of life outcomes, including reproduction. Compared to liver/kidney, lung transplantation has other unique reproductive considerations including requiring relatively more aggressive immunosuppression, lifelong steroids, and propensity for rejection. As well, lung transplantation recipients may require or request assisted reproductive technology (ART) to conceive due to their underlying condition (notably Cystic Fibrosis). A multidisciplinary team, including fertility and transplant specialists, must work with the patient to make an informed choice around reproduction; however, there is a paucity of lung transplantation-specific literature. The aim of this study is complete an in-depth scoping review of fertility considerations after lung transplantation to review available evidence and identify knowledge gaps in the literature.

**Methods:** This project is a scoping review of published literature on lung transplantation and fertility. A search was executed by an expert searcher/health librarian (SC) on multiple databases using controlled vocabulary and key words representing the concepts "lung transplantation" and "Pregnancy" or "reproduction". Articles will be reviewed by two independent reviewers and conflicts will be settled by discussion. Transplantation data from 2008-2018 was received from the United Network for Organ Sharing (UNOS).

**Anticipated Results and Progress:** The systematic search resulted in 986 unique articles for review. The title and abstract review is currently underway. It is anticipated that most articles will be irrelevant and will emphasize the paucity of literature on this topic.

**Significance and Relevance:** As lung transplantation survivorship improves, patients and their healthcare team are making reproductive decisions without available evidence. This study aims to identify gaps in the literature and inform future studies.

Flash Talk  
Session II, Room 1

## DEVELOPMENT OF SUPPORTIVE TEXT MESSAGES FOR AN ONLINE CBT-BASED INTERVENTION FOR MENOPAUSAL WOMEN

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Women and Children's Health Research Institute,  
Department of Psychiatry,  
University of Alberta

### **Objective:**

The most cited symptoms during menopause transition include vasomotor symptoms, sleep disorders, and mental health problems. Daily supportive text messaging programs such as Text4Mood and Text4Hope in Alberta, based on cognitive behavioural therapy techniques, have been shown to help individuals suffering from addiction and mood disorders.

The goal of this research is to develop a text messaging intervention for women suffering from menopause symptoms. The prior success of text messaging programs in Alberta led us to hypothesize that this program has the potential to reduce symptoms of depression, sleep disorders, and hot flashes/night sweats.

Our objective is to develop text messages that are appealing and appropriate for women, based on input from menopausal women.

### **Methods:**

Women who had previously expressed interest in menopause-related research were contacted via email: Eighteen out of 57 women were available for focus groups. Focus groups were held virtually via Zoom with consented women. Discussions about potential text messages were audio/video recorded and analyzed qualitatively.

### **Anticipated Results and Progress:**

Two focus groups have been conducted. Focus groups were limited to 4-5 women (including researchers): this small group size worked well for virtual meetings, allowing for a relaxed online experience. All participants had experienced menopausal symptoms: they felt positive about using a text messaging intervention.

Participants were asked about types of messages they would find useful: they wanted practical advice about physical activity and mental health, information about physiology/symptoms of menopause, and wanted reassurance that menopause symptoms are normal.

### **Significance/Relevance:**

Based on menopausal women's input we have developed a catalogue of text messages suited to their needs: we continue to collect further input. The next steps include pilot testing the text messages to evaluate effectiveness. Ultimately, the text-messaging intervention could become available through gynecology and family medicine clinics and via Alberta Health Services.

### **Ethics:**

The project has received ethics approval from the University of Alberta REB (Pro00100237)

### **Funding/Acknowledgements:**

This research has been facilitated by the Women and Children's Health Research Institute through the generosity of the Alberta Women's Health Foundation. SR is the recipient of the Cavarzan Chair in Mature Women's Health.

Flash Talk  
Session II, Room 1

## ATYPICAL PROTEIN KINASE C ISOFORMS REGULATE PLACENTAL MICROVILLI STRUCTURE

**Khushali Patel**<sup>1</sup>, Ashley Zubkowsky<sup>2</sup>, Meghan Riddell<sup>1,2</sup>

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2. Department of Physiology, University of Alberta

### Introduction

The syncytiotrophoblast (ST) is a single giant cell that forms the maternal/fetal surface of the placenta. It is a highly polarized with membrane protrusions, called microvilli, on its' apical surface which are supported by a F-actin core. These ST features, facilitate maternal-fetal exchange and require active maintenance, but regulatory mechanisms that are yet unknown. Atypical protein kinase C (aPKC) isoforms are evolutionarily conserved apical polarity regulators. In other tissues, aPKCs regulate microvilli via activation of ezrin, a key microvilli component, and regulation of F-actin dynamics. Thus, we hypothesize that aPKC isoforms regulate ST microvilli stability.

### Methods

4-11 week (n=2) human placenta was stained for aPKC $\iota$ /ezrin and aPKC $\zeta$ /ezrin and examined by immunofluorescence. 10-12 week (n=3) human placental explants were cultured +/- 10 $\mu$ M aPKC psuedosubstrate inhibitor for 6 hours and stained for Phalloidin (F-actin)/Hoechst (nucleus) and phospho-Thr567 ezrin (activated ezrin)/total ezrin and imaged by confocal microscopy.

### Results

aPKC isoform expression in the ST apical membrane has not been previously examined. We found that both isoforms of aPKC, aPKC $\iota$  and aPKC $\zeta$ , colocalize with ezrin throughout the first trimester in ST apical membrane [aPKC $\iota$ /ezrin mean colocalization coefficient 0.60 (range: 0.47-0.69); aPKC $\zeta$ /ezrin mean colocalization coefficient 0.41 (range: 0.36-0.74)]. Placental explants treated with total aPKC inhibitor had a decreased microvilli abundance with a change in shape from finely branched meshed microvilli to bulbous protrusions as observed with F-actin staining. These changes will be confirmed with electron microscopy, and the isoform specific role of aPKCs will be examined with siRNA knock down.

### Significance

Our data shows that aPKC isoforms may regulate the shape and abundance of ST microvilli. Markedly decreased ST microvilli abundance is a feature of intrauterine growth restriction and preeclampsia. Therefore, future studies examining if altered aPKC expression can lead to development of placental pathologies via dysregulation of ST microvilli are warranted.

**Funding** : CIHR, WCHRI, Alberta Women's Health Foundation, Stollery Children's Hospital Foundation; MatCH

Flash Talk  
Session II, Room 1

## CLINICAL PREGNANCY SUCCESS RATES POST FALLOPIAN TUBE RECANALIZATION: A RETROSPECTIVE COHORT STUDY IN EDMONTON, ALBERTA

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**Objective:** Previous studies have suggested that pregnancy success rates following fallopian tube recanalization (FTR) are in the range of 12.8-51%. Our primary objective is to identify patients in the Edmonton Region that underwent fluoroscopy guided FTR between 2017-2019 and investigate clinical pregnancy outcomes.

**Methods and Materials:** This retrospective study included females treated at a primary care centre that underwent both a hysterosalpingogram and FTR between 2017-2019. 175 women were assessed for eligibility, of whom 25 were excluded due to incomplete charts. No other exclusion criteria were used. Characteristics including location of tubal occlusion, gravidity/parity status and body mass index were recorded.

Pearson chi-square tests were used for categorical variables and Wilcoxon rank sum tests for continuous variables. A value of  $p \leq 0.05$  was considered significant.

**Results:** 150 women with 199 obstructed fallopian tubes were analyzed for clinical intrauterine pregnancy. The overall rate of conception was 28.6% (43 of 150). Age did predict pregnancy after FTR (mean 35.59;  $p=0.0095$ ); however, BMI (mean 30.05;  $p=0.6031$ ) and infertility status ( $n=113$  primary infertility;  $n=37$  secondary infertility;  $p=0.6870$ ) did not. The location of tubal obstruction relative to the uterine ostium ( $n=117$  proximal;  $n=23$  distal;  $n=10$  proximal and distal;  $p=0.3621$ ) as well as the number of occluded tubes ( $n=101$  unilateral obstruction;  $n=49$  bilateral obstruction;  $p=0.6870$ ) were also not predictive of pregnancy after FTR. The mean time between FTR to confirmed pregnancy was 331 days (range 44-698 days). 175 women with 230 obstructed tubes were analyzed for technical success of FTR. The success rate was 92% (213 of 230 tubes). Complications included a catheter dissociation ( $n=1$ ) and allergic reactions ( $n=2$ ).

**Conclusion:** FTR is a safe intervention with a high technical success rate and a comparable clinical pregnancy rate to other minimally invasive techniques. It should be considered for patients seeking infertility treatment due to tubal occlusion.

**Funding/Acknowledgements:** Funding for statistics provided by the Department of Radiology at the University of Alberta.

Flash Talk  
Session II, Room 1

## Causes and Predictors of Early Postpartum Complications that Result in Visits to the Emergency Department

**Prabhpreet Kaur Hundal**, Rahim Valani, Cassandra Quan, Shayan Assaie-Ardakany, Tanmay Sharma, Maher Abou-Seido, Leila Salehi, Qamar Amin, Simina Luca

### Objective

This study aimed to review the reasons why postpartum women present to the emergency department (ED) over the short term ( $\leq 10$  days post-delivery) and to identify the risk factors associated with early visits to the ED.

### Methods

This retrospective chart review included all women who delivered at the William Osler Health System (WOHS) in 2018 and presented to the WOHS ED within 10 days after delivery. Baseline descriptive statistics were used to examine the patient demographics and identify the timing of the postpartum visit. Binary regression was used to identify predictors of early visit to the ED.

### Results

There were 381 visits identified, and the average age of the patients was 31.22 years (SD: 4.83), with median gravidity of 2 (IQR: 1–3). Most patients delivered via spontaneous vaginal delivery (53.0%). The median time of presentation to the ED was 5.0 days, with the following most common reasons: abdominal pain (21.5%), wound-related issues (12.6%), and urinary issues (9.7%). Delivery during the weekend (OR 2.7,  $P < 0.01$ ) was the only significant predictor of ED visit. Thirty four percent of the patients who presented to the ED required consultation, the majority being from the obstetrical service (74.8%). Only 12.0% of the total cohort required hospital admission.

### Conclusions

This was the first study in a busy community setting that examined ED visits over a short postpartum period. Patient education on pain management and wound care, including the availability of an early postpartum contact, can reduce the rate of early postpartum ED visits.

Flash Talk  
Session II, Room 1



## HUMAN CYTOMEGALOVIRUS INFECTION OF FIBROBLASTS AND BREAST CANCER CELLS IS ENHANCED BY PDGFR $\alpha$ RESULTING IN INCREASED INFLAMMATION

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**Objective/Hypothesis:** Human cytomegalovirus (HCMV) infection occurs in 40-70% of adults in developed countries. HCMV proteins and DNA are detected in tumors and metastatic tissues. The present study investigates the impacts of HCMV infection in human breast cancer cell lines compared to human fibroblasts, a cell type found in the tumor microenvironment. We focused on inflammatory consequences of these infections, which we hypothesized contribute to metastasis.

**Methods:** Human HEL299 fibroblasts and four breast cancer cell lines were challenged with a low passage clinical isolate of HCMV. Lysates and culture media were collected between 0 to 48 h. Expression of viral genes, proteins, and productive infection were quantified and compared in different cell lines. Secretion of 71 cytokines/chemokines and mRNA expression for IL-1 $\beta$ , IL-6, cyclooxygenase-2 and platelet-derived growth factor receptor- $\alpha$  (PDGFR $\alpha$ ) were quantified from HCMV-infected and uninfected cultures.

**Results:** HCMV significantly infected Hs578T triple-negative breast cancer cells and HEL299 fibroblasts. By contrast, infection of another triple-negative cell line, MDA-MB-231, and MCF-7 breast cancer cells was extremely low. These disparate infection rates reflected the expression levels of PDGFR $\alpha$ , a receptor involved in HCMV uptake in epithelial cells. When PDGFR $\alpha$  expression was increased by transducing this gene and an inducible promoter into T47D breast cancer cells and BCPAP thyroid cancer cells, the level of HCMV infection was substantially increased. Conversely, HCMV infection decreased PDGFR $\alpha$  expression, potentially attenuating subsequent infection. Productive infection of HEL299 fibroblasts and Hs578T with HCMV increased mRNA expression of inflammatory mediators. Secretion of proinflammatory cytokines/chemokines were increased while anti-inflammatory cytokines were decreased in infected HEL299 fibroblasts. 24/71 cytokines/chemokines were decreased with the remainder unchanged in infected Hs578T cells.

**Conclusion/Significance:** CMV infection in tumors will preferentially target tumor-associated fibroblasts and cancer cells with high expression of PDGFR $\alpha$ . HCMV infection in the tumors increases the inflammatory milieu and this could contribute to increased metastasis.

**Funding/Acknowledgements:** A seed grant from Women and Children's Health Research Institute resulted in an Innovative Grant from the Canadian Breast Cancer Foundation administered through the Canadian Cancer Society Research Institute and Canadian Institutes of Health Research funding.

Flash Talk  
Session II, Room 1

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

**Marina Bianchi Lemieszek**<sup>1</sup>, Michael Jewer<sup>2</sup>, Gabrielle Siegers<sup>2</sup>, Douglas Quilty<sup>2</sup>, Scott Findlay<sup>2</sup>, Krista Vincent<sup>2</sup>, Yangxin Fu<sup>1,2</sup>, Lynne-Marie Postovit<sup>1,2</sup>

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**Objective/Hypothesis:** Breast cancer (BC) is the most common cancer among Canadian women. Luminal A, the most common BC subtype, is associated with the best prognosis. However, luminal A is the 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 cell-type-specific splicing program. Previous results from the Postovit laboratory, obtained using the cancer genome cancer atlas (TCGA) as a test data set and BreastMark as a validation set, showed that ESRP1 is highly expressed in primary BC when compared to normal breast tissue. In fact, 61% of the TCGA annotated BC samples have *ESRP1* copy number gain or amplification. Additionally, ESRP1 high expression correlates with both poor overall and disease-free survival of patients with BC. We hypothesize that ESRP1 can induce a tumorigenic splicing program in BC cells and that ESRP1 copy number variation (CNV) predicts metastatic progression.

**Methods:** ESRP1 CRISPR knockout was performed in MCF7 and T47D cell lines. Proliferation, mammosphere formation assay, and epithelial to mesenchymal transition gene expression were analyzed. ESRP1 overexpression will be performed with knockout clones to send them for RNA sequencing. ESRP1 knockdown with short hairpin RNA is being done in both cell lines. ESRP1 CNV of BC patients' samples will be analyzed with Real-time PCR.

**Anticipated Results and Progress:** Two ESRP1 knockout and two wild-type clones were identified and confirmed with Sanger sequencing and western blot. Functional studies showed clonal heterogeneity between clones.

**Significance/Relevance:** The role of ESRP1 in BC still has to be elucidated. Alternative splicing changes analysis will help to understand the ESRP1 function. *ESRP1* CNV analysis and its association with prognosis may help identify patients in need of aggressive treatment and close follow up.

**Funding/Acknowledgments:** CRINA Marathon of Hope Graduate Studentship in Breast Cancer or Glioblastoma Research 2020. Women and Children's Health Research Institute, MaTCH program of the University of Alberta.

Flash Talk  
Session II, Room 1

## PRE-PREGNANCY OVERWEIGHT AND DIABETES, AND THEIR RELATIONSHIP WITH GESTATIONAL HYPERTENSION AND PREECLAMPSIA: A MEDIATION ANALYSIS APPROACH.

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**Objective.** Diabetes mellitus (DM) and pre-pregnancy overweight are known risk factors of gestational hypertension (GH) and preeclampsia (PE). However, DM can act as a mediator in the pathway between overweight and GH or PE, as overweight is also a risk factor of DM. Our objective is to estimate the mediation effect of pre-pregnancy DM in the path from pre-pregnancy overweight to GH or PE.

**Methods.** We are conducting a case-control study using data from the Alberta Perinatal Health Program for the years 2010-2013. Cases are nulliparous women aged >16 years having GH or PE. Controls are a random sample of pregnant women in their first pregnancy with no diagnosis of GH or PE, matched by gestational age for a ratio of 1:3 cases/controls. Structural equation models were used for the mediation analysis, with smoking during pregnancy, maternal age, and socioeconomic status as covariates. We reported odds ratios (OR) with 95% confidence intervals (CI) for direct effects, and the proportional effect for the DM-mediation component.

**Anticipated Results and Progress.** Data from 19,075 women were analyzed (controls=14,307; GH=4,768; PE=1,213). For GH, the direct effect of pre-pregnancy overweight (OR 3.2; CI 2.8-3.4) was greater than the direct effect of pre-pregnancy DM (OR 1.6, CI 1.2-2.1). For PE, the direct effect of both pre-pregnancy overweight (OR 2.4; CI 2.1-2.8) and pre-pregnancy DM (OR 2.1; CI 1.4-3.1) were similar. Pre-pregnancy DM mediated 44% and 27% of the total effect of pre-pregnancy overweight on PE and GH, respectively. Next steps will include asthma and depression as risk factors for GH and PE.

**Significance/Relevance.** Pre-pregnancy overweight plays a relevant direct role on GH, while in PE, both direct and mediating roles of DM are important. Diabetes management has important but different implications for overweight women at risk of developing GH and PE.

**Funding/Acknowledgements:** This research has been funded by the Women and Children's Health Research Institute and receives generous support of the Alberta Women's Health Foundation through the Women and Children's Health Research Institute.

Flash Talk  
Session II, Room 1

## MATERNAL DOXYCYCLINE TREATMENT RESULTS IN FETAL CARDIAC DYSFUNCTION AND PLACENTAL ABNORMALITIES IN MICE THROUGH DECREASED ENDOTHELIN-1 EXPRESSION

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University of Alberta

**Objective/Hypothesis:** Low endothelin-1 (ET-1) levels lead to cardiac dysfunction but high levels of this potent constrictor increase afterload, also negatively impacting cardiac function. In non-pregnant mice, doxycycline (Doxy), a commonly prescribed antibiotic, reduces ET-1 levels. During pregnancy, ET-1 plays a physiological role by promoting placental development. Proper placental function is crucial for fetal heart development. However, the effect of Doxy on placental function, ET-1 levels and fetal heart disease is unclear. We hypothesized that treating pregnant mice with Doxy would decrease placental ET-1 expression, alter placental function and induce fetal cardiac dysfunction.

**Methods:** Pregnant mice received Doxy (200mg/kg, n=4 dams) or control feed (n=3 dams) from embryonic day 6.5 (E6.5)-16.5. Fetal heart dimensions, flow, and function were assessed by M-Mode and Doppler ultrasound on E16.5-17.5. ET-1 mRNA and protein levels were assessed by qRT-PCR, Western blot and ELISA. Placental vascularity and morphology were analyzed by CD31 staining and H&E. Superoxide levels were measured using dihydroethidium staining. Maternal and placental inflammation and cell damage were examined using C-reactive protein and lactate dehydrogenase assays. Statistical analyses by Student's t-test.

**Results:** Doxy-treated dams gained less weight during pregnancy and had fewer fetuses. Placental weights (p=0.0034) and placental/fetal weight ratios (p=0.06) were higher in Doxy pregnancies. As hypothesized, placental ET-1 mRNA expression was lower in Doxy pregnancies (p=0.0098), but without differences in active ET-1 levels. The labyrinth/junctional zone ratio was higher in Doxy pregnancies (p=0.01) without vascularity differences. No differences in cell death, inflammation or oxidative stress were detected. In Doxy pregnancies, the early to late ventricular inflow ratio for both fetal ventricles was reduced (p<0.03), indicating diastolic dysfunction.

**Conclusion/Significance:** Maternal Doxy treatment reduced ET-1 mRNA expression and caused fetal diastolic dysfunction. The increased placental weights and labyrinth zones might indicate an adaptive response to suboptimal uterine conditions and reflect poor placental function.

**Funding/Acknowledgements:** WCHRI

Flash Talk  
Session II, Room 1

## THE GENDER CLINIC: A DESCRIPTIVE OBSERVATIONAL STUDY DESCRIBING A NOVEL PERIOPERATIVE GENDER-AFFIRMING CLINIC

Lucas Vasas MD, Matthew Mancuso BSc, Brooke Hanson BSc MScPT, May Sanaee MD, FRSCS, MHScEd, Cathy Flood MD, FRCSC

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**Objectives:** To outline the clinical environment in Edmonton for transgender patients to receive perioperative care, as well as to describe the clinical needs and complications for which patients seek care and the outcomes of treatment in the clinic.

**Methods:** The research team will be describing the Gender Clinic and the care path for patients referred to the clinic. A retrospective review of 138 patients seen in the clinic will be performed to describe the patient population demographics, as well as to assess for post-operative complications.

**Anticipated Results:** As this project is descriptive, we plan to use this paper to provide a framework for other centers to adopt a similar model of care. We expect that many common complications will have been successfully managed in Edmonton without requiring transfer back to the patient's site of gender affirming surgery.

**Relevance:** In Canada, the majority of gender-affirming surgery is performed at the Centre Métropolitain de Chirurgie in Montreal. Transgender patients often travel far distances to receive gender affirming care, and only remain there for a brief period of time post-operatively. When they return home, they may not always have access to a physician who is able to address their post-operative needs or complications. To enhance the care provided to transgender patients in Edmonton, our Urogynecology Clinic has initiated a multidisciplinary peri-operative clinic (The Gender Clinic) to improve patient outcomes, decrease the burden on the emergency department, and to reduce the number of patients requiring transfer back to Montreal for post-operative care. We hope that this paper will help to provide a framework for other centres to develop a similar peri-operative model of care in locations where gender affirming surgery is not yet available.

**Funding:** None to disclose.

Flash Talk  
Session II, Room 2

## UTERINE ARTERY ADAPTATIONS TO PREGNANCY ARE IMPAIRED BY ADVANCED MATERNAL AGE

**Wooldridge AL**<sup>1,3</sup>, Pasha M<sup>1,2,3</sup>, Kirschenman R<sup>1,3</sup>, Spaans F<sup>1,3</sup>, Davidge ST<sup>1,2,3</sup>, Cooke CLM<sup>1,3</sup>

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**Objective/Hypothesis:** Advanced maternal age (>35 years) is associated with pregnancy complications, which may be due to impaired adaptations to uteroplacental blood flow. In a rat model, we previously showed that constriction responses to increasing intraluminal pressures (i.e. myogenic tone) were greater in uterine arteries from aged compared to young pregnant dams. We hypothesized that age-related differences in vascular function develop as a result of poor adaptations during pregnancy.

**Methods:** Pregnant young (~4 months) and aged (~9 months; ~35 years in humans) rats were studied on gestational day 20 (term=22 days) and compared to age-matched non-pregnant rats. Myogenic tone (%; n=3-9/group) and mechanical properties (circumferential stress and strain; measures of circumferential force and the subsequent vascular wall stretch, which inform on elasticity and stiffness across increasing pressure; n=10-24/group) were assessed in isolated main uterine arteries using pressure myography. Data presented as area under the curve [AUC] and analyzed by two-way ANOVA with Sidak post-hoc comparisons.

**Results:** Arteries from young and aged non-pregnant rats did not differ in myogenic tone. In young pregnant rats, myogenic tone in uterine arteries was reduced compared to young nonpregnant rats (p=0.027). However, this pregnancy adaptation did not occur in aged dams. Circumferential stress and strain increased with pregnancy (young and aged, both p<0.0001). Circumferential stress was not affected by age, however, circumferential strain was lower in arteries from aged pregnant dams than arteries from young pregnant dams (p=0.029).

**Conclusion/Significance:** Maternal aging was associated with impaired uterine artery adaptations to pregnancy. Arteries from pregnant aged dams were less compliant, and more constrictive with increasing pressure, compared to those from young dams. These age-related impairments were not evident in the non-pregnant state, suggesting they developed during pregnancy. These impaired vascular adaptations may contribute to complications in advanced maternal age pregnancies.

**Funding/Acknowledgements:** This study is supported by a Canadian Institutes of Health Research Foundation Grant and by the generosity of the Stollery Children's Hospital Foundation and the Alberta Women's Health Foundation through the Women and Children's Health Research Institute. Amy Wooldridge is supported by postdoctoral fellowships from the Women and Children's Health Research Institute, Alberta Innovates, and Canadian Institutes of Health Research.

Flash Talk  
Session II, Room 2

## OPTIMIZING RATES AND ACCESS TO CAESAREAN SECTIONS IN INDIA: A COST-EFFECTIVENESS ANALYSIS

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**Objective:** In India, some women lack access to cesarean section (CS) while others are exposed to non-indicated CS. Scaling up of CS could be achieved by either increasing access to comprehensive emergency obstetric care (CEmOC) facilities or by increasing CS rates in existing facilities. This study assessed the cost-effectiveness of three different strategies, each of them with different CS rates and access to CEmOC.

**Methods:** A decision analysis model was created to estimate the cost of care, maternal and neonatal outcomes in three different strategies using the data on CS rates and access to CEmOC from: (A) India's national average (50.2% access;17.2% CS rate), (B) rural areas (47.2% access;12.8% CS rate) and (C) urban areas (55.7% access;28.2% CS rate). We considered all women of reproductive age, performing first-order Monte Carlo simulation using a 1-year cycle time and 35-year time horizon. Costs, probabilities and utilities were derived from literature. A societal perspective was utilized with a willingness-to-pay threshold of \$1,940, India's GDP per capita.

**Results:** The strategy with the highest access to CEmOC (55.7%) and highest CS rate (28.2%) was cost-effective, with an incremental cost-effectiveness ratio of 354.90. Two-way sensitivity analysis demonstrated this was driven by increased access to CEmOC. The strategy with the highest CS rate had the highest number of placentae previa, accreta and ICU admission but the lowest rates of neonatal mortality. In contrast, the strategy with the lowest access to CEmOC had the highest number of fistulae, uterine rupture and stillborn.

**Conclusion:** Avertable morbidity and mortality result from both the lack of access to CEmOC and the overuse of CS. While both issues should be addressed, the cost-effective strategy is the one with the highest access to CS, despite excessive CS rates. Therefore, increasing access to surgical obstetric care is paramount to optimize maternal and neonatal outcomes.

Flash Talk  
Session II, Room 2

## AGGRESSIVE DEDIFFERENTIATED ENDOMETRIAL CANCER CAN BE RECAPITULATED FROM CELL LINE MODELS WITH CHROMATIN REMODELING PROTEIN SMARCA4 DEFICIENCY AND TREATED WITH SYNTHETIC LETHALITY APPROACHES

**Mackenzie Brandon-Coatham**<sup>1</sup>, Zihua Xu<sup>2</sup>, Guihua Zhang<sup>2</sup>, Jiahui Liu<sup>2</sup>, Edmund Su<sup>3</sup>, Dylan Dieters-Castator<sup>4</sup>, Gilles Lajoie<sup>4</sup>, Franco Vizeacoumar<sup>5</sup>, Martin Hirst<sup>3</sup>, Cheng-Han Lee<sup>3,6</sup>, Lynne-Marie Postovit<sup>2</sup>

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**Introduction:** One of the most lethal yet rare subsets of uterine cancer is dedifferentiated endometrial carcinoma (DDEC). Less than 20% of patients diagnosed with DDEC survive. DDEC tumors possess both well-differentiated and undifferentiated regions. Previously, we demonstrated that 80% of the undifferentiated regions in DDEC lesions lack the expression of core chromatin remodeling proteins, SMARCA4 or ARID1A and ARID1B. We hypothesize that loss of these proteins, which are known regulators of transcription may lead to the induction and/or maintenance of gene expression programs that drive dedifferentiation, metastasis and therapy resistance.

**Methods & Results:** SMARCA4-deficient endometrial cancer (EC) cell line models were generated by CRISPR gene editing and were found to be less capable of self-renewal and anchorage-independent growth. SMARCA4 knockout cells were found to be more senescent than their wild-type counterparts, possessing more positive beta-galactosidase stained cells and expressing higher levels of p21 and H3K9me3. Existence of a senescent associated secretory phenotype (SASP) was determined by mass spectrometry of conditioned media. Tumors formed from SMARCA4-deficient EC cell line models in immune-compromised mice recapitulated the mixed phenotype observed in patient DDEC lesions. Endometrial cancer cells lacking SMARCA4 expression were also found to be more sensitive to inhibition with clinically available therapeutics targeting CDK4 and EGFR. Synergistic effects upon combining therapies against CDK4 and EGFR were observed in SMARCA4 knockout cells. Response to CDK4 inhibition in the absence of SMARCA4 is likely mediated through dysregulation of the p16/cyclin D1/Rb pathway.

**Conclusions:** Lineage tracing with DNA barcodes in addition to single cell RNA-Seq and ATAC-Seq will be carried out in the future to elucidate whether it is the consequence of clonal outgrowth, changes in gene expression or alterations to nucleosome occupancy that contribute to cellular dedifferentiation in the context of DDEC.

Flash Talk  
Session II, Room 2



## DEVELOPMENT OF A SURGICAL BUNDLE TARGETED TO REDUCE URINARY TRACT INFECTIONS IN UROGYNECOLOGIC SURGERY

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University of Alberta

### **Objective/Hypothesis:**

Twenty percent of women undergo urogynecologic surgery by the age of 80 and 1 in 10 of these women will develop a urinary tract infection in the post-operative period. At our center 11% of women develop a post-operative bladder infection and 20% receive antibiotics in the first six weeks from surgery. There are a number of interventions that are known to reduce urinary tract infections that are being implemented as a surgical bundle.

### **Methods:**

The surgical bundle is currently being implemented as a quality improvement project. Interventions include utilization of chlorhexidine vaginal preparation, prophylactic antibiotic prescription or cranberry capsules, a clean closed catheter system, and patient education. We are currently performing a retrospective chart review as the before intervention group and will be assessing our bundle at a variety of time points moving forward over the next two years. We require 316 patients before and after bundle implementation and anticipate approximately 500 patients included in the bundle based on 240 major urogynecologic operations in May 2018 – May 2019. We will ultimately utilize univariable and multivariable regression modelling to assess our data.

### **Anticipated Results and Progress:**

Since the implementation of this project from March 1, 2021 to March 12, 2021, 12 major urogynecologic cases have been involved with successful implementation of each bundle component as follows: vaginal preparation with chlorhexidine (12/12), appropriate catheter care (8/12), antibiotics appropriately prescribed (4/4), cranberry capsules appropriately prescribed (7/8), and appropriate discharge teaching (8/12).

### **Significance/Relevance:**

If successfully implemented the surgical bundle will reduce morbidity associated with post-operative urinary tract infections and the consequences of antimicrobial treatment in major urogynecologic surgeries. If feasible extension of this bundle or aspect of this bundle may apply to minor surgeries or gynecologic surgery in general.

### **Funding/Acknowledgements:**

None.

Flash Talk  
Session II, Room 2

## Childbearing and cannabis for Canada: A review

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**Objective/Hypothesis:** As of Oct. 17, 2018, the Cannabis Act passed by the Federal Government of Canada came into effect, legalizing the use of marijuana for recreational purposes. However, the effect of cannabis on the pregnant mother has been the subject of debate in scientific literature. Noting that the main active component of marijuana, delta-9-tetrahydrocannabinol (THC) can cross the placenta, we predict that prenatal marijuana can have detrimental effects on fetal development. This review aims to summarize the existing literature and current recommendations for marijuana use in pregnant mothers following legalization.

**Methods:** A systematic review was designed following PRISMA guidelines. 39 papers were identified using PubMed/MEDLINE, EMBASE, and Google Scholar databases to collect and synthesize evidence of current guidelines for marijuana use in pregnancy using keywords: "cannabis," "cannabis legalization," "cannabinoids," "marijuana," "fetal outcomes," "perinatal outcomes," "pregnancy," and "prenatal outcomes."

**Anticipated Results and Progress:** Reviewed studies appear to show increased risks associated with fetal growth and neurodevelopmental repercussions that can be attributed to cannabinoid receptors identified in the fetal brain and placenta. Mice models seem to corroborate these negative effects on the neurobiology of the endocannabinoid systems in the brain. Guidelines in countries that have compiled data following cannabis legalization including Canada, the United States, and New Mexico appear to dissuade the use of cannabis due to these reasons given the scarcity of evidence.

**Significance/Relevance:** The effects on pregnancy of using THC is integral because marijuana is the most used dependent substance during childbearing. A better characterization of the benefits and detriments of marijuana can allow us to incorporate these suggestions into medical care.

Flash Talk  
Session II, Room 2

## POSTPARTUM PREECLAMPSIA CLINIC ON BEHAVIORAL CHANGE AND LONGTERM OUTCOMES: a CASE-CONTROL STUDY

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**Objective/Hypothesis:** Preeclampsia is an independent risk factor for future vascular disease, including cardiovascular related death<sup>1</sup>. The Edmonton Postpartum Preeclampsia Clinic (PPPC), a vascular risk reduction clinic, showed short term benefit on improving exercise habits<sup>2</sup>. The objective of this study was to examine the long-term impact of PPPC. We hypothesize that patients who attended this clinic found the clinic helpful and had improved long-term health behaviors and outcomes.

**Methods:** A retrospective case-control study was performed using mailed out surveys. All 2010-2019 PPPC patients who attended clinic were identified as case. Each of the 235 case was matched with a control, who was identified in the Obstetric Medicine clinic database who was diagnosed with preeclampsia but was not seen at the postpartum clinic, matched by pregnancy year. The survey collected information on preeclampsia information, and long-term lifestyle behaviours and health outcomes.

**Preliminary Results:** 94 case and 63 control surveys were returned. Median age was 37 vs 38 (case vs control), and time of preeclampsia diagnosis was 28 vs 32 weeks. More controls had additional preeclamptic pregnancies. Preliminary analyses showed cases to have less long-term hypertension, diabetes, kidney diseases, and weight gain. Further analyses are underway to adjust for potential confounders. In patients who attended PPPC, 60.9% found the clinic to be helpful in improving health and maintaining positive lifestyle changes. In controls, 66.1% indicated no one or can't remember anyone discussing preeclampsia impacting on future heart disease with them.

**Conclusion/Significance:** Our study preliminary findings are encouraging in that the PPPC has a positive impact on patients with preeclampsia in terms of long-term behavioral changes, and health outcomes. These findings should support not only the continuation of Edmonton PPPC, but also the expansion of vascular risk reduction clinics for women with preeclampsia in other sites and possibly the adoption of PPPC clinic model.

**Funding/Acknowledgement:** This research project was funded by the WCHRI Obstetrics & Gynecology resident grant and Alberta Women's Health Foundation.

Flash Talk  
Session II, Room 2

## OPTIMIZATION OF A TISSUE-BASED ASSAY TO MEASURE ADHERENCE OF PLASMODIUM FALCIPARUM INFECTED ERYTHROCYTES (iRBC) TO PLACENTAL CELLS

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**Objective:** Placental malaria results in low birth weight and fetal morbidity. It develops when infected red blood cells (iRBCs) adhere to chondroitin sulfate A (CSA) glycosylated syndecan-1 (SDC-1) on placental syncytiotrophoblasts (ST) via VAR2CSA, a parasite protein localized to the iRBC surface. Antibodies to VAR2CSA-based vaccines are being generated and blocking efficiency needs to be assessed as a surrogate for protection against placental malaria. Current assays use plated CSA and are non-physiological. We aim to optimize a physiological, tissue-based assay to test adhesion-blocking activity of antibodies using placental villous explants.

**Hypothesis:** Development and optimization of a placenta tissue-based iRBC binding assay with quantification will provide a physiologically relevant mechanism to test blocking efficiency of antibodies developed against VAR2CSA-based vaccines.

**Methods:** Extensive optimization led to this methodology. Villous explants from term human placentas were used. iRBCs were stained with ethidium bromide to detect parasite DNA and uninfected RBCs were stained with DiD. Infected or uninfected RBC were added to explants and rocked for 40 minutes. After washing, explants were fixed, whole mounted and RBC binding was quantified manually using confocal microscopy. Controls included chondroitinase (1U/mL) cleavage of CSA from explants and soluble CSA (500µg/mL) competition. Blocking iRBC binding with rabbit anti-VAR2CSA IgG (100 µg/mL) validated the assay.

**Anticipated Results and Progress:** SDC-1 localized to the apical membrane of ST (n=10). Chondroitinase treatment reduced bound iRBCs by 76.02±15.31% (n=3, p=0.005). Preincubation of iRBCs with soluble CSA or rabbit anti-VAR2CSA IgG reduced binding by 80.19±15.31% (n=3, p=0.004) and 93.94±17.11% (n=2, p=0.003), respectively. Binding by uninfected RBCs was reduced by 75.83±15.31% (n=3, p=0.006) compared to iRBC.

**Significance:** Specific iRBC binding to CSA/SDC-1 on explants was reduced after removal of CSA on ST or preincubation of iRBC with soluble CSA or anti-VAR2CSA IgG. This study will significantly impact vaccine development for placental malaria by providing a more physiologically relevant assay to test vaccine efficacy.

**Funding/Acknowledgments:** CIHR, Li Ka Shing Institute of Virology Graduate Studies Entrance Award and FoMD 75<sup>th</sup> Anniversary Award

Flash Talk  
Session II, Room 2

## PROGESTERONE RECEPTOR POSITIVE UTERINE ENDOTHELIAL CELL DEPENDENT REGULATION OF ANGIOGENIC TIP CELL SELECTION

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**Objective/Hypothesis:** Conversion of the endometrium to form the decidua is crucial for embryo implantation and maintenance of early pregnancy. Central to this process is angiogenesis; the formation of new blood vessels. Angiogenesis is controlled by the emergence of a tip cell that sprouts from existing vessels and guides the formation of new vasculature. Vascular endothelial growth factor (VEGF) is a key mediator of angiogenesis, but, progesterone (P4) has also been shown to stimulate uterine endothelial cell (UtEC) sprouting through unknown mechanisms. UtEC uniquely express progesterone receptors (PR). A previous paper found that P4 treatment of PR positive (PR+) endothelial cells induces a tip cell-like genetic sequence. We hypothesize that P4 controls decidual angiogenesis by regulating tip cell selection through PR dependent mechanisms.

**Methods:** 4 to 6 week decidual tissue (n=6) was collected and fixed in 4% PFA. The type of decidua was determined by HLA-G staining. Immunostaining of decidual vessels was performed on 100um thick vibratome slices with anti-VE-cadherin, anti-PR A/ B, and Hoechst and imaged by confocal microscopy. The endothelial cells and tip cells were counted for total cell number, and total PR+ cells. Statistical analysis was performed using a  $\chi^2$  test.

**Anticipated Results and Progress:** Overall, 23% of decidual endothelial cells were PR+ across all types of decidua, similar to other published reports. Whereas, there was a significant enrichment of PR+ positive UtEC in tip cells (42%;  $p=0.012$   $\chi^2$ ). Therefore, our interim results support a role for P4/PR+ endothelial cells in tip cell selection and regulation of decidual sprouting angiogenesis. We will use 3D angiogenesis sprouting assays to understand how PR+ UtEC contribute to sprouting and the molecular mechanisms through which P4 regulates decidual angiogenesis.

**Significance/Relevance:** Understanding the mechanisms regulating decidual angiogenesis could identify points of therapeutic intervention for treatment of pathologies such as implantation failure and miscarriage.

**Funding/Acknowledgements:**

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Flash Talk  
Session II, Room 2

## EFFECTIVENESS OF A PODCAST FOR EDUCATION AMONG OBSTETRICS AND GYNECOLOGY CLERKSHIP STUDENTS

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### **Objective:**

Podcast use is becoming increasingly popular and is used in many areas of medical education. The purpose of this study is to determine if listening to an audio podcast is an effective learning method for medical students during their obstetrics and gynecology (OBGYN) clerkship rotation.

### **Methods:**

This cluster randomized controlled trial recruited University of Alberta medical students starting their OBGYN clerkship rotation. Students in the intervention group listened to a podcast episode on a common OBGYN topic and then completed a 20-question multiple choice test. The control group completed the test and listened to the podcast after. After listening to the podcast, both groups of participants completed a survey detailing their experience with the podcast using 5-point Likert scale and short answer questions. Statistical analysis included descriptive statistics and independent t-test to compare mean tests scores of the groups.

### **Results:**

One hundred and twenty-four students participated in the study, sixty-three in the intervention group and sixty-one in the control group. The average score of the intervention group was 88.9% (55-100%) compared to 76.8% (30-100%) in the control group ( $p < 0.01$ ). 80% of participants agreed that the podcast was an effective learning tool and that they would listen to a podcast covering other topics in obstetrics and gynecology. Students would be most likely to listen to a podcast while commuting (76%), or while doing household chores (60%).

### **Conclusions:**

Students who listened to a podcast topic performed better on a knowledge test, and podcasts appear to be an acceptable learning format for students. Technology plays an important role in medical education, and it is important that women's health topics are represented.

### **Funding/Acknowledgements:**

The authors have no funding sources to declare.

Flash Talk  
Session II, Room 3

## TRENDS IN PUBLIC FUNDING FOR SURGICAL INNOVATION IN CANADA

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3. Faculty of Medicine, McMaster University, Hamilton, Ontario

**Objective** Surgical innovation is necessary for advancing modern medicine. A decline in research funding has been cited as a potential cause for limited surgical innovation in the United States. We aim to understand whether there is a dearth of public funding in Canada.

**Methods** Publicly available funding data from Canadian Institutes of Health Research (CIHR) were reviewed from 2008 to 2019 to determine the yearly funding distributed to surgical departments. Successful grant titles/abstracts were reviewed by two reviewers. Based on inclusion and exclusion criteria, surgical innovation studies were identified and total yearly funding was calculated. All amounts were adjusted for inflation to reflect 2019 Canadian dollar value.

**Results** From 2008 to 2019, surgical departments were granted 1.82-4.70% of total CIHR funding. Nine-hundred and two grants were allocated to surgical departments and 126 (14.0%) met criteria for surgical innovation. Surgical innovation research were allocated a total annual amount ranging from 1.52 to 9.01 million CAD. There appears to be an upward trend in surgical innovation funding over this time period.

**Conclusion** Contrary to the landscape in the United States, there is no evidence of decreasing trends in funding for surgical innovation in Canada. There may be barriers outside of funding precluding surgeons from participating in innovation. Understanding these barriers will be necessary in order for Canada to become a leader in surgical innovation.

**Acknowledgements:** Women and Children's Health Research Institute

Flash Talk  
Session II, Room 3

**SHEDDING LIGHT ON THE EFFECTS OF MATERNAL SUNLIGHT EXPOSURE ON OFFSPRING HEALTH: A SCOPING REVIEW**

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**Objectives/Hypothesis:** Sunlight exposure during pregnancy may be implicated in the physiological fetal development. Although several studies suggest the involvement of ultraviolet radiation-mediated vitamin D synthesis, current understandings of sunlight exposure effects during pregnancy remain incomplete. We aimed to (i) summarize the existing body of research on the influence of sunlight exposure on birth and long-term health outcomes and (ii) determine its implications for therapeutics and public health policy.

**Methods:** We conducted a scoping review following PRISMA-ScR guidelines followed by a qualitative narrative synthesis. Databases including PubMed/MEDLINE, EMBASE and Google Scholar were screened, and no time, setting, or language restrictions were imposed on the search strategy. Primary research articles such as case studies, systematic reviews and meta-analyses, were included. Experimental and animal studies were excluded.

**Results:** A total of 14 studies were included after screening and exclusion. Of the studies identified on birth outcomes, the majority (5/8) demonstrated an association between sunlight exposure and reduced adverse birth outcomes (e.g., low birth weight, preterm births, small for gestational age, etc.), 2/8 studies showed no association, and 1/8 suggested a negative association between sunlight exposure and reduction of these adverse birth outcomes. Of the studies examining long-term health outcomes, sunlight exposure during pregnancy was shown to promote skeletal growth and development (2/6), and reduce the incidence of multiple sclerosis (2/6), asthma (2/6) and pneumonia (1/6). However, several of these studies used different methodologies and populations making it difficult to compare and integrate findings. Based on these results, we examined: the importance of exposure at different stages of pregnancy, proposed mechanisms by which sunlight exposure could lead to optimal outcomes, epidemiological differences influencing the findings, and necessary practical considerations prior to the implementation of public health policy recommendations.

**Conclusion/Significance:** While these associations are promising, randomized controlled trials are warranted to support these recommendations.

**Funding/Acknowledgements:** N/A.

Flash Talk  
Session II, Room 3



## **EFFECTS OF MINIMALLY INVASIVE VERSUS OPEN APPROACH FOR TREATING EARLY CERVICAL CANCER IN EDMONTON, ALBERTA: A RETROSPECTIVE ANALYSIS**

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University of Alberta

### **Objective/Hypothesis**

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 current standard of care for treatment of early cervical cancer. Minimally invasive surgery (MIS) has become more common in the treatment of gynecologic cancers as it is associated with 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. Until recently, retrospective data has suggested no difference in prognosis or survival outcomes between MIS and open surgeries for the management cervical cancers. However, in 2018, two key studies presented preliminary 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. Given the practice-changing potential of this information, we are retrospectively examining cases of early stage cervical cancers treated with radical surgery from 2000 to 2019 and comparing outcomes based on surgical approach. This data will be incorporated in a nationwide study to investigate the role of MIS in cervical cancer treatment in Canada.

### **Methods:**

This is a retrospective chart review of all patients diagnosed with early cervical cancer treated with radical hysterectomy or trachelectomy between 2000-2019 at the Royal Alexandra Hospital. Data will incorporate surgical, pathological, and clinical variables. The primary outcomes are recurrence rates and progression-free survival. Secondary outcomes include the use of adjuvant treatments, and overall survival.

### **Anticipated Results and Progress:**

Chart review is near completion.

### **Significance/ Relevance:**

This study will help inform our understanding of the association between MIS approach and the risk of recurrence of early cervical cancer based on local practices. It will clarify whether pathological features and technical factors may be confounders or independent factors contributing to the risk of recurrence.

Flash Talk  
Session II, Room 3

## UNDERSTANDING THE PERSPECTIVES OF INDIGENOUS MEDICAL STUDENTS AS THEY APPROACH OPPORTUNITIES FOR POSTGRADUATE MEDICAL TRAINING

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**Introduction:** Indigenous Peoples are underrepresented in Euro-Canadian medicine. In an effort to address the need for substantive equality in postgraduate training, the University of Alberta Ob/Gyn residency program has developed an Indigenous Admissions Pathway (IAP). The objective of this study is to understand the postgraduate training goals of Indigenous medical students.

**Methods:** Self-identified Indigenous students currently enrolled in a Canadian medical school were invited to participate in an electronic survey. Analysis included descriptive statistics and a thematic analysis of open-ended questions.

**Results:** Thirty-six participants responded to the survey. Family medicine (66.7%), internal medicine (44.4%), and Ob/Gyn (38.9%) are the most common intended specialties. Factors that would influence trainee choice of specialty include personal interest, work-life balance, and community need. Trainees identified mentorship from Indigenous physicians, community engagement, and Indigenous Health electives as important complements to an IAP. Participants were asked to describe factors which would influence their choice to apply through an IAP and eight themes were identified. All participants thought that an IAP would have a positive impact on health care for Indigenous patients.

**Conclusion:** This study supports the ongoing use of the Ob/Gyn IAP. It highlights the goals and priorities of Indigenous students and provides direction for medical educators. An IAP must be accompanied by a robust program of Indigenous professional development and other effective, community driven initiatives to decolonize postgraduate medical education. This study will be used to improve the IAP with the ultimate goal of increasing Indigenous representation in Ob/Gyn and improving access to culturally safe care for Indigenous women.

**Funding:** The Dr. M.E. Ledingham Memorial Summer Research Award

Flash Talk  
Session II, Room 3

## EXPLORING MECHANOSENSATION: A NOVEL REGULATOR OF PLACENTAL DYSFUNCTION IN PREECLAMPSIA

**Saloni Koshti**<sup>1</sup>, Yuliya Fakhr<sup>1,2</sup>, Yasaman Bahojb Habibyan<sup>3</sup>, Denise G. Hemmings<sup>1,2,3</sup>

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**Objective/Hypothesis:** Poor placental perfusion is associated with preeclampsia, an inflammatory pregnancy disorder. The placental syncytiotrophoblast, the site of maternofetal transport, detects maternal blood flow through mechanosensory channel activation. However, identification and the functional consequences of channel activation are poorly characterized in syncytiotrophoblast. Our objectives were to define the cell-specific expression patterns of Piezo1, a mechanosensory channel, in placentas from healthy and preeclamptic pregnancies and to define a role for Piezo1 in trophoblast differentiation by syncytialization under normal and inflammatory conditions.

**Methods:** Piezo1 in placentae from normal (n=12) and preeclamptic (n=5) pregnancies were analyzed by qRT-PCR and by immunofluorescence along with E-cadherin, demarking syncytiotrophoblast. Human chorionic villous explants were treated up to 48hrs after initial syncytiotrophoblast sloughing with and without tumour necrosis factor-alpha (TNF $\alpha$ ; 1ng/mL) and/or Yoda1 (Piezo1 agonist; 1 $\mu$ M). Cell death and syncytiotrophoblast function were assessed using lactate dehydrogenase (LDH) and human chorionic gonadotropin (hCG; n=6) assays. Piezo1 expression was measured by qRT-PCR (n=4, 0-48hrs).

**Results:** Piezo1 was localized in blood vessels and detected in the syncytiotrophoblast. Piezo1 mRNA expression in whole placental biopsies was similar in both groups; however, greater expression in blood vessels and in the syncytiotrophoblast was detected by immunofluorescence in the preeclamptic placental sections (P<0.05). This could be in response to elevated inflammatory cytokines since TNF $\alpha$  treatment of explants increased Piezo-1 expression by 3.5-fold after 3 hours (p=0.01). Under normal conditions, Piezo1 mRNA expression remained constant during re-syncytialization. Neither LDH or hCG changed in response to Piezo1 activation and/or TNF $\alpha$  treatment in static cultures.

**Conclusion/Significance:** Placental Piezo1 levels were increased in preeclampsia, alluding its disruptive role for placental function. This can be explained by its increase in response to TNF $\alpha$ , which is elevated in PE. Piezo1 may not fully activate in static explant conditions, and future mechanosensation studies will include a flow culture component.

**Funding/Acknowledgements:** CIHR, Department of Obstetrics and Gynecology.

Flash Talk  
Session II, Room 3

## AMONG RURAL-DWELLING WOMEN IN ALBERTA CANADA, WHAT PATIENT, LOCATION, AND SYSTEM FACTORS INFLUENCE LOCATION OF DELIVERY?

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**Background:** Available evidence suggests that, when possible, offering birth close to home in rural and remote region is a safe option and represents best practice. Despite this, the last decade in Alberta has seen a progressive centralization of medical care and a corresponding decrease in the availability of rural and remote maternity services.

**Objective:** The purpose of this study was to identify factors which contribute to the place of birth for rural-dwelling women in Alberta.

**Methods:** A retrospective cohort study was conducted using the Alberta Perinatal Health Program (APHP) database. The study included all patients residing in rural or remote Alberta (local geographic area (LGA) of 30,000 residents or less) who delivered a live born infant in an Alberta hospital between 2013 and 2018. Factors independently associated with place of birth were identified by logistic regression analysis.

**Results:** In total, 94 475 women met the inclusion criteria. While 51.2% of hospitals had obstetrics services, only 25.5% (2018) – 29.2% (2013) of women delivered in the hospital closest to home. Logistic regression modeling identified the following factors which were associated with delivery at a hospital other than the closest hospital: Maternal age (OR=0.81, 95% CI:0.75,0.87), multiparity (OR=0.95, 95% CI:0.90,0.99), maternal obesity (OR=1.16, 95% CI: 1.08,1.25), smoking during pregnancy (OR=1.17, 95% CI:1.11,1.25), gestational diabetes (OR=1.27, 95% CI:1.14,1.42), and hypertensive disorders of pregnancy (OR=1.31, 95% CI:1.17,1.46). Increased obstetrical services available at the delivery hospital was a significant factor (OR=7.03, 95% CI:6.84,7.23).

### **Conclusion:**

The majority of women in Alberta do not deliver at their closest hospital. Many patient factors are predictably associated with requirement for a higher level of care but system factors also appear to be associated with delivery location. Further research on factors which support delivery close to home are warranted.

Flash Talk  
Session II, Room 3

## PLACENTAL SYNCYTIOTROPHOBLAST-ENRICHED EXTRACELLULAR VESICLES FROM NORMAL AND PREECLAMPTIC PREGNANCIES HAVE A DISTINCT IMPACT ON NITRATIVE STRESS IN HUMAN UMBILICAL VEIN ENDOTHELIAL CELLS (HUVECS)

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**Objective/Hypothesis:** Preeclampsia (PE) is a pregnancy disorder characterized by new-onset hypertension after 20 weeks of gestation and evidence of reduced organ perfusion (e.g. proteinuria). Women with PE present with vascular endothelial dysfunction, contributing to the development of hypertension. The PE placenta may contribute to systemic endothelial dysfunction by releasing syncytiotrophoblast-derived extracellular vesicles (STBEVs) into the maternal circulation. STBEVs from normal pregnancies (NP) impair vascular function and increase nitrotyrosine levels (a marker of nitrative stress/endothelial dysfunction). However, although literature shows PE-STBEVs differ in composition from NP-STBEVs, the effects of NP- vs. PE-STBEVs on endothelial function are still unknown. Thus, we hypothesized that PE-STBEVs are internalized by HUVECs and induce a greater nitrative stress in endothelial cells compared to NP-STBEVs.

**Methods:** STBEVs were collected using *ex vivo* placental perfusion (pooled from n=3 NP or PE placentas). HUVECs isolated from NP umbilical cords were: 1) incubated (1 h) with 80 µg/mL of fluorescently (CFSE) dyed STBEVs to assess uptake (n=2), and 2) exposed to NP- or PE-STBEVs at increasing concentrations (0-1-10-100-200 µg/mL; 24h) to evaluate nitrotyrosine levels by immunofluorescence staining (confocal microscopy; n=5). Data were analyzed using two-way ANOVA with Sidak's multiple comparisons test.

**Results:** Both NP- and PE-STBEVs were located intracellularly in HUVECs. Nitrotyrosine levels increased after exposure with NP-STBEVs at 100 and 200 µg/mL compared to untreated cells (1.56±0.12 and 1.52±0.10 fold, respectively [p<0.05]), while PE-STBEVs did not induce any changes (interaction: p<0.0001). Nitrotyrosine levels were higher in cells stimulated with NP- vs PE-STBEVs at 10, 100, and 200 µg/mL concentrations (p<0.05).

**Conclusion/Significance:** Our preliminary data showed that NP- and PE-STBEVs were internalized by HUVECs. In contrast to our hypothesis, only NP-STBEVs induced nitrative stress, which suggests NP- and PE-STBEVs may differentially impact endothelial function. Further studies are necessary to evaluate the effects of NP vs. PE-STBEVs on endothelial function.

**Funding/Acknowledgements:** This study has been funded by a Canadian Institutes of Health Research Foundation grant and by the generosity of the Stollery Children's Hospital Foundation and the Alberta Women's Health Foundation through the Women and Children's Health Research Institute. Dr. Villalobos-Labra is supported by a Molly Towell Perinatal Research Foundation Fellowship.

Flash Talk  
Session II, Room 3

## Wildfire Exposure During Pregnancy and the Risk of Adverse Birth Outcomes: A Systematic Review

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**Background:** Maternal wildfire exposure has been associated with poor birth outcomes with effects potentially mediated through air pollution and psychosocial stress. Despite the recent hike in the intensity and frequency of wildfires in some regions of the world, a critical appraisal of the evidence on the association between maternal wildfire exposure and adverse birth outcomes has not yet been undertaken. We conducted a systematic review that evaluated the scientific evidence on the association between wildfire exposure during pregnancy and the risk of adverse birth outcomes.

**Methods:** Comprehensive searches in nine bibliographic databases were conducted from database inception up to June 2020. Observational epidemiological studies that evaluated associations between exposure to wildfire during pregnancy and adverse birth outcomes were eligible for inclusion. Studies were assessed using the National Toxicology Program's Office of Health Assessment and Translation (NTP OHAT) risk of bias tool and certainty of evidence was assessed using the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) framework. Screening of retrieved articles, data extraction, and risk of bias assessment were performed by two independent reviewers. Study results were synthesized descriptively.

**Results:** Eight epidemiological studies conducted in four countries and involving 1,702,252 births were included in the review. The exposure to wildfire during pregnancy was assessed in individual studies by measurement of PM2.5 (n=2), PM10 (n=1), Total Ozone Mapping Spectrometer (TOMS) aerosol index (n=1), heat spots (n=1), and by proximity of maternal residence to wildfire-affected areas (n=3). There is some evidence indicating that maternal wildfire exposure associates with birth weight reduction (n=7, range: -4.8 gm per 1ug/m<sup>3</sup> increase in gestational average daily smoke exposure to -18.0 gm for overall exposure) and preterm birth (n=4), particularly when exposure to wildfire smoke occurred in late pregnancy. The association between wildfire exposure and small for gestational age (n=2) and infant mortality (n=1) was inconclusive.

**Conclusion:** Current evidence suggests that maternal exposure to wildfire during late pregnancy is linked to reduced birth weight and preterm birth. Well-designed comprehensive studies are needed to better understand the perinatal effects of wildfires.

**Funding:** This research has been funded by the generous supporters of the Lois Hole Hospital for Women through the Women and Children's Health Research Institute.

Flash Talk  
Session II, Room 3

## A CURRICULUM FOR TRAINING GENERAL SURGEONS TO PROVIDE ESSENTIAL OPERATIVE OBSTETRICAL CARE IN LOW-RESOURCE SETTINGS

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**Objective:** Interest in global surgery has dramatically increased in the past decade, particularly among resident trainees. The aim of this study is: (1) to describe the curriculum of existing global surgery fellowship programs offering competencies in obstetrics and gynecology and (2) to develop a curriculum to be incorporated into the Global Surgery and Acute Care Fellowship at the University of Alberta, the first of its kind in Canada.

**Methods:** A systematic review was conducted of PubMed, MEDLINE, and Embase for articles pertaining to fellowship training in OB/GYN that include global health competencies. A secondary review was conducted of relevant courses identified in the literature and the curriculum for training rural physicians in Canada. Utilizing these sources, a preliminary curriculum was developed and presented to an expert committee consisting of general surgeons, obstetricians, and physicians providing obstetrical and gynecologic care in rural Canada and LMICs (Angola and Kenya). Through consensus, a final curriculum was devised.

**Results:** The systematic review revealed 50 articles with 16 articles included in the full-text review, eight of which met our eligibility criteria. Eight courses were identified, five of which have publicly accessible course material. Following review by the expert committee, we propose a curriculum for a three-month period. Objectives on the fundamentals of global surgery are included relating to ethics, resource awareness, and continuous quality improvement. Core clinical objectives consist of cesarean sections, dilation & curettage, surgical management of ectopic pregnancies, and management of obstetrical complications. Supplementary objectives include point-of-care ultrasound, management of obstetrical medical conditions, communicable diseases in pregnancy, assisted vaginal delivery, and shoulder dystocia.

**Conclusion:** The proposed curriculum can serve as a model for providing obstetrical and gynecologic care in low resource settings. Future studies are required to evaluate the effectiveness and relevancy of this curriculum in the global health context and to develop a competency-based evaluation tool.

No sources of funding to acknowledge.

# Flash Talk

## Session II, Room 3

## IMPAIRED ENDOTHELIUM-DEPENDENT VASCULAR FUNCTION IN FEMALE MICE WITH A HISTORY OF A PREGNANCY COMPLICATED BY DYSLIPIDEMIA

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**Objective/Hypothesis:** Women that have experienced gestational dyslipidemia are at risk for developing cardiovascular disease (CVD) in later life. Gestational dyslipidemia is accompanied by maternal vascular dysfunction; however, whether this vascular dysfunction may persist postpartum is unclear. We hypothesized that gestational dyslipidemia leads to later-life vascular dysfunction.

**Methods:** Pregnant C57BL/6 mice were fed a high-cholesterol diet, or control diet, between gestational day (GD) 13.5 and term (GD19.5). After delivery, all females were on a control diet for 3 months postpartum (5-7 years in human age). Aortas were isolated to assess *ex vivo* vascular function by wire myography (n=7-11). Methacholine (MCh)-induced vascular responses were evaluated in presence/absence of oxidized LDL (oxLDL, a lipid involved in the pathogenesis of CVD) or L-NAME (nitric oxide synthase inhibitor), as well as responses to the nitric oxide donor sodium nitroprusside (SNP). Superoxide (oxidative stress marker) was evaluated in aortic sections by dihydroethidium staining (n=3-5). Data were analyzed using t-test or two-way ANOVA with Sidak's posthoc test;  $p < 0.05$  was considered statistically significant.

**Results:** Three months postpartum, exposure to a high-cholesterol diet during pregnancy reduced maximal MCh-induced vasodilation ( $p=0.001$ ) and nitric oxide contribution ( $p=0.036$ ) versus control diet females. Pre-incubation with oxLDL decreased maximal vasodilation to MCh compared to vessels without oxLDL ( $p=0.04$ ) in females that had been on a high-cholesterol diet in pregnancy, while no effects of oxLDL were found in control diet females. SNP-induced vasodilation was not different between groups. Compared to the control diet group, aortic superoxide levels tended to be increased ( $p=0.06$ ) three months postpartum after exposure to a high-cholesterol diet in pregnancy.

**Conclusion/Significance:** Gestational dyslipidemia impairs postpartum vascular function, potentially via increased vascular responsiveness to oxLDL and oxidative stress. Our study suggests that vascular dysfunction due to gestational dyslipidemia persists after pregnancy, which could play a key role in developing CVD later in life.

**Funding/Acknowledgements:** This study is supported by a Canadian Institute for Health Research (CIHR) Foundation Grant, and by the generosity of the Stollery Children's Hospital Foundation and the Alberta Women's Health Foundation through the Women and Children's Health Research Institute (WCHRI). TS holds WCHRI and CIHR-Banting postdoctoral fellowships.

Oral Presentation  
Session IV



## OPTIMIZING ANTENATAL CORTICOSTEROID ADMINISTRATION FOR WOMEN AT RISK OF PRETERM BIRTH: A QUALITY IMPROVEMENT PROJECT

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**Objective:** Preterm birth occurs in 8% of pregnancies in Canada. Administration of antenatal corticosteroids (ANCS) within 7 days of delivery significantly reduces adverse outcomes related to prematurity. This project aims to develop and implement a decision making tool to increase the percentage of infants born prematurely who receive ANCS within 7 days of delivery.

**Methods:** Evidence-based Practice for Improving Quality (EPIQ) methods were used to engage a multidisciplinary team to develop an evidence-based decision making tool to guide the administration of ANCS. The tool was implemented on labour and delivery, triage and antepartum wards at a tertiary care centre after educational presentations were offered to Obstetricians, Maternal Fetal Medicine Specialists, NICU, residents and nursing staff and feedback from these stakeholders was incorporated. The Plan-Do-Study-Act (PDSA) cycle was used as a template to evaluate the change in practice.

**Results:** PDSA cycles were completed from July 27-August 6, 2020, October 19-25, 2020 and February 1-7, 2021. In cycle 1, 66 patients were assessed, with 50% uptake of the tool and 6/11 patients who received ANCS delivered within 7 days of administration. Based on feedback, the data collection process was streamlined in cycle 2, where 23 patients were assessed, the tool was used in 57% of cases and 5/8 patients who received ANCS delivered within 7 days. In cycle 3, 15 cases were assessed and the tool was used in 33%. ANCS were prescribed appropriately for the one patient who delivered at <35 weeks and were held in all other cases.

**Conclusion:** The use of an evidence-based tool was effective in guiding decision making on whether to administer ANCS. The tool has been disseminated to community hospitals for broader implementation across the Edmonton zone.

**Funding:** This is an unfunded study.

# Oral Presentation

## Session IV

## RETROSPECTIVE ANALYSIS OF SATISFACTION, QUALITY OF LIFE, AND PERIOPERATIVE COMPLICATIONS IN A COHORT OF WOMEN UNDERGOING LAPAROSCOPIC SACROCOLPOPEXY USING AN ULTRA-LIGHTWEIGHT POLYPROPYLENE MESH (ULWPM).

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**Objective/Hypothesis:** Sacrocolpopexy is the gold standard for treating vault prolapse, traditionally done abdominally. Early data from minimally invasive laparoscopic sacrocolpopexy (LSC) has been promising, though few studies have examined the effect of concurrent hysterectomy on rates of mesh erosion and other outcomes of interest in the era of ULWPM. Our study determines postoperative satisfaction, quality of life, and rates of peri-operative complication in a cohort of women undergoing LSC with an ULWPM, with and without concurrent hysterectomy. We hypothesized comparable perioperative complications, improved postoperative quality of life, and no significant differences in mesh erosion between groups. We will contribute to the growing evidence that LSC is a safe and effective management option for vault prolapse.

**Methods:** Retrospective cohort study on 93 patients who underwent LSC with, and without concurrent hysterectomy between August 2018 and June 2020. Primary outcomes were overall satisfaction (visual analog scale), surgical complications including mesh erosion, and change in quality of life using Pelvic Floor Impact Questionnaire short form (PFIQ-7). All variables were reported as median (IQR) for continuous, and n (%) for categorical. Groups of categorical variables were tested using chi-square tests, and continuous using Kruskal-Wallis tests with  $p < 0.05$ .

**Results:** 93 total patients were analyzed (27 LSC only, 66 LSC with concurrent hysterectomy). No significant differences were found in baseline and outcomes between groups. Overall satisfaction was high (Median: 10, 8 to 10) with intraoperative and postoperative complication rates of 5.4% (4.3% bladder/ureter, 1.1% bowel) and 11.8% (5.4% urinary, 4.3% infection, 2.2% bowel, and 1.1% prolapse recurrence), respectively. There was no mesh erosion at the 6-week postoperative visit. General quality of life (PFIQ-7) improved post procedure (Median -67; -114.3 to -23.8).

**Conclusion/Significance:** LSC appears to be a safe and efficacious procedure in the treatment of vault prolapse, and concurrent hysterectomy did not increase the risk of complications.

**Funding/Acknowledgements:** WCHRI grant

Oral Presentation  
Session IV

## DEMOGRAPHIC RISK FACTORS ASSOCIATED WITH PRENATAL HEPATITIS C (HCV) INFECTIONS IN ALBERTA

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**Objective/Hypothesis:** Hepatitis C (HCV) is a virus that can be transmitted from mother to infant during pregnancy and cause severe liver disease. While there are defined risk behaviors to screen pregnant women for HCV, epidemiological associations between demographic risk factors and HCV infectivity in prenatal women have not been investigated provincially. We aimed to identify the associations between age, geographic region, and co-infection status with prenatal HCV positivity in Alberta.

**Methods:** Starting February 27, 2020, all prenatal women in Alberta were screened for HCV as part of a pilot universal screening program. Demographic data was collected from prenatal patients and uploaded into Alberta Precision Laboratories Information System (LIS) with corresponding test results. Information on prenatal women (n=44,621) testing positive for HCV after ten months of universal screening (n=44) was extracted from the LIS for analysis. Multivariable logistic regression was used to determine the association between demographic variables (age, geographic region, and co-infection with hepatitis B (HBV), human immunodeficiency virus (HIV), syphilis) and HCV prenatal positivity.

**Results:** No significant association was observed between age and prenatal HCV positivity (AOR 1.05, p=0.113). Prenatal patients from northern and southern rural regions were significantly more likely to be positive for HCV compared to patients from the Edmonton metropolitan region (AOR 6.21 p=0.001 and AOR 5.82 p=0.01, respectively) and Calgary metropolitan region (AOR 3.87 p=0.007, AOR 3.63 p=0.04, respectively). Those infected with syphilis were significantly more likely to be HCV positive compared to prenatal patients without syphilis (AOR 21.82, p<0.001). No co-infections with prenatal HCV and either HBV or HIV were detected.

**Conclusion/Significance:** Geographic region and syphilis co-infection are important risk factors for prenatal HCV positivity and should be considered when screening pregnant women in Alberta. Universal screening initiatives could lead to increased diagnosis of prenatal HCV infections and overall reduction in long-term liver complications.

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Oral Presentation  
Session IV

## **DEVELOPMENT OF A PHYSIOLOGICALLY ORIENTED PLACENTA ORGANOID MODEL** Development of a Physiologically Oriented Placenta Organoid Model

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**Introduction:** Organoids are novel 3D models representing the micro-anatomy of an organ allowing for the study of complex cellular interactions. The discovery of human trophoblast stem cells (TSC) in 2018 led to rapid development of placental trophoblast organoids that allow for studies of early placental development. These placental organoids are capable of forming the syncytiotrophoblast (ST) and progenitor cytotrophoblasts (pCTs), however, develop inside out with a ST cystic core surrounded by pCTs. We propose to use microcarrier technology to develop a 3D placental organoid model that forms with a physiologically oriented surface ST.

**Methods:** Trophoblasts isolated from human 1<sup>st</sup> trimester placenta were cultured with microcarriers in defined trophoblast organoid medium under rotation to establish cell attachment and growth. Organoids were fixed and cellular composition was examined by immunofluorescence for trophoblast lineage markers. Growth was monitored with microscopy.

**Results:** Placental organoids formed villous structures that grow rapidly from days 1 to 4. 60-75% of cells stain positive for villous trophoblast lineage markers (E-cadherin, GATA-3, p63). Multinucleated hCG positive ST developed at tips of villous structures after 2 days of culture and are supported by columns of heterogeneous and proliferative CTs. Organoids were passaged after 5 days to prevent overgrowth and could repopulate new microcarriers.

**Conclusions:** Our placental organoid model is the first 3D *in vitro* model that forms with physiologically oriented ST supported by underlying pCTs. Interestingly, our model develops villous like structures that rapidly grow into large clusters of hCG positive cells. Future work includes RNA Seq to compare genetic signature to placental villi and other placental organoids. Further, organoids need to be assessed for their bi-potential lineage development to establish if they contain TSC. This unique model will be used in the future to study placental villi and ST formation, and additionally, how dynamics of pCT populations contribute to the development of placental pathologies.

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Oral Presentation  
Session IV