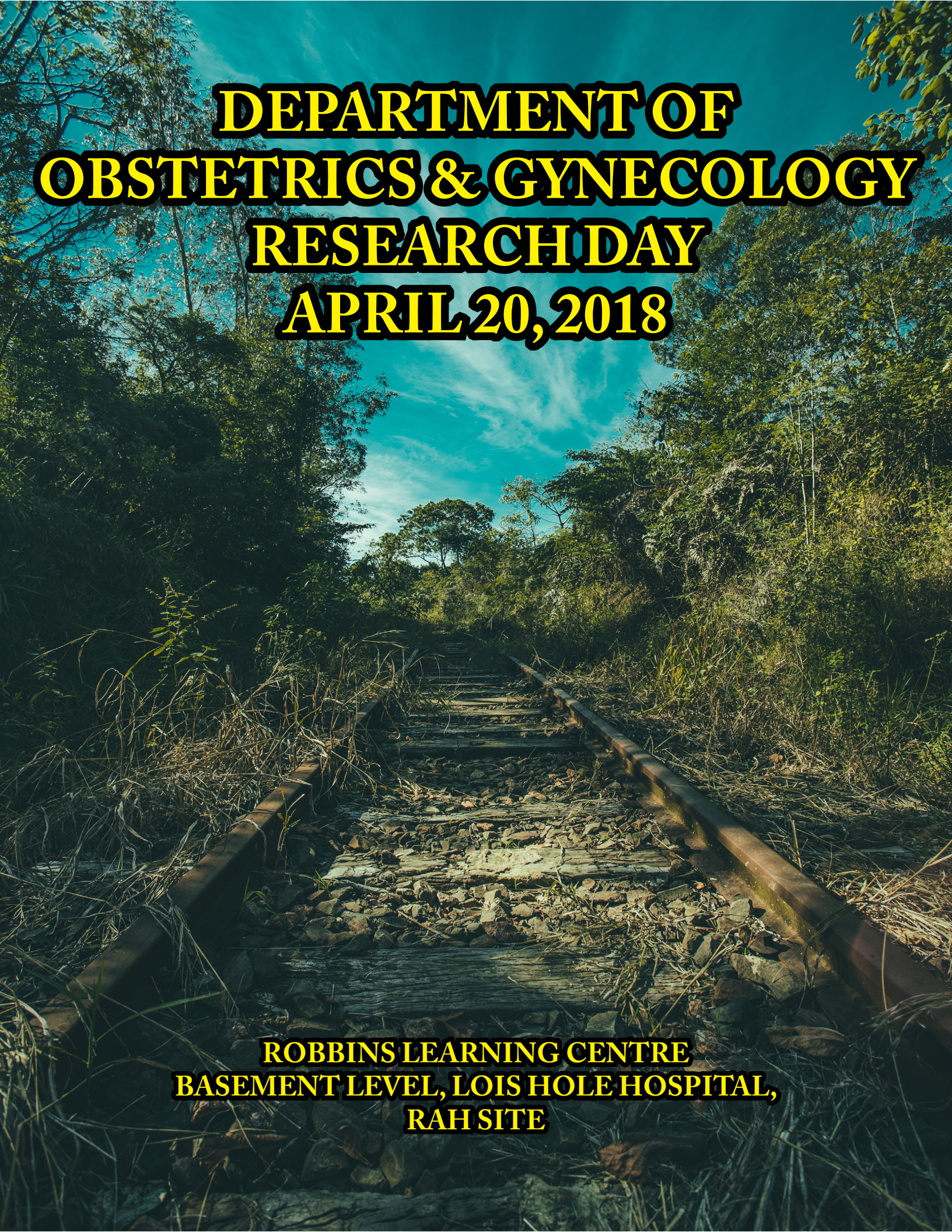
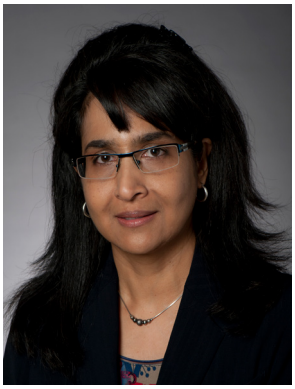


DEPARTMENT OF OBSTETRICS & GYNECOLOGY RESEARCH DAY

APRIL 20, 2018

ROBBINS LEARNING CENTRE
BASEMENT LEVEL, LOIS HOLE HOSPITAL,
RAH SITE

Chair's Welcome



On behalf of the Department of Obstetrics and Gynecology, welcome to our 31st Annual Department Research Day 2018! We look forward to this opportunity for our residents, graduate students, fellows and their supervisors to share their research with our department.

We are very pleased this year to welcome our Visiting Professor, Michael A. Belfort, MD, PhD, who is Chair of the Department of Obstetrics and Gynecology at Baylor College of Medicine (BCM), and a very accomplished clinician and medical researcher. We are very fortunate to have him join us this year and share his expertise and experience

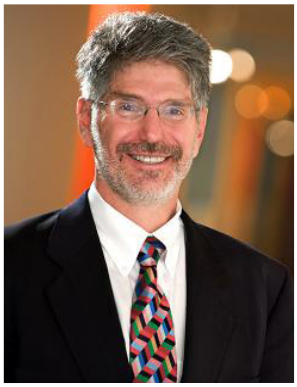
"The measure of greatness in a scientific idea is the extent to which it stimulates thought and opens up new lines of research."
— *Paul A.M. Dirac*

Acknowledgements

We would like to thank the co-chair moderators, judges, and committee members for their help in making the 31st Annual Research Day a success.

Maria Ospina	Tamara Sáez
Radha Chari	Mackenzie Coatham
Ginevra Mills	Christa Aubrey
Arielle Cantor	Jonathan Tankel
Sandra Davidge	Jesus Serrano-Lomelin
Laura KarisAllen	Peter Mitchell
Lorin Charlton	Allison Thiele
Michael Belfort	Christy-Lynn Cooke
Denise Hemmings	Sue Ross

J. Ross Vant Visiting Professor



Dr. Michael A. Belfort is Professor and Chairman of the Department of Obstetrics and Gynecology at Baylor College of Medicine, in Houston, Texas, and Obstetrician and Gynecologist-in-Chief at Texas Children's Hospital, in Houston. He is also a Clinical Adjunct Professor of Obstetrics and Gynecology at Stanford University in Palo Alto, California. He is Co-Director of the Perinatal Surgery Fellowship at Baylor College of Medicine – this is a quaternary training program that cross-trains MFM physicians and Pediatric Surgeons in Fetal Surgery.

Dr. Belfort trained as a physician in South Africa and did his first Ob/Gyn residency there. He then immigrated to the US and did his second Ob/Gyn residency and MFM Fellowship at Baylor College of Medicine in Houston, Texas. He is Board certified in Obstetrics and Gynecology and Maternal and Fetal Medicine in the United States and holds certificates of specialization in Obstetrics and Gynecology in South Africa, the United Kingdom and Canada. He has a PhD from the Karolinska Institute in Sweden which he earned as part of an exchange program that Dr. Michael Debakey set up in the 1990's. His areas of research and special interest are in Fetal Medicine and Surgery, Critical Care Maternal Medicine, the surgical management of placenta percreta, and most recently in systems development to reduce maternal mortality and improve maternal health in low resource environments. He is a great proponent of developing sustainable global education programs and along with his colleagues at Texas Children's Hospital and Baylor College of Medicine he is working hard to expand his Department's footprint in Malawi and Liberia in Africa, as well as in Shanghai, Beijing and Chongqing in China.

Dr. Belfort has more than 270 peer-reviewed publications in his areas of interest. He has co-authored books on Critical Care Obstetrics, Hypertension in Pregnancy, and Preeclampsia, and Algorithms in obstetric management.

Dr. Belfort serves on the Editorial Boards for The British Journal of Obstetrics and Gynaecology and Gynecologic and Obstetric Investigation. He was a Co-Editor of the Journal of Hypertension in Pregnancy for many years.

Dr. Belfort holds two patents, one for a drain used in the management of malignant ascites in ovarian cancer, and a second, which is a US Provisional Patent for a tamponade balloon system used in the management of postpartum hemorrhage.

For fun Dr. Belfort enjoys aviation and holds a fixed-wing commercial pilot's license and private pilot helicopter license. He enjoys flying the Texas coastline in the airplane on weekends with his wife Joanne. No-one in his family will fly with him in a helicopter!

Presentation Schedule

8.45-9.00	**Dr. Radha Chari** **Department Chair**	**Opening Remarks**	
SESSION I		**ORAL PRESENTATIONS - Robbins Auditorium** **Co-Chaired by Maria Ospina and Tamara Sáez**	**Page**
9.00-9.15	**Fahrin Rawji,** **Allison Edwards,** *M Yaskina, S Ross*	Creating Cost-Conscious Residents in Obstetrics and Gynecology: A Randomised Controlled Trial	27
9.15-9.30	**Yuliya Fakhr,** *M Mackova,* *DG Hemmings*	Sphingolipid and Inflammation Interplay in Placental Barrier Development	16
9.30-9.45	**Mon Tun,** *M Paulden, R Chari,* *P Kaul,* *A Kozyrskyj*	Is Induction of Labour (IOL) Associated with Emergency Caesarean Section (CS) in an Alberta Term Nulliparous Birth Cohort?	33
9.45-10.00	**Olena Bilyk,** *L Lee, ND Le,* *L Cook, M Koebel,* *L-M Postovit*	Embryonic Protein Nodal as a Novel Marker of Progression and Drug Resistance of Ovarian Cancer	10
10.00-10.15	**MORNING BREAK**		
SESSION II		**ORAL PRESENTATIONS - Robbins Auditorium** **Co-Chaired by Radha Chari and Mackenzie Coatham**	**Page**
10.15-10.30	**Esha Ganguly,** *JS Morton,* *R Kirschenman,* *CL Cooke, P Case,* *ST Davidge*	Treating the Placenta with a Nanoparticle-Linked Antioxidant to Improve Pregnancy Outcomes in a Rat Model of Fetal Hypoxia	18
10.30-10.45	**Priscilla Frenette,** *S Crawford,* *J Schulz,* *MB Ospina*	Impact of Episiotomy during Operative Vaginal Delivery on Risk of Obstetrical Anal Sphincter Injuries (OASIS) in Alberta	17
10.45-11.00	**Huachen Chen,** *K Vincent, Z Xu,* *L-M Postovit, Y Fu*	ZIC2 is a Cancer Stem Cell Regulator in Epithelial Ovarian Cancer	12

Presentation Schedule

SESSION III		POSTERS - Auditorium, Classroom 1, and Classroom 3 (CONCURRENT)	
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11.15-11.25	**Dana Rivet,** *S Ross, H Robinson*	Contraception Use and Attitudes Among Women Seeking Pregnancy Termination	28
11.25-11.35	**Nayara Lopes,** *J Robbins, X Fang, E Falkenberg, GA Metz, D Olson*	Paternal Transmission of Prenatal Maternal Stress - Research Proposal	24
11.35-11.45	**Kate Greeff, J Mateshaytis**, *J Tankel*	An Alphanumeric Paging System; A Quality Improvement Project	19
11.45-11.55	**Sana Amjad,** *A Osornio-Vargas, S Chandra, D Voaklander, J Serrano-Lomelin, MB Ospina*	Sociodemographic Characteristics and Obstetric and Neonatal Outcomes of Adolescent Mothers in Alberta	9
Classroom 1		**Co-Chaired by Christy-Lynn Cooke and Christa Aubrey**	**Page**
11.05-11.15	**Alicia Long,** *C Williams, H Noga, C Allaire, M Bedaiwy, S Lisonkova, P Yong*	East/South East Asian Ethnicity and Moderate-to-Severe Endometriosis	23
11.15-11.25	**Helen Yang,** *S Ross, V Capstick*	Does Cost Influence the Choice of Disposable vs Reusable Instruments? Survey of Obstetrician/Gynecologists	34
11.25-11.35	**Tamara Sáez,** *F Spaans, J Morton, ST Davidge*	Role of OX LDL in Human Umbilical Vein Endothelial Cells from Preeclamptic Pregnancies	29
11.35-11.45	**Julia Parkman,** *L Hornberger, E Jaeggi, B Cuneo, J Fouron, J Huhta, E Silverman, N Silverman*	Multi-Centre Study on the Impact of Transplacental Fetal Treatment with Steroid and Immunoglobulin on Early- and Late-Onset Immune Mediated Fetal Complications	26

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Poster presentations continued			Page
11.45-11.55	**Bahareh Hamedi** *O Bilyk, Y Fu, L-M Postovit*	PARP Inhibitors' Effect on the Expression of Homologous Recombination DNA Damage Response Genes in BRCA-Mutant vs Wild-Type Ovarian Cancer Stem Cells	21

Classroom 3		**Co-Chaired by Sue Ross and Arielle Cantor**	**Page**
11.05-11.15	**Jesus Serrano-Lomelin**, *R Chari, S Crawford, A Hicks, D Johnson, A Osornio-Vargas, MB Ospina*	Early Childhood Respiratory Morbidity and Health Services Utilization in Children Born Preterm	30
11.15-11.25	**Mais Aljunaidy,** *J Morton, T Phillips, C Case, C Cooke, ST Davidge*	Effect of Placental-Derived Factors on Fetal Cardiomyocyte Development in a Rat Model of Prenatal Hypoxia	8
11.25-11.35	**Allison Edwards,** *J Sabourin*	Does a Structured Formative Feedback System Improve Learner Perception of the Obstetrics and Gynecology Clerkship?	15
11.35-11.45	**Kesia Dias,** *D Hemmings*	The Role of Inflammation Mediated By TNF□ on the S1P Pathway in Preeclamptic Pregnancies	14
11.45-11.55	**Aisling Young,** *L Hornberger, E Tham, M Noga, K Haberer, A McBrien*	Prenatal Detection, Comorbidities and Management of Vascular Rings: A 15-Year Regional Study	35

12.00-1.00 **LUNCH BREAK**

Session IV		**PLENARY LECTURE-Robbins Auditorium** **Chair – Jonathan Tankel**
1.00-2.00	**Dr. Michael Belfort, Baylor College of Medicine**	Management of Placenta Accreta

Presentation Schedule

SESSION V		ORAL PRESENTATIONS - Robbins Auditorium Co-Chaired by Sandra Davidge and Jesus Serrano-Lomelin	Page
2.00-2.15	**Mackenzie Coatham,** *M Koebel, C-H Lee, L-M Postovit*	Linking Chromatin Remodeling Protein Deficiencies to Aggressive Dedifferentiated Endometrial Cancer	13
2.15-2.30	**Deliwe Ngwezi,** *L Hornberger, J Serrano-Lomelin, C Nielsen, D Fruitman, A Osornio-Varga***s**	Maternal Exposures to Developmental Toxicants and Socio-Economic Status on the Development of Congenital Heart Disease in Alberta	25
2.30-2.45	**Kristin Black,** *I MacDonald, T Chambers, MB Ospina*	Prevalence of Postpartum Mental Health Disorders Among Indigenous Women: A Systematic Review	11
2.45-3.10	**Photos/Afternoon Break**		

SESSION VI		ORAL PRESENTATIONS - Robbins Auditorium Co-Chaired by Jonathan Tankel and Laura KarisAllen	Page
3.10-3.25	**Kim Haberer,** *A McBrien, A Young, L Eckersley, T Colen, W Savard, LK Hornberger*	Early Fetal Echocardiography: Diagnoses and Outcomes	20
3.25-3.40	**Brad Sullivan,** *X Thompson, P Mathura, A Wong, J Crawford, C Salguero, J Tankel, A Fuezery, V Jain, W Sia*	Reducing Excessive Lab Ordering for Preeclampsia Bloodwork: A Quality Improvement	32
3.40-3.55	**Floortje Spaans,** *JS Morton, R Kirschenman, T Sawamura, ST Davidge*	Pregnancy Outcomes and Vascular Function in Lectin-like Oxidized LDL Receptor-1 Knockout Mice	31

Presentation Schedule

Concluding Session		**Robbins Auditorium**
3.55-4.10	**Dr. Sandra Davidge WCHRI**	
4.10-4.15	**Dr. Radha Chari & Dr. Christy-Lynn Cooke Closing Remarks**	
4.15-4.30	**Chief Resident Farewell**	
4.30-6.00	**Wine Reception Awards Ceremony**	**Robbins Learning Centre Lobby**

poster

EFFECT OF PLACENTAL-DERIVED FACTORS ON FETAL CARDIOMYOCYTE DEVELOPMENT IN A RAT MODEL OF PRENATAL HYPOXIA

Mais Aljunaidy*[1,2,3], JS Morton[1,3], T Phillips[4], CP Case[4], CL Cooke[1,3], and ST Davidge[1,2,3]
[1]Department of Obstetrics and Gynecology, University of Alberta
[2]Department of Physiology, University of Alberta
[3]Women and Children's Health Research Institute, University of Alberta
[4]Musculoskeletal Research Unit, University of Bristol

Objective:
Hypoxia is a common feature of pregnancy complications leading to placental oxidative stress and cardiac dysfunction in offspring. Loading the mitochondrial antioxidant MitoQ onto nanoparticles (nMitoQ) restricts nMitoQ to the placenta and prevents potential off-target effects on the fetus. We have previously shown that placental-conditioned media from nMitoQ-treated hypoxic dams improved fetal neuronal development. We hypothesized that placental oxidative stress will lead to secretion of factors that will alter fetal cardiomyocyte development and this will be prevented by nMitoQ treatment.

Methods:
Pregnant rats were intravenously injected with nMitoQ (125 μM) or saline on gestational day (GD)15. Rats were further subdivided into two groups exposed to hypoxia (11% O2) or normoxia (21% O2) from GD15-21 (term; 22 days). On GD21, placental cultured media was prepared and used to assess the effect of placental secreted factors on normal cardiomyocyte growth in male and female fetuses separately. Dihydrodichlorofluorescein (DCF), hematoxylin & eosin staining and enzyme-linked immunosorbent assay (ELISA) were used to assess placental oxidative stress, structure and inflammatory factor secretion respectively.

Results:
Hypoxia increased oxidative stress in both male and female placentas, which was prevented by nMitoQ: male (hypoxia/saline: 0.43±0.13 arbitrary units (a.u.), hypoxia/nMitoQ: 8.56±1.85 a.u.; $P<0.001$) and female (hypoxia/saline: 0.43±0.19 a.u., hypoxia/nMitoQ 6.93±2.09 a.u.; $P<0.01$). Neither hypoxia nor nMitoQ altered total placental labyrinth or junctional areas in male or female fetuses. Levels of placental-derived inflammatory factors were not altered by hypoxia or nMitoQ and placental cultured media did not affect cardiomyocyte development

Conclusions:
Hypoxia induced placental oxidative stress without altering placental structure in male and female offspring. nMitoQ treatment reduced placental oxidative stress in both sexes. Contrary to our hypothesis, factors released from hypoxic placentas did not alter normal cardiomyocyte growth or maturation, therefore, further studies are needed to understand the link between placental oxidative stress and abnormal cardiomyocyte development in hypoxic pregnancies

poster

poster

SOCIODEMOGRAPHIC CHARACTERISTICS AND OBSTETRIC AND NEONATAL OUTCOMES OF ADOLESCENT MOTHERS IN ALBERTA

Sana Amjad*[1], A Osornio-Vargas[2], S Chandra[3], D Voaklander[1], J Serrano-Lomelin[3], MB Ospina[1,3]
[1]School of Public Health, University of Alberta
[2]Department of Pediatrics, University of Alberta
[3]Department of Obstetrics and Gynecology, University of Alberta

Objective:
Teen pregnancy is a significant public health issue in Canada. We present a descriptive analysis of the sociodemographic characteristics, obstetric and neonatal outcomes of teenage mothers in Alberta.

Methods:
The study population consisted of all pregnant women aged 15-19 years who gave singleton live births between April 1, 2010 to March 31, 2015 in Alberta. Administrative health data from the Alberta Perinatal Health Program, Alberta Health Care Insurance Plan and the Pampalon Material Deprivation Index Dataset was used to obtain information on socioeconomic status (SES), area of residence, and obstetric and perinatal outcomes.

Results:
A total of 9,606 mothers (mean age=18 years) were included in the analysis. Of these, 23% lived in rural and 77% lived in urban areas. About 40% of adolescents fell in the lowest SES quintile, 44% smoked, 6% were drug dependent and 8% used alcohol sometime during their pregnancy. Majority of teens received antenatal care (47%) and delivery services (52%) through family practice. The proportion of mothers who had labor induction, spontaneous vaginal delivery, operative vaginal delivery (suction/forceps) and cesarean section was 30%, 70%, 14%, and 17% respectively. Almost 7% of the total births were preterm, 9% were large for gestational age and 10% were small for gestational age. Overall, the rate of poor obstetric and neonatal outcomes was higher among teens from urban and low SES groups.

Conclusion:
Urban residence and low SES seem to be linked with poor pregnancy outcomes in teenage mothers. Multivariate analyses are needed to further explore these associations.

poster

oral

EMBRYONIC PROTEIN NODAL AS A NOVEL MARKER OF PROGRESSION AND DRUG RESISTANCE OF OVARIAN CANCER

Olena Bilyk*[1], L Lee[1], ND Le[2], L Cook[3], M Koebel[4], LM Postovit[1,5]
[1]Department of Oncology and Women and Children's Health Research Institute, University of Alberta
[2]British Columbia Cancer Research Centre
[3]Department of Internal Medicine, University of New Mexico
[4]Arnie Charbonneau Cancer Institute, University of Calgary
[5]Department of Obstetrics and Gynecology and Women and Children's Health Research Institute, University of Alberta

Objective:
Cancer cells can exploit normally dormant embryonic stem cell pathways to promote cancer progression and metastasis. Studying embryonic signaling pathways in aggressive cancer has led to the discovery of the re-expression of the embryonic protein Nodal. Nodal, an embryonic morphogen belonging to the TGF-β superfamily of secreted signalling factors, maintains pluripotency and cell plasticity of human embryonic stem cells. In many cancers Nodal signalling promotes tumor growth and metastasis. *The objective of this study is to investigate the role of Nodal in ovarian cancer (OC) cell plasticity, progression and resistance to platinum/taxol chemotherapy.*

Methods:
We applied bioinformatics approach and RNA sequencing to explore the impact of Nodal on biological processes in OC cells and disease outcome. In vitro assays designed to assess growth, stem cell like phenotypes and chemoresistance in OC cell line A2780s wherein Nodal was added with Nodal expression construct, or knockout with CRISP/Cas9 genome editing were conducted. IHC staining to evaluate Nodal expression in high-grade serous OC (HGSOC) tissue microarrays was done.

Results:
We discovered that Nodal induces transcriptional reprogramming in OC cells via altering immune response, metabolism and drug resistance gene expression. In vitro, we showed that OC cells overexpressing Nodal characterized by increased resistance to cytostatic drugs, tumorigenicity and cell plasticity (partial EMT and stem cell-like phenotype). The results of analysis of TCGA microarray data and IHC of microarrays of different histotypes of OC (OVAL BC cohort) showed the significant association of Nodal expression with HGSOC. Survival analysis determined that Nodal predicts poor overall and progression-free survival in HGSOC patients.

Conclusion:
Nodal predicts poor survival in high-grade serous OC patients and likely drives tumorigenic potential and resistance to platinum in OC cells by promoting cancer stem cell plasticity and upregulating target genes involved in immune response, drug resistance and metabolism, and may hold promise as a therapeutic target to prevent OC recurrence.

oral

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PREVALENCE OF POSTPARTUM MENTAL HEALTH DISORDERS AMONG INDIGENOUS WOMEN: A SYSTEMATIC REVIEW

Kristin Black*[1], I MacDonald[1], T Chambers[2], MB Ospina[1]
[1]Department of Obstetrics and Gynecology, and Women's and Children's Health Research Institute, University of Alberta
[2]John W. Scott Library, University of Alberta

Objective:
Women in the postpartum period have an increased risk for mental health disorders (e.g., postpartum depression [PPD], anxiety, and psychosis) that carry significant long-term sequelae. Little is known about the prevalence of these disorders in Indigenous women. This systematic review evaluated the prevalence of selected postpartum mental health disorders in Indigenous women.

Methods:
Comprehensive searches of biomedical electronic databases were conducted to identify epidemiological studies that evaluated postpartum mental health disorders prevalence in Indigenous women. Two reviewers independently assessed study eligibility and evaluated quality using the Hoy et al. critical appraisal tool. Pooled prevalence odds ratios (pOR) and 95% confidence intervals (CI) were calculated in a random-effects model. Subgroup analyses by Indigenous groups were conducted.

Results:
From 98 potentially relevant studies, 7 were included in the review. Ethnicities studied were Native Americans (n=3), Maori (n=2), Aboriginal Australians (n=1) and Indigenous Canadians (n=1, with no comparative data with a reference group). All studies evaluated PPD. Meta-analysis of 6 studies showed that Indigenous women were more likely to report PPD compared to non-Indigenous women (pOR: 2.02, 95% CI 1.35, 3.03). Results for Indigenous subgroups were: Maoris pOR: 2.07, 95% CI 1.68, 2.55), Native Americans pOR: 1.83, 95% CI: 1.05, 3.19, and Aboriginal Australians OR 11.3 (0.98, 126.68).

Conclusions:
A gap in PPD between Indigenous and non-Indigenous women exist in a variety of settings and countries. The knowledge gap for Indigenous Canadians is huge. Further evidence-based investigations should be conducted to address these postpartum mental health inequalities and identify areas for intervention.

oral

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ZIC2 IS A CANCER STEM CELL REGULATOR IN EPITHELIAL OVARIAN CANCER

Huanchen Chen*, K Vincent, Z Xu, LM Postovit, YX Fu
Department of Obstetrics and Gynecology, Faculty of Medicine and Dentistry, University of Alberta

Objectives:
Current regimens are ineffective against epithelial ovarian cancer (EOC) due to disease recurrence and acquired chemoresistance driven by cancer stem cells (CSCs). Transcription factor ZIC2 has been shown to regulate CSC phenotype in several types of cancer. The objective of this project is to determine the relation between ZIC2 and CSC phenotypes in EOC.

Methods:
The correlation between survival of EOC patients and ZIC2 expression was analyzed using The Cancer Genome Atlas database. ZIC2 and Oct4 (a pluripotency factor) expression was examined in a panel of EOC cell lines. ZIC2 knockout and overexpression models were obtained by CRISPR/cas9 gene editing and stable transfection. Immunoblotting were used for OCT4 and ALDH1A1 expression. Immunofluorescence, ALDEFLUORTM assay and sphere formation assay were used to determine the CSC subpopulation and self-renewal capacity of CSCs in EOC cells.

Results:
The overall survival curve shows that higher ZIC2 expression is associated with shorter EOC patient survival. ZIC2 is positively correlated with Oct4 expression in the panel of EOC cell lines. The ZIC2 knockout decreased, whereas ZIC2 overexpression increased, the expression of stemness-associated genes in EOC cells. ZIC2 knockout decreased ALDH1A1 expression and ALDH1+ population in EOC cells. Functionally, ZIC2 knockout impaired the capacity to grow and form colonies of EOC cells. Importantly, ZIC2 knockout dramatically decreased the ability to form spheres of EOC cells.

Conclusion:
Our work indicates that ZIC2 is a potential CSC regulator in EOC. In vivo work is required to further characterize the function of ZIC2 in EOC.

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LINKING CHROMATIN REMODELING PROTEIN DEFICIENCIES TO AGGRESSIVE DEDIFFERENTIATED ENDOMETRIAL CANCER

Mackenzie Coatham*[1], M Koebel[2], CH Lee[4,5], LM Postovit[5,6].
[1]Department of Obstetrics and Gynecology, University of Alberta
[2]Department of Pathology and Laboratory Medicine,Calgary Laboratory Services, University of Calgary
[4]Department of Laboratory Medicine and Pathology, University of Alberta/Royal Alexandra Hospital
[5]Department of Pathology and Laboratory Medicine, University of British Columbia
[5]Department of Oncology, University of Alberta
[6]Department of Anatomy and Cell Biology, University of Western Ontario

Objective:
One of the most lethal subsets of uterine cancer is dedifferentiated endometrial carcinoma (DDEC). DDEC tumors possess both well-differentiated and undifferentiated regions. The majority of metastatic disease is made up of cells from the undifferentiated component of DDEC yet it is unclear how these poorly differentiated regions are initiated and sustained. Examining the well-differentiated and undifferentiated components of DDEC tumors, 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 the 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:
SMARCA4-deficient or ARID1A/B co-deficient endometrial cancer cell line models were generated by CRISPR and validated using immunohistochemistry. qRT-PCR and immunoblotting were used to assess the level of expression of markers of epithelial-to-mesenchymal transition (EMT), stemness and endometrial lineage. The ability of the generated knockouts to proliferate and form spheres was evaluated and tumor formation in immune-compromised mice was monitored to ascertain any histological differences between wildtype and SMARCA4 or ARID1A/B knockout endometrial cancer cells.

Results & Conclusions:
SMARCA4 deficient endometrial cancer cell lines have been shown to partially undergo EMT. Cells lacking SMARCA4 also formed less vascularized tumors of a mixed phenotype at a slower rate. Determining the extent to which loss of SMARCA4 or ARID1A/B contributes to the acquisition of DDEC is a critical step towards improving treatment practices for aggressive forms of gynecological cancers.

oral

poster

THE ROLE OF INFLAMMATION MEDIATED BY TNF-α ON THE S1P PATHWAY IN PREECLAMPTIC PREGNANCIES

Kesia Dias*, DG Hemmings
Department Obstetrics and Gynecology, and Women and Children's Health Research Institute, University of Alberta

Introduction:
Preeclampsia can lead to placental artery constriction, contributing to intrauterine growth restriction. The bioactive lipid, sphingosine 1-phosphate (S1P) regulates vascular tone through differential effects on endothelial (dilation) versus vascular smooth muscle receptors (constriction). Tumor necrosis factor-alpha (TNF-α), an inflammatory cytokine, is increased in preeclampsia and can increase vasoconstriction in other conditions. We hypothesize that TNF-α stimulates production of S1P that will leak through the endothelial barrier and generate vasoconstriction with a greater effect in placentas from women with preeclampsia.

Methods:
Chorionic plate arteries from normal human placentas were dissected, and pressurized on a pressure myograph (n=1-4). S1P (0.1 mM), TNF-α (10ug/ml) and/or N(ω)-nitro-L-arginine methyl ester (L-NAME; 0.1M) were infused inside the arteries or added to the bath. Percent constriction was calculated from vessel diameters.

Results to Date:
Infused TNF-α induces dilation; however, infusion in the presence of L-NAME to inhibit production of the potent dilator, nitric oxide, results in constriction (-10.8±3.06% vs 19.0±5.81%, respectively). No effect is observed when TNF-α is added to the bath (-4.81±1.51). Infused or added S1P induces dilation (-11.0% vs -8.70%±1.07, respectively)..

Value of Research:
TNF-α may induce overall dilation through nitric oxide under normal conditions that is in contrast to the overall constriction effect published using other vessel types. We hypothesize that this occurs through activation of S1P which we are now testing using inhibitors. Importantly, when the ability to produce nitric oxide is reduced, as is found in preeclamptic pregnancies, TNF-α could result in overall constriction. We will test this in placentas from women with preeclampsia.

poster

poster

DOES A STRUCTURED FORMATIVE FEEDBACK SYSTEM IMPROVE LEARNER PERCEPTION OF THE OBSTETRICS AND GYNECOLOGY CLERKSHIP?

Allison Edwards*, J Sabourin
Department of Obstetrics and Gynecology, University of Alberta

Objective:
Medical students are more likely to pursue specialty training in fields they perceived positively during their training. This can be influenced by their satisfaction with feedback during a rotation. We investigated whether a structured formative feedback system would improve learner perception of the Obstetrics and Gynecology clerkship.

Methods:
This prospective cohort study included medical students from the Class of 2017 (control cohort) and 2018 (intervention cohort). A formative feedback system was introduced to Obstetrics and Gynecology rotations for the Class of 2018. It consisted of a set of electronic forms asking for strengths and requirements for improvement in the student's assessment of a patient with a particular presenting complaint. Students were invited to complete a survey about their overall rotation experience in their final year of training which used Likert scales. The primary outcome was the proportion of students who reported a positive experience during their rotation. Chi-squared analysis was used to compare the proportion of positive responses between each group.

Results:
190 students responded to the survey. 65/87 students (74.7%) and 72/103 (70.6%) students reported a positive experience on their rotation (good, very good or excellent) in the intervention and control cohorts respectively (p=0.5). 27/83 (31.0%) of students felt the system positively influenced their rotation.

Conclusion:
Obstetrics and Gynecology is a unique rotation for medial students which can highly influence their aspirations for training. This research has identified that improving learner perception of their rotation will likely need to address multiple factors beyond dissemination of feedback.

poster

oral

SPHINGOLIPID AND INFLAMMATION INTERPLAY IN PLACENTAL BARRIER DEVELOPMENT

Yuliya Fakhr*, M Mackova, DG Hemmings
Department of Obstetrics and Gynecology, and Women and Children's Health Research Institute, University of Alberta

Objectives:
Tumor Necrosis Factor-α (TNF-α), an inflammatory cytokine, is elevated in placentas of mothers with preeclampsia (PE). TNF-α increases apoptosis in trophoblasts, that regulate nutrient transfer and barrier function. TNF-α could be doing this by signalling through S1P, a bioactive sphingolipid. S1PR2, a receptor involved in apoptosis in other cells, is upregulated in PE. TNF-α increases S1PR2 expression in endothelial cells. However, the effect of TNF-α on trophoblast S1PR2 expression is unknown. This information may provide another treatment target since blocking TNF-α harms fetal development. We hypothesized that TNF-α increases S1PR2 expression in BeWo cells, a human term trophoblast cell line.

Methods:
Placental sections from human term pregnancies were stained for dual expression of endothelial or trophoblast markers with S1PR1-3. A TNF-α dose response was assessed in BeWo cultures after 24hrs, with LPS (lipopolysaccharide) as the positive control followed by a time course. Western Blot analysis of S1PR1-3 was performed.

Results:
Only S1PR1,2 were expressed in trophoblasts from normal term placentas. S1PR1 was also expressed in endothelial cells and S1PR3 was expressed in other cell types. In BeWo cultures, S1PR2 expression significantly decreased to 51.5+/-3.7% at 20 ng/mL TNF-α and to 47.5+/-4.9% with LPS. However, no differences in S1PR2 expression were observed at 12, 24, and 36 hrs after addition of 10ng/mL TNF-α.

Conclusion:
BeWo cells respond to TNF-α and LPS by reducing, not increasing, S1PR2 expression, opposite to the literature and contradicting our hypothesis. BeWo cells are choriocarcinoma cells and might not be a good model for studying S1PRs in trophoblasts.

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IMPACT OF EPISIOTOMY DURING OPERATIVE VAGINAL DELIVERY ON RISK OF OBSTETRICAL ANAL SPHINCTER INJURIES (OASIS) IN ALBERTA

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Objective:
Operative vaginal deliveries are a known risk factor for obstetrical anal sphincter injuries (OASIS). The utility of episiotomy in preventing OASIS in the setting of forceps and vacuum-assisted deliveries is controversial. The purpose of this investigation was to evaluate whether episiotomy at the time of operative vaginal delivery was associated with a reduced risk of OASIS in Alberta.

Methods:
A population-based retrospective cohort study was conducted using delivery information housed in the Alberta Perinatal Health Program data repository. All term (≥37 weeks' gestational age) singleton, operative vaginal deliveries of vertex-presenting infants in Alberta hospitals from April 1, 2006 to March 31, 2016 were identified. Rotational forceps were excluded from analyses as well as those in which both vacuum and forceps were used in the same delivery. The presence of a third or fourth degree tear was compared for deliveries in which an episiotomy was performed and those with no episiotomy.

Results:
A total of 52,241 operative vaginal deliveries met the inclusion criteria. Episiotomy was performed in 34% of all deliveries (25.7% of vacuum-assisted deliveries and 55.6% of forceps-assisted deliveries). Episiotomy was associated with increased odds of a third or fourth degree tear compared to no episiotomy (odds ratio 1.54; 95% confidence interval 1.46, 1.63).

Conclusion:
Preliminary analyses suggest that episiotomy may increase the risk of OASIS at the time of operative vaginal delivery. The final results of this research may influence the episiotomy practices of local practitioners and will contribute to the overall body of literature on the topic.

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TREATING THE PLACENTA WITH A NANOPARTICLE-LINKED ANTIOXIDANT TO IMPROVE PREGNANCY OUTCOMES IN A RAT MODEL OF FETAL HYPOXIA

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Objective:
Pregnancy complications leading to fetal hypoxia are linked to the development of adult cardiovascular disease in offspring. A prenatal hypoxic insult reduces placental perfusion and increases oxidative stress in the placenta. Factors released from a stressed placenta affect the development of fetal organs (e.g. heart). MitoQ is an antioxidant which, when attached to nanoparticles (nMitoQ), can be used to target maternal and placental oxidative stress without crossing the placenta. We hypothesized that nMitoQ treatment will improve oxygenation and reduce oxidative stress in both placental and fetal cardiac tissues, ultimately leading to better pregnancy outcomes.

Methods:
Pregnant rats were exposed to hypoxia (11% O2) or normoxia (21% O2) from gestational day (GD) 15-21; term=22 days. On GD15, rats were intravenously injected with saline or nMitoQ. Placentae and fetal tissues were collected from both sexes on GD21. Tissue hypoxia was assessed by hypoxyprobe-1 staining, which binds at PO2<10mmHg. Reactive oxygen species (ROS) were assessed by dihydroethidium and MitoSOX staining in placenta and fetal cardiac tissues.

Results:
Prenatal hypoxia enhanced hypoxyprobe-1 staining in placentae of only male offspring. nMitoQ treatment improved oxygen levels in placentae of prenatally hypoxic female but not male offspring. Mitochondrial ROS was significantly increased in placentae of prenatally hypoxic male offspring (normoxia: 0.021±0.001 a.u. vs. hypoxia: 0.025±0.001 a.u.; $p<0.05$), which was not improved by nMitoQ. Interestingly, nMitoQ treatment reduced mitochondrial ROS in only prenatally hypoxic but not normoxic placentae of female offspring. Evidence of cardiac oxidative stress was observed in male hypoxia exposed offspring ($p<0.05$) while nMitoQ treatment reduced cardiac ROS in only hypoxic female offspring.

Conclusion:
Treatment with nMitoQ at the time of a prenatal hypoxic insult prevented both placental hypoxia and reduced mitochondrial ROS production in female but not male offspring. Without crossing the placenta, nMitoQ exerted a sexually dimorphic effect on fetal cardiac oxidative stress.

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AN ALPHANUMERIC PAGING SYSTEM; A QUALITY IMPROVEMENT PROJECT

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Objectives:
To implement an alphanumeric paging system for the Royal Alexandra Hospital Labour and Delivery Unit. The goal of this quality improvement project is to streamline communication between nurses and residents in order to enhance patient safety through improving resident efficiency, response time to emergent situations and triaging abilities.

Methods:
Pre-intervention Likert format surveys were distributed to OBGYN residents and L&D RNs, to evaluate the current paging practices at RAH. This included questions assessing perceptions of efficiency, ability to triage, effectiveness of communication and patient safety. The survey responses were anonymous, and collected via REDcap. The alphanumeric paging system was then implemented for a two-month trial period. Nursing staff were educated on how to page using a specific reproducible template which included the location, urgency and context of the page. Post-intervention Likert format surveys will be distributed to reassess the perceptions of the paging process, and to solicit feedback on the change. The data will again be collected and analyzed via REDcap.

Progress to Date:
We have collected the pre-implementation surveys. The two-month trial period is underway. The trial period, data collection and analysis will be complete prior to Research Day.

Value of Research:
Many tertiary care centers utilize alphanumeric paging systems. According to a review of the literature, the results of switching to a message based paging system have been extremely positive. The process of text-paging sends a message that includes pertinent information to allow the recipient to triage the page appropriately - subsequently improving patient care.

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EARLY FETAL ECHOCARDIOGRAPHY: DIAGNOSES AND OUTCOMES

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Objective:
Fetal echocardiography in early gestation enables detailed assessment of the heart. Our aim was to define the spectrum and outcomes of congenital heart disease (CHD) diagnosed in early pregnancy and define which lesions are missed.

Methods:
We searched our Fetal Cardiology database retrospectively. Patients with pathology who underwent early fetal echo (eFE) at 15 weeks or less were included. Fetal echocardiograms and patient charts were reviewed for diagnosis and pregnancy outcome.

Results:
Of ~600 consecutive pregnancies assessed by eFE, 45 cases with CHD were identified. The median gestational age at first echocardiogram was 13 weeks (range 9-15). Referral indications included: increased nuchal translucency(n=20), assisted fertilization(n=9), previous child with CHD(n=2), suspected cardiac pathology(n=7), positive genetic testing(n=2) and other(n=5). In 36 cases, CHD was identified on eFE, including: left heart obstructive disease(n= 15), conotruncal lesions(n=6), complex single ventricle disease(n=3), atrioventricular or ventricular septal defect (AVSD or VSD)(n=3), ectopia cordis(n= 4), pulmonary stenosis(n= 2), bilateral semilunar valve insufficiency(n=1), conjoined twins(at thorax)(n= 1), and corrected transposition(n=1). Those identified at later gestation included: VSD(n=7), noncritical Tetralogy of Fallot(n=1), and AVSD(n=1). Genetic information was available for 32 patients. Chromosomal abnormalities were found in 16. Pregnancy termination occurred in 21 patients and 6 had fetal demise, all 27 of which were identified by eFE.

Conclusions:
eFE is effective at identifying most cases of severe CHD. Lesions diagnosed by eFE are more likely to be associated with chromosomal anomalies and have a high rate of pregnancy termination and fetal demise. CHD missed by eFE represented non-critical pathology.

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PARP INHIBITORS' EFFECT ON THE EXPRESSION OF HOMOLOGOUS RECOMBINATION DNA DAMAGE RESPONSE GENES IN BRCA-MUTANT VS WILD-TYPE OVARIAN CANCER STEM CELLS

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Objective:
PARP inhibitors have shown promising results for treatment of breast cancer associated gene (BRCA)-deficient breast and ovarian cancers; however, resistance eventually develops. Recent evidence indicates that ovarian cancer stem cell (CSC) play critical roles in resistance to conventional treatments. The sensitivity of ovarian CSC to PARP inhibitors (PARPi) is unknown.

Methods:
We selected four high grade serous ovarian cancer cell lines (OCC) with and without BRCA mutation. Sensitivity to Olaparib (as a PARPi) was determined by clonogenic assay. ALDH and CD133 were selected as potential markers of CSC and TaqMan Array DNA repair gene expression was used to evaluate gene expression.

Progress:
Cell lines with BRCA mutation were more sensitive to Olaparib compared to wild-type OCC, which was predictable. Based on results of Flow cytometry and Sphere formation assays, ALDH+/CD133+ vs just ALDH+ were selected to be the CSC markers in different cell lines, with CSCs being enriched by a different set of markers in each cell line. We also showed that treatment with Olaparib for 3 weeks can increase the expression of stem cell markers in some OCC. Now, we are evaluating the effects of PARPi on OCC, treated for different durations with Olaparib, and the expression of CSC markers and HRR pathway genes will be measured in these cells.

Value of Research:
Our study will clarify new resistance mechanisms through which ovarian cancer cells, especially stem cells, can survive PARP-inhibitor treatment and open opportunities for the development of novel therapeutic approaches for treatment of ovarian cancer.

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EFFECT OF MATERNAL ANTIOXIDANT (nMitoQ) TREATMENT ON CARDIAC OUTCOMES IN A RAT MODEL OF INTRAUTERINE GROWTH RESTRICTION

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Objective:
Many pregnancy complications result in fetal hypoxia leading to intrauterine growth restriction (IUGR). IUGR offspring are more susceptible to develop adult cardiovascular disease which may be linked to increased cardiac oxidative stress and mitochondrial dysfunction in IUGR offspring. nMitoQ, a nanoparticle-linked mitochondrial antioxidant, has been shown to accumulate in the placenta without crossing to the fetus where it may have off-target effects. We have previously shown that maternal treatment with nMitoQ decreased oxidative stress in female fetal IUGR hearts and improved vascular function in adult male and female IUGR offspring. We, therefore, hypothesize that maternal treatment with nMitoQ will lead to long-term improvement of cardiac function in adult IUGR offspring.

Methods:
Pregnant Sprague Dawley rats will be randomized into normoxic (21% O2) or hypoxic groups (11% O2) from gestational day (GD)15-21. On GD15, rats from each group will be intravenously injected with nMitoQ (125 μM) or saline. At birth, fetal biometrics will be recorded. Cardiac function, assessed by susceptibility to ischemia reperfusion injury, will be examined in 4-month-old rat offspring using Langendorff isolated heart technique. Western blot, DHE, and zymography techniques will be used to assess Collagen I and III content, β/α MHC ratio (contributors to myocardial mechanics), protein levels of PKCε/δ (involved in cardio-protection), superoxide levels (indicators of oxidative stress), and collagenase activities (MMP-1, MMP-13, MMP-2, MMP-9) in neonatal and 4-month-old offspring hearts.

Value of Research:
We expect that treatment of pregnant rats with nMitoQ will lead to amelioration of cardiac structural alterations and dysfunction in IUGR offspring.

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EAST/SOUTH EAST ASIAN ETHNICITY AND MODERATE-TO-SEVERE ENDOMETRIOSIS

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Objective:
To investigate ethnic differences for moderate-to-severe endometriosis.

Methods:
This is a prospective cohort study using a prospective patient registry from a tertiary referral center, from December 2013 – December 2016. Exclusion criteria were age >50 or menopausal, and mixed ethnicity. A total of 1594 women with pelvic pain and/or endometriosis were included. Logistic regression analysis was used to obtain adjusted odds ratios (aOR) and 95% confidence intervals (CI) adjusting for potential confounders (e.g., age, infertility, body-mass-index (BMI), previous hormonal use and previous surgery for endometriosis).

Results:
After adjusting for potential confounders, East/South East Asians were 7.7 times more likely than Caucasians to have a previous diagnosis of Stage III/IV endometriosis prior to referral (aOR 7.74, 95% CI 3.52–17.00); 2.5 times more likely to have a palpable nodule (aOR 2.48, 95% CI 1.48-4.16); 4.3 times more likely to have an endometrioma on ultrasound (aOR 4.31, 95% CI 2.85–6.51); and 11.3 times more likely to have Stage III/IV endometriosis at the time of surgery at our center (aOR 11.26, 95% CI 4.61–27.49).

Conclusion:
Moderate-to-severe endometriosis was more common in women with East or South East Asian ethnicity in this tertiary referral center. This could be explained by East/South East Asians with minimal-mild disease being less likely to seek care, or genetic/environmental differences that increase the risk of more severe disease amongst East/South East Asians.

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PATERNAL TRANSMISSION OF PRENATAL MATERNAL STRESS – RESEARCH PROPOSAL

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Background:
Gestational stress in females has been shown to affect epigenetic programming that can be transmitted through the maternal lineage and result in adverse pregnancy outcomes (APOs), mainly preterm birth. However, little is known about paternal transmission of stress, both to the offspring and the influence of the sperm in maternal tissues.

Hypothesis:
Stress effects are transmitted through the paternal lineage to their partners and offspring.

Methods:
Pregnant rats of the F0 generation were exposed to prenatal stress producing the maternal transgenerational stress lineage until the F3 generation. To compare the characteristics of stress transmission and transgenerational effects between the maternal/paternal lineage, F1 stressed-exposed males will be bred with stress-naïve females. Their F2 and F3 female offspring will be bred with non-stress males, producing the prenatal paternal lineage (F0-F4). Pregnancy outcomes will be evaluated and brain, blood and sperm from males and uterus from females will be collected to identify markers of allostatic load and APOs: stress hormones, cytokines, prostaglandins, microRNAs, 11β-HSD, imprinted IGF2/H19 locus. Neonatal offspring behaviour will be analyzed.

Results:
48/58 (83%) physicians responded.33% never or rarely screen for IPV/abuse during prenatal visits. 69% never or rarely screen for childhood abuse and 0% always screen for childhood abuse. 19% of physicians have never received training on IPV. 94% do not have a written protocol to regularly screen patients for IPV. 93% felt current obstetrics providers do not adequately assess for IPV and history of abuse. Many barriers to screening were identified

Progess:
F1 generation breeding has started at the vivarium of the U Lethbridge.

Value of Research:
We expect that transmission of epigenetic markers will occur through the paternal lineage of stress-exposed rats to their offspring and partners, increasing the risk of APOs, similar to results in our maternal lineage. Identifying epigenetic changes/inflammation will allow translation of the results to human males and their contribution to their partners'/daughters' pregnancies, as well as development of interventions to mitigate transgenerational stress.

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MATERNAL EXPOSURES TO DEVELOPMENTAL TOXICANTS AND SOCIO-ECONOMIC STATUS ON THE DEVELOPMENT OF CONGENITAL HEART DISEASE IN ALBERTA

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Background:

Associations between environmental pollutants, socio-economic status (SES) and congenital heart disease (CHD) are gaining attention; however, the results are inconclusive. We explored the effect of exposure to developmental toxicants (DTs) and SES on CHD development in Alberta.

Methods:

We identified 2,413 CHD cases and postal codes (PC) from echocardiographic databases (2003-2010). We used previously defined DT groups comprised of: 1- organics and gases, 2-organics and 3-heavy metals. An inverse distance weighted approach was used to assign exposure to the PC within 10 km radius. Exposures were categorized into deciles for group 1 DTs and tertiles for groups 2 and 3 DTs and the SES index. Poisson regression was used to calculate risk ratios and 95% CI, adjusted for SES index or DTs and urban related surrogates (NO2, PM2.5).

Results:

Group 1 DT showed increased risk in urban and rural regions in the 10th decile of exposure, aRR=1.85(1.5, 2.3) and 2.67(1.04, 6.8, respectively). Group 2 DT risk was increased only in urban 3rd tertile, RR=1.45(1.3, 1.6). Group 3 DTs were associated with an increased risk in urban and rural regions in the 3rd tertile of exposure [aRR=1.16(1.04, 1.3), and 2.8(1.14, 7.1, respectively)].

SES was associated with increased risk of CHD in urban lowest tertile, [aRR=1.13(1.0, 1.3)] and rural lowest and middle SES tertile, [aRR=2.9(1.9, 4.8) and 1.6(1.1, 2.6), respectively].

Conclusion:

High DT groups' exposures and SES were independently associated with increased risk of CHD in urban and rural Alberta. SES had a greater impact in rural compared to urban regions.

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MULTI-CENTRE STUDY ON THE IMPACT OF TRANSPLACENTAL FETAL TREATMENT WITH STEROID AND IMMUNOGLOBULIN ON EARY- AND LATE-ONSET IMMUNUE MEDIATED FETAL COMPLICATIONS

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Research Question:
Although maternal antibody-mediated fetal atrioventricular block (AVB) is associated with significant mobidity and mortality, including endocardial fibroelastosis (EFE) and dilated cardiomyopathy (DCM), prenatal tretment remains controversial. We hypothesized that prenatal treatment with dexamthasone, and/or beta-mimetic and/or IVIG will be associated with increased fetal/neonatal survival, improved cardiac function, and decreased need for permanent pacing.

Methods:
This multicentre retrospective study involved seven North American pediatric centres. Data fields collected included: presence of maternal anti-Ro/La antibodies, degree of AVB, presence of endocardial fibroelastosis, type of treatment, and neonatal and long-term cardiac outcomes.

Results:
Sixteen cases from the Stollery Children's Hospital in Edmonton from 2002-2017 were identified and combined with cases from the other sites for a total of 95 cases. Compared to previously published data of mostly untreated cases, there were increased rates of neonatal and long-term survival and a decreased rate of late-onset DCM in this study.

Conclusion:
Despite poor outcomes, there is no consensus on prenatal treatment of maternal autoantibody-mediated fetal AVB. This multicentre study of treated cases of maternal autoantibody-mediated fetal AVB reports increased survival rates and a decreased incidence of late-onset DCM compared to previously published case series, supporting prenatal treatment of this condition. Further research is needed to determine the optimal treatment regimen.

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CREATING COST-CONSCIOUS RESIDENTS IN OBSTETRICS AND GYNECOLOGY: A RANDOMISED CONTROLLED TRIAL

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Background:
Residents have a professional obligation to the stewardship of healthcare resources yet there is a paucity of research on how to improve their cost-awareness. Rising health care expenditure has highlighted a critical need to improve education in this competency. This study aims to test if an educational module can teach residents about making cost-conscious choices to decrease health care spending.

Methods:
We developed four hypothetical obstetrical clinical vignettes and created a survey for respondents to make choices about the investigations and medications they would prescribe. Canadian Obstetrics and Gynecology PGY1-5 residents were recruited to participate. Interested residents were enrolled, stratified by level of training and block randomized. The intervention was a self-directed educational module on cost-effective ordering. The intervention group reviewed the module prior to completing the survey and the control group had the option to review it after. The entire study was administered via REDCap. The primary outcome was the mean total expenditure as calculated from the survey. Student's t-test was used to compare the mean total expenditure between the two groups.

Results:
85 residents were enrolled and 63 residents completed study requirements (30 intervention and 33 control). Mean total expenditure was $291.03CAD versus $192.98CAD in the control and intervention arms respectively, corresponding to a 33.69% or $98.05CAD reduction in total expenditure (p=0.0001).

Conclusions:
This educational module decreased expenditure by Canadian Obstetrics and Gynecology residents in the management of hypothetical obstetrical cases. This introduces a potential curriculum innovation to improve resident education in judicious use of healthcare resources.

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CONTRACEPTION USE AND ATTITUDES AMONG WOMEN SEEKING PREGNANCY TERMINATION

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Objective:
Unintended pregnancies pose negative health and social outcomes to mothers and child. North America has an unplanned pregnancy rate of 51%, higher than the worldwide rate of 40%. The reasons are complex and the purpose of this research was to determine what proportion of women presenting for pregnancy termination were using contraception and their perceived reason for contraception failure or for not using contraception..

Methods:
For this descriptive study, women presenting for pregnancy termination were recruited by clinic counsellors. Consenting women completed a self-administered anonymous survey before leaving the clinic. Data were entered using REDCap and analyzed using descriptive statistics.

Results:
331 women completed questionnaires. Of these 44% used contraception at the time of conception, most commonly condoms (55%), oral contraception (32%) and withdrawal (30%). Among contraceptive users (n=146) imperfect use was most commonly reported (47%), including missing pills or forgetting to use their contraceptive. Other reasons included inconsistent use (32.9%), broken condom (27%) and suspected method failure (24%). Among contraceptive nonusers (n=185) perceived low risk of pregnancy was most commonly reported (58%), followed by concerns/issues with contraception (50%). Other reasons included problems accessing contraception (35%), ambivalence towards contraception (27%) and unexpected/unwanted sex (15%).

Conclusion:
The most surprising finding was the prevalence of perceived low risk of pregnancy among women who did not use contraceptives. Less surprisingly, imperfect use was the most common reason contraceptive failure. This suggests sex education including fecundity and proper use of contraceptive methods might have the most impact at reducing unplanned pregnancies..

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ROLE OF OXLDL IN HUMAN UMBILICAL VEIN ENDOTHELIAL CELLS FROM PREECLAMPTIC PREGNANCIES

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Objective:
Preeclampsia (PE) is a pregnancy syndrome characterized by vascular/endothelial dysfunction. The lectin-like oxidized low-density-lipoprotein (oxLDL) receptor-1 (LOX-1) has been suggested to be involved in cellular mechanisms of endothelial dysfunction in PE. Both oxLDL and soluble LOX-1 are increased in umbilical cord blood from PE pregnancies, and angiotensin II type 1 receptor (AT1) expression is increased in human umbilical vein endothelial cells (HUVECs). Interestingly, in vitro studies show that oxLDL-mediated LOX-1 activation causes subsequent AT1 activation and AT1 activation also increases LOX-1 expression. However, the role of these pathways in fetoplacental vessels in PE is not known. We hypothesized "the synergistic activation of LOX-1 and AT1 by oxLDL induces increased oxidative stress, eNOS uncoupling and adhesion molecule expression in HUVECs from PE".

Methods:
Umbilical cords from uncomplicated and PE pregnancies will be collected from the Lois Hole Hospital for Women. LOX-1 and AT1 expression will be assessed in umbilical cord cross-sections by immunofluorescence. In HUVECs isolated from uncomplicated and PE pregnancies, receptor expression will be evaluated using Western blotting and qPCR. Intracellular reactive oxygen species production will be determined using the fluorescent dye CM-H2DCFDA. NADPH oxidase, adhesion molecule (ICAM-1, VCAM-1) and eNOS expression will be evaluated using Western blotting. Finally, intracellular nitric oxide formation will be evaluated using DAF-FM in the absence or presence of L-NAME.

Progress to Date:
Initial collections of umbilical cords and HUVEC isolation have been performed.

Value of Research:
Investigation of an interaction between oxLDL and the LOX-1/AT1 signaling pathway on fetoplacental endothelial function is a novel concept that may provide a mechanism for the long-term detrimental vascular effects of offspring born from a PE pregnancy.

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EARLY CHILDHOOD RESPIRATORY MORBIDITY AND HEALTH SERVICES UTILIZATION IN CHILDREN BORN PRETERM

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Objective:
Evaluations of the relationship between preterm birth (PTB) and respiratory disease have focused on the development of asthma. It is unclear whether PTB leads to differential risk patterns for the development of other respiratory diseases in childhood. Our objective is to evaluate the association between PTB and the risk of hospital admissions and emergency department (ED) visits for respiratory conditions in early childhood.

Methods:
A population-based retrospective cohort based on administrative health data of all singleton live births (≥20 weeks of gestation) born in Alberta between 2005 and 2015. PTB was defined as a live birth with a gestation period <37 weeks. The number of hospital admissions and ED visits during the first five years of life per child were analyzed for acute upper respiratory infections (AURI), acute lower respiratory infections (ALRI), wheezing disorders, and influenza/pneumonia (IP). Adjusted odds ratios (adjOR) and 95% confidence intervals (CI) were calculated using logistic regressions (0=no event, 1=one or more events) with area-level socioeconomic status, maternal age, antepartum risk score, 5-min Apgar score, parity and infant's sex as covariates.

Results:
The cohort contained 206,994 infants of whom 9.1% (n=18,968) were PTB. PTB increased the odds of hospital admissions for ALRI (OR=1.9, 95%CI:1.7-2.0), wheezing disorders (OR=1.7, 95%CI:1.5-1.9), IP (OR=1.6, 95%CI:1.5-1.8), AURI (OR=1.5, 95%CI:1.3-1.7). PTB increased the odds of ED visits for wheezing disorders (OR=1.4, 95%CI:1.3-1.5), IP (OR=1.3, 95%CI:1.2-1.4), ALRI (OR=1.3, 95%CI:1.2-1.4), and AURI (OR=1.1, 95%CI:1.0-1.1).

Conclusion:
PTB is an important risk factor for increased respiratory disorders in early childhood and consequent health service use.

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PREGNANCY OUTCOMES AND VASCULAR FUNCTION IN LECTIN-LIKE OXIDIZED LDL RECEPTOR-1 KNOCKOUT MICE

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Objective:
The development of hypertension and proteinuria in preeclampsia (PE) is thought to be due to maternal endothelial and vascular dysfunction, which has been associated with increased expression of the lectin-like oxidized LDL receptor-1 (LOX-1), a multi-ligand scavenger receptor. LOX-1 expression is increased in women with PE, and that PE plasma factors impair vascular function via LOX-1. However, the role of LOX-1 in contributing to vascular maladaptations in pregnancy is unknown. Therefore, we propose to further study its function using genetically modified LOX-1 deficient (knockout; KO) mice.

Methods:
Fetal and placental weights were collected from late pregnant gestational day 18 (term = day 19) C57BL/6 mice (WT; n=7-15) and LOX-1 KO mice (n=8-16). Uterine arteries were isolated and incubated overnight in physiological salt solution. Using wire myography, endothelium-dependent (methylcholine; MCh) vasodilation (in the presence or absence of L-NAME, a pan nitric oxide synthase inhibitor), endothelium-independent vasodilation (sodium nitroprusside; SNP) and high potassium physiological salt solution (KPSS) mediated vasoconstriction responses were measured.

Results:
No differences in placental or fetal weights were observed, however, litter size was significantly increased in LOX-1KO mice compared to WT mice (WT 7(2-10) vs. LOX-1KO 9(7-10); p=0.003). Uterine arteries from LOX-1KO mice were less sensitive to MCh (pEC50: WT 7.4±0.06 vs. LOX-1KO 7.1±0.08; p=0.01) but showed higher nitric oxide contribution to vasodilation (delta AUC: WT 54.8±11.7 vs. LOX-1KO 146.4±34.9; p=0.02) compared with arteries from WT mice. No changes were observed in SNP-induced vasodilation or KPSS-mediated vasoconstriction.

Conclusion:
Mice that do not express the LOX-1 receptor show an improved pregnancy outcome, while also displaying a shift in the mechanisms of endothelium-dependent vasodilation, suggesting that LOX-1 could play a role in the development of pregnancy complications. The mechanisms remain to be further investigated. These data increase our understanding of endothelial dysfunction in PE and contribute to the development of novel treatment strategies in the future.

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REDUCING EXCESSIVE LAB ORDERING FOR PREECLAMPSIA BLOODWORK: A QUALITY IMPROVEMENT PROJECT

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Objectives:
Pregnant women suspected of having preeclampsia receive laboratory workup for diagnosis and surveillance. However, many investigations are ordered inappropriately with considerable healthcare cost and the potential for iatrogenic harm. This quality improvement (QI) project aims to reduce patient blood draws and healthcare costs.

Methods:
A QI was conducted on the labour and delivery, triage, and antepartum wards of a tertiary care centre. It was developed via Plan-Do-Study-Act (PDSA) cycles of quality improvement involving appropriate stakeholders (physicians, residents, nurses, unit clerks). Healthcare providers received a survey regarding laboratory ordering practices, which was corroborated with 20 inpatient charts. A 4-month data set of laboratory usage and costs was collected and analyzed. An algorithm for ordering preeclampsia investigations was developed, posted on wards and distributed to residents as a pocket aide. Practitioners were invited to educational seminars to support adoption.

Results:
Survey data indicated most providers ordered broad panels of investigations, rarely re-evaluated frequency, and were unaware of laboratory costs. A majority of respondents acknowledged that some investigations did not affect patient management and based these decisions on institutional convention. Baseline data shows 10,462 investigations ($69,350) (Jan-Apr, 2017). Preliminary post-intervention data (Sept/Oct 2017) revealed a 26% reduction in investigations ($4,515/month), particularly those of low clinical utility including D-dimer (56%) and urea (51.5%).

Conclusion:
Preliminary data indicate that a simple and inexpensive intervention reduced overall laboratory investigations for preeclampsia, particularly those of low clinical utility. This resulted in annualized savings of $54,180. Subsequent PDSA cycles will continue to study and refine the interventions.

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IS INDUCTION OF LABOUR (IOL) ASSOCIATED WITH EMERGENCY CAESAREAN SECTION (CS) IN AN ALBERTA TERM NULLIPAROUS BIRTH COHORT?

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Objectives:
Our study aimed to determine whether induction of labour (IOL) between 37 through 41 weeks of gestation, as compared with expectant management (EM), is associated with emergency caesarean section (CS) delivery in nulliparous pregnancies in a large population-based Alberta birth cohort.

Methods:
This was a retrospective population-based birth cohort study of all nulliparous women with live singleton births in Alberta from 2005-2014. The cohort was developed by linking multiple administrative health databases. We excluded women with gestational diabetes, gestational hypertension, pre-eclampsia, eclampsia and premature rupture of membrane. The IOL cohort was compared to the EM group, which included women who delivered at or beyond the gestation of IOL. Multivariable logistic regression analysis was performed to control for potential confounding.

Results:
In a cohort of 136,563 low-risk, nulliparous Albertan women, labour was induced in 26.4% and the IOL rate increased from 24.8% to 30.7% from 2005-2014. About 50% of IOL was performed before 41 weeks in low-risk nulliparous pregnancies. IOL was associated with lower odds of emergency CS at early-term, with 14% & 8% reduction at 37 & 38 weeks of gestation (aOR 0.86, 0.78-0.95, aOR 0.92, 0.85-0.99), and 35% reduction at 41 weeks (aOR 0.65, 0.56-0.75) when compared to EM at a gestation greater than the one tested.

Conclusion:
IOL was associated with reduced risk of emergency CS delivery when compared to EM group in low-risk nulliparous pregnancies at early-term and late term. Expectant mothers should be counselled for informed choice between early term vs. late term induction.

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poster

DOES COST INFLUENCE THE CHOICE OF DISPOSABLE VS REUSUABLE INSTRUMENTS? SURVEY OF OBSTETRICIAN/GYNECOLOGISTS

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Objectives:
A "cost awareness" campaign was undertaken at the Lois Hole Hospital for Women from 2015 to 2016 to raise awareness about costs of disposable versus reusable instruments in laparoscopic procedures. We undertook a survey of obstetrician/gynecologists (Ob/Gyns) to find out if the campaign had affected their attitudes about choosing disposable versus cheaper reusable instruments.

Methods:
In 2015 and 2017, all full-time university-associated Ob/Gyns were mailed a cover letter, questionnaire and coffee card ($5) with postage-paid return envelope. Responses (with unique ID) from Ob/Gyns who perform laparoscopic procedures were entered into a password-protected REDCap database on a secure server. Data analysis used REDCap summary descriptive statistics.

Results:
34/47 eligible Ob/Gyns (72%) completed questionnaires before and after the intervention, with median 11.5 years in practice. The majority had undertaken MIS training, mainly during residency (78.4%) and conferences (73.0%). Before the intervention, the three most important qualities influencing their decision to use a particular instrument were safety (64.9%), effectiveness (54.1%) and personal experience (48.6%), and after the intervention were effectiveness (63.0%), safety (47.8%) and ease of use (47.8%). Device cost was ranked sixth (29.7%) before and fourth after (26.1%).

Conclusion:
Given the current economy, operative costs are constantly under review. Knowledge about Ob/Gyns' attitudes provides information to design more effective awareness campaigns to encourage use of less costly instruments. To change practice, a campaign increasing Ob/Gyns' exposure to cheaper but safe and effective instruments may help to increase uptake and potentially lead to cost reduction. Cost awareness alone is unlikely to change practice.

poster

poster

PRENATAL DETECTION, COMORBIDITIES AND MANAGEMENT OF VASCULAR RINGS: A 15-YEAR REGIONAL STUDY

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Mazankowski Alberta Heart Institute, Alberta Health Services

Objective:
Vascular rings (VR) are rare and traditionally present with symptoms postnatally, making the need for surgery clear. The three-vessel-trachea view, now widely used in obstetrical screening, may enhance prenatal detection of VR. Our objective was to examine trends in prenatal detection, associated anomalies and clinical outcomes in pediatric patients with VR.

Methods:
Retrospective review of pediatric patients with VR born from 2003-2017.

Results:
Of 99 patients with VR, 23 (23%) had a prenatal diagnosis. Prenatal detection rates increased over time; zero before 2010, 5/24 (17%) from 2010-2012, 13/26 (50%) from 2013-2015, and 5/8 (62%) from 2016-2017. Most VR diagnoses were right aortic arch/aberrant left subclavian artery/left ductus (72/99, 73%). Prenatally diagnosed VR were more likely to have additional cardiac lesions than those diagnosed postnatally (17/23 vs 34/76, p=0.01). There was no difference in the rate of associated genetic abnormalities between pre/postnatal groups (7/23 vs 14/76, p=0.19). Need for surgical intervention was common and comparable between pre/postnatal groups (21/23 vs 63/76, p=0.32). Those with prenatal diagnoses were less likely to require additional imaging (CT/MRI) compared with those diagnosed postnatally (5/23 vs 46/76, p=0.002). Additional imaging changed the echo diagnosis of VR type in one patient.

Conclusion:
This is the largest contemporary cohort of VR. Prenatal detection of VR has improved over time. VR have the same rate of surgery regardless of pre/postnatal detection. The rate of genetic abnormalities is higher than previously reported, suggesting the need for genetic counseling. The reliability of echo diagnosis in both groups questions the need for further imaging modalities.

poster

Maternal Fetal Medicine Research Dr. Trina Stryker, Acting Division Director	
Oral Presentation **Cooke CL**, Care AS, Kirshenman RD, Quon AL, Morton JS and Davidge ST. San Diego, March 2018.	Society for Reproductive Investigation. Vascular Function is Altered via Sex-Specific Mechanisms in Aged Offspring Born from Dams of Advanced Maternal Age.
Cooke CL, Shah A, Kirschenman R, Quon AL, Morton JS, Care AS, Davidge ST.	Increased susceptibility to cardiovascular disease in offspring born from dams of advanced maternal age. *J Physiology*, revised 2018.
Aljunaidy MM, Philips T, Case CP, Morton JS, **Cooke CL** and Davidge ST.	Maternal treatment with a placental-targeted anti-oxidant (MitoQ) impacts offspring cardiovascular function in a rat model of prenatal hypoxia. *Pharmacological Research* revised 2018.

Reproductive Endocrinology and Infertility	
The FLUSH Study - **T Motan**	This trial examines whether flushing of ovarian follicles at the time of retrieval changes various IVF outcomes. (for presentation at ASRM 2018)
The Fit for Fertility Multicentre RCT (CIHR funded) - **M Sagle**	Chief investigator: JP Baillargeon (Sherbrooke University) The goal is to examine life style interventions and their impact on fertility outcomes To be starting sometime in 2018

Urogynecology Dr. Jane Schulz, Division Director	
CRISP grant from WCHRI **Drs. Schulz & Poirier**, 2017	Knowledge of pelvic floor disorders in newly arrived Canadian immigrants
WCHRI summer student grant 2018 **Dr. Schulz** and Sarah Kent (medical student)	Knowledge of pelvic floor disorders in newly arrived Canadian immigrants
KarisAllen L, **Schulz J**, **Flood C**, Ross S, Naud K.	Retrospective Cohort Study of Cervical Pessary Use in Women with Short Cervix at Risk of Preterm Delivery. J Obstet Gynaecol Can. 2017 Dec;39(12):1137-1142. doi: 10.1016/j.jogc.2017.05.017. Epub 2017 Aug 16. PMID: 28822628

Reproductive Sciences Division Report
Dr. BF Mitchell, Division Director

In the past year, the total number of trainees in our Division were: 2017 summer students (7), MSc (8), PhD (7), PDF (4) who were highly successful in obtaining funding as reported below and in the Graduate Research Section.

Dr. David Olson	Received a sizable donation from the Bauld family to support the research of his graduate student Han Lee to study how leukocytes can predict preterm delivery. As part of his MSc studies, Han was instrumental in simplifying the protocol that may allow this test to reach the market. David now holds a US patent for this test. For more information: **www.ualberta.ca/medicine/news/2018/march/giving-the-gift-of-healthier-new-lives** Meghan Onushko received a WCHRI summer studentship in 2017.
Dr. Sandy Davidge	Awarded a prestigious CIHR - Foundation Grant which includes 7 years of funding support for core research programs. 2017-2018 President of the prominent international Society for Reproductive Investigation (SRI) and organized this year's Annual Meeting in San Diego this past March. Dr. Floor Spaans helped organize the trainee events at the meeting in her new role as Chair of the In-Training Member Committee. Trainee update: Floortje Spaans, PDF, was awarded the Molly Towell Fellowship and Tamara Saez, new PDF, was awarded the Izaak Walton Killam Memorial Postdoctoral Award. Paul Li, 2017 summer student, was funded by AIHS and WCHRI. See Graduate Research for graduate student funding updates. Trainees have published 5 new articles in Hypertension, Journal of DOHAD, Clinical Sciences, Frontiers in Physiology and PLoS ONE
Dr. BF (Peter) Mitchell	Peter will be retiring on June 30 and his lab has closed, awaiting the arrival of Meghan Riddell in January. Three manuscripts (one already submitted) will be completed with remaining CIHR funds to cover publication costs. Next project will be an in-depth study of mechanisms to lower personal golf score.

Reproductive Sciences Division Report continued Dr. BF Mitchell, Division Director	
Dr. Denise Hemmings	Awarded a WCHRI Operating Grant in 2017. International 2017 summer student, Tejasvene Ramesh was supported in part by UARE funding. Two project/summer students who worked in the Hemmings lab were accepted into Undergraduate Medical Program at U of A - Joren Manz and David Edgeworth.
Dr. Maria Ospina	Epidemiologist who joined our department in 2016 has been highly successful in obtaining grant funding in the past year. She received a Project Grant from CIHR, a Provincial Grant-in-Aid from the Lung Association and is a co-applicant on another funded CIHR Catalyst Grant. Dr. Jesus Serrano-Lomelin joined her team as a postdoctoral fellow in Jan 2018. Recognized by the School of Public Health's Student Association as the 2017 Professor of the Year for teaching excellence in the Master's in Public Health Program. Organized and ran the 2018 Canadian Developmental Origins of Health and Disease (DOHaD) Society Scientific Meeting
Dr. Meghan Riddell	Meghan was successfully recruited to join our department in the Reproductive Division as an Assistant Professor. She will start in 2019 once she has completed her postdoctoral fellowship in Germany.

Graduate Coordinator's Report

Our department now has one PhD student and four MSc students, the majority of whom have been successful in obtaining scholarship awards. Two of those MSc students are residents who are participating in the CIP program, Ashley Demsky and Shawna Stafford.

2017-2018 awards to OBGYN Graduate Students:

Mackenzie Coatham - PhD (Postovit):
a) CIHR Frederick Banting and Charles Best Canada Graduate Scholarship - Doctoral Award
b) AIHS Studentship. Mackenzie also published two papers this past year.

Ashley Demsky - CIP-MSc (Steed):
Queen Elizabeth II Graduate Scholarship

Shawna Stafford - CIP-MSc (Steed):
Medical Sciences Graduate Program Scholarship

Yuliya Fakhr - MatCH-MSc (Hemmings):
new student in 2017, Medical Sciences Graduate Program Scholarship

Our department is also home to several graduate students who are part of the Reproductive Division but who are graduate students of Physiology, the main department our investigators are cross-appointed to. These students are also highly successful in obtaining scholarship awards.

2017-2018 awards to other Graduate Students in Reproductive Sciences Division:

Nataliia Hula – PhD (Davidge): new student Sept 2017:
a) Stefan and Pelagia Wychowanec Graduate Scholarship
b) University of Alberta Doctoral Recruitment Scholarship

Esha Ganguly – PhD (Davidge):
a) WCHRI Graduate Studentship
b) FoMD 75th Anniversary Graduate Student Award

Mais Aljunaidy – PhD (Davidge):
Received the best Poster Presentation award (20 prizes out of >650 abstracts) at the international SRI meeting

Nayara Gabriela Lopes – PhD (Olson):
Faculty of Medicine & Dentistry/Alberta Health Services Graduate Student Recruitment Studentships (GSRS)

Barbara Verstraeten – PhD (Olson):
received a best poster presentation award (20 prizes out of >650 abstracts) at the inter national SRI meeting

Sana Amjad – MSc (Ospina):
Indigenous Graduate Award