James A. Low Research Day
Department of Obstetrics & Gynaecology

Friday, April 20th, 2018
Cover: Campus Aerial View of Queen's University
Courtesy of: Graphic Design Services, Queen's University
Look up at the stars and not down at your feet. Try to make sense of what you see, and wonder about what makes the universe exist. Be curious.

Stephen Hawking (1942 – 2018)
Contents

Morning Program ............................................................... 6
Afternoon Program ................................................................ 7
Poster Presentation Outline ............................................. 8
Abstracts: Oral Presentations ............................................... 9
Abstracts: Poster Presentations ....................................... 27
Keynote Speaker Biography ............................................. 43
2017 Award Winners ............................................................ 44
2016 Photo ....................................................................... 45
**James A. Low Research Day**  
Donald Gordon Centre, Conference Room A  
Friday, April 20, 2018

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
</table>
| 7:30 – 8:10   | Coffee and Continental Breakfast  
**Poster and Oral Presentation Set-up**                                  |
| 8:10 – 8:15   | Opening Remarks (Dr. Maria Velez, Resident Research Director)         |
| 8:15 – 10:15  | **Morning Session**  
**Chair: Dr. Maria Velez**                                           |
| 8:15          | (O1) Amanda Webb (PGY-4)  
Opioid Prescribing Practices and Short-Term Outcomes Following Cesarean Section  
After Discharge from a Tertiary Care Centre                             |
| 8:30          | (O2) Kerry Howatt (PGY-5)  
Knowledge and attitudes regarding intrauterine contraception among Canadian gynecologists and family physicians |
| 8:45          | (O3) Prabhpreet Hundal (Meds 2018)  
Prevalence of Chlamydia Trachomatis and Neisseria Gonorrhea Among Pregnant Adolescents Screened Routinely in the 3rd Trimester Using a Urine PCR Test for Diagnosis: A Retrospective Chart Review |
| 9:00          | (O4) Katherine Rabicki (Meds 2019)  
Incidence of Urinary Retention following Mid-Urethral Sling Procedure and Validation of a Screening Protocol. |
| 9:15          | (O5) Sarah Dobrowolski (PGY-4 / CIP, Ph.D. Candidate)  
Urinary incontinence among competitive female Rope Skipping athletes: A cross-sectional study. |
| 9:30          | (O6) Julie Ellsworth (PGY-5)  
Choice of Contraception Following a Therapeutic Abortion in 2016. |
| 9:45          | (O7) Lauren Wilson (Meds 2019)  
| 10:00         | (O8) Alida Pokorad (PGY-2)  
No woman left behind: Moving toward a pan-Canadian strategy for universal BRCA testing in ovarian cancer. (Retrospective study of Kingston Regional Cancer Centre) |
| 10:15 – 10:55 | Health Break & Poster Viewing (40 minutes)  
**Presenters available P1-4** & **Presenters available P5-9** |
| 11:00         | **Keynote Speaker:** Dr. Stephen Wood, Professor Department of Obstetrics and Gynecology and Community Health Sciences University of Calgary  
Trial of Operative Vaginal Delivery versus Cesarean Section (CS) for Indicated 2nd Stage Deliveries. |
| 11:50         | **Group Photo** (Everyone meet outside on front steps) View 2016 as example |
| 12:00 – 12:50 | Lunch |
# James A. Low Research Day
Donald Gordon Centre, Conference Room A
Friday, April 20, 2018

| 13:00–14:30 | Afternoon Session 1  
Chair: Dr. Marie-Andrée Harvey |
|-------------|-------------------------------------------------|
| 13:00       | (O9) **Andrew McNaughton** (Meds 2019)  
Correlation of POPQ Points C and D with Cervical Width and Length in Hysterectomy Patients. |
| 13:15       | (O10) **Logan Barr** (M.Sc. Candidate)  
Vascular Outcomes of a Pregnancy Complicated by Preeclampsia. |
| 13:30       | (O11) **Haris Imsirovic** (M.Sc. Candidate)  
Thyroid Cancer and subsequent Infertility Risk in Young Adult Females: A Retrospective Cohort Study (Study Proposal). |
| 14:00       | (O12) **Jacqueline Galica** (Postdoctoral Fellow)  
A study of coping with fear of cancer recurrence among ovarian cancer survivors living outside of large metropolitan centres: The FEARLESS Study. |
| 14:15       | (O13) **Luciana Guerra Gallo** (Visiting Research Student, Ph.D. Candidate Brazil)  
Prenatal Zika Virus Infection in Brazil, 2016: the year that it was declared a Public Health Emergency of International Concern. |
| 14:30–15:00 | Health Break & Poster Viewing (30 minutes)  
*(Presenters available P10-12) & *(Presenters available P13-15)* |
| 15:00–16:00 | Afternoon Session 2  
Chair: Dr. Chandrakant Tayade |
| 15:00       | (O14) **Sarah Nersesian** (M.Sc. Candidate)  
Study Proposal - BLISS: Building Lessons in Sexual Health Stories. |
| 15:15       | (O15) **Vanessa Kay** (MD / Ph.D. Candidate 2020)  
Exploring the early postnatal period as a potential time for correction of cognitive and neuroanatomical alterations in preeclampsia-affected offspring using a mouse model. |
| 15:30       | (O16) **Ryan Marks** (B.Sc. Candidate)  
IL-13 and IL-33 polarize macrophages to the M2 phenotype and contribute to endometriosis pathophysiology |
| 15:45       | (O17) **Cole Clifford** (Independent Study Student)  
Characterizing Exosome Production and immunogenicity in Genetically Distinct High Grade Serous Carcinoma of the Ovaries (HGSC) cells. |
| 16:00       | Summation by Dr. Maria Velez |
| 16:10–17:30 | **Wine & Cheese Reception, John Deutsch & Board Room**  
*(Awards Presentation)* [View 2017](#) |
# James A. Low Research Day
Donald Gordon Centre, Conference Room A | Friday, April 20, 2018

## Morning Poster Presentations [10:15 - 10:55]

| P1 | Michael Puopolo (B.Sc. Candidate)  
Investigating the role of the cGAS-STING pathway in BRCA1 mutated ovarian cancer cells. |
| P2 | Thiago Vidotto (International Visiting Ph.D. Candidate)  
STAT1 associated immune checkpoint gene expression indicates adaptive immune resistance in chemotherapy sensitive high grade serous ovarian tumours. |
| P3 | Abdi Ghaffari1 (Research Associate), Madhuri Koti  
A novel STING agonist in combination with immune checkpoint blockade therapy enhances response to carboplatin chemotherapy in a high-grade serous ovarian cancer model. |
| P4 | Kiera Liblik (B.Sc. Candidate)  
Differential Inflammasome Pathway Activation in Endometriosis. |
| P5 | Megan Dickson (M.Sc. Candidate)  
Study Proposal - Effects of carbon monoxide on vascular adaptations during pregnancy. |
| P6 | Lindsey Symons (M.Sc. Candidate)  
Neutrophils and the Endometriotic Lesion Immune Microenvironment. |
| P7 | Chioma U Odozor (M.Sc. Candidate)  
Menadione increases endogenous carbon monoxide production in pregnant mice. |
| P8 | Karalyn E McRae (Ph.D. Candidate)  
Alterations in Blood Pressure of Pregnant CD-1 Mice Using Carbon Monoxide Releasing Molecules. |
| P9 | Takafumi Ushida (Visiting Fellow), Tiziana Cotechini (Postdoctoral Fellow)  
Aberrant inflammation in rat pregnancy leads to persistence of risk factors for cardiovascular and metabolic disease in the offspring. |

## Afternoon Poster Presentations [14:30 –15:00]

| P10 | Haris Imsirovic (M.Sc. Candidate)  
Radioactive iodine therapy for thyroid cancer and infertility risk: a systematic review. |
| P11 | Shikha Kuthiala (Meds 2019)  
Safety and efficacy of menorrhagia treatments in women with bleeding disorders: a retrospective analysis. |
| P12 | Katherine Rabicki (Meds 2019)  
High Sensitivity C-Reactive Protein as a Postpartum Biomarker for CVD Risk. |
| P13 | Chantal Valiquette (Meds 2010)  
Development and Evaluation of Educational Orientation Materials for Parents of Extremely Premature Infants in the NICU. |
| P14 | Elizabeth Russell (PGY-4)  
Cause or Coincidence? Spontaneous Hematometra in Young Women on Depomedroxyprogesterone Acetate: A Small Case Series. |
| P15 | Marie Eve Murray (CARE Fellow)  
Patient’s motivation for surgical vs medical abortion. |
Abstracts

Oral Presentations
(O1) Opioid Prescribing Practices and Short-Term Outcomes Following Cesarean Section After Discharge from a Tertiary Care Centre
Amanda Webb, MD (PGY-4), Sahra Nathoo (Meds 2019), Romy Nitsch
Kingston General Hospital, Department of Obstetrics and Gynecology, Queen’s University

**Background:** Adequate pain control following cesarean section promotes quicker return to function, mother-infant bonding, and decreases risk of venous thromboembolism via early mobilization. Opioids are frequently used for post-cesarean pain with these goals in mind, however opioid prescribing is not without risk. Emerging evidence is increasingly linking short term post-operative opioid use to long term opioid addiction and dependence.

**Objective:** The purpose of this study was to determine rates of opioid over-prescribing following cesarean section at discharge from a tertiary care centre.

**Methods:** Eighty-nine patients who underwent a cesarean section at our tertiary care centre were recruited to complete a telephone survey at least 2 weeks following discharge from hospital. Information on prescriptions given, quantity and type of analgesia used, and pain control satisfaction was collected.

**Results:** Eighty-nine patients (80%) completed the telephone survey. Ninety-seven percent received an opioid prescription at the time of discharge, but only 59% used the prescribed opioid. Co-analgesic use was reported by 96%. Of those who used their opioid prescription, only 61% used more than 5 tabs (morphine 5mg, or hydromorphone 1mg). Of patients who did not use opioids, 89% rated pain control as ‘very good’, where only 56% of those who used opioids reported ‘very good’ control (p < 0.05).

**Conclusions:** There are high rates of opioid over-prescribing at our tertiary care centre. Patients are not using excess opioid prescribed as pain control is adequate with co-analgesics alone (acetaminophen and NSAIDS). These findings will hopefully reduce rates of opioid over-prescribing for patients following cesarean section.

[Return to Morning Session]
(O2) Knowledge and attitudes regarding intrauterine contraception among Canadian gynecologists and family physicians
Kerry Howatt MD (PGY-5) 1, Audrey Binette2, Jessica Pudwell1, Ashley Waddington1
1. Department of Obstetrics and Gynecology, Queen’s University, Kingston, ON, Canada and
2. Department of Obstetrics and Gynecology, Sherbrooke University, Sherbrooke, QC, Canada

Objectives: To identify knowledge gaps and attitudinal barriers to prescribing intrauterine contraception (IUC).

Methods: We conducted a national, web-based survey of Canadian gynecologists and family physicians (FPs). The survey was distributed through several channels, including physician databases, invitations through commercial email aggregating service, and contacting residency programs. For knowledge-based questions, correct answers were those consistent with Canadian practice guidelines. Ethics approval was granted through Queen’s Health Sciences Research Ethics Board. Project funding was through a research grant from Bayer Inc.

Results: 600 responses were received. Gynecologists’ knowledge about IUC (number correct /40) was better than that of the FPs and FPs with additional gynecology training (median[IQR]=39[37-40], 36[32-38], & 37[35-39]; p<0.0001). Factors associated with lower scores included rural practice location, lack of affiliation with medical trainees, extremes of practice duration, and self-perceived lack of knowledge about IUC.

Most respondents prescribed IUC (93.7%). Among prescribers, 97.0% insert IUC. The most common reasons for not prescribing or inserting IUC included lack of training, lack of comfort, and referral to other physicians to provide this service.

Respondents indicated that they would be more likely to prescribe and/or insert IUC if cost barriers were removed, patient interest was increased, or if there was improved access to patient-centered educational materials and hands on training modules.

Conclusion: This study suggests that while many gynecologists and FPs are offering IUC, misconceptions regarding contraindications still exist and several barriers are related to deficiencies in provider knowledge. Therefore, educational efforts should be prioritized to increase the usage of IUC.

Key words: intrauterine contraception, LNG-IUS, Cu-IUD, knowledge
(O3) Prevalence of Chlamydia Trachomatis and Neisseria Gonorrhea Among Pregnant Adolescents Screened Routinely in the 3rd Trimester Using a Urine PCR Test for Diagnosis: A Retrospective Chart Review
Prabhpreet Kaur Hundal (Meds 2018), Julie G Thorne, Jessica Pudwell, Mary Anne Jamieson. Kingston General Hospital, Queen’s University

Objectives: Current Canadian antenatal care guidelines include screening for chlamydia and gonorrhea (C&G) in the first trimester for all women and repeat third trimester screening for adolescents (<21 years). This study aims to assess the rate of new and recurrent C&G infections in a multidisciplinary Adolescent OB Clinic. We hypothesize it would be appropriate to do targeted repeat screening in the adolescent population.

Study methods: Routine third trimester screening using urine nucleic acid amplification testing for C&G commenced in the Adolescent OB Clinic in October 2016. All charts were reviewed retrospectively; demographic and pregnancy data, results from screening at entry into care, third trimester (33-37 weeks), and any other STI testing was recorded.

Results: Thirty-four adolescents (mean age 17.7±1.5 years) delivered as of October 2017 (data collection ongoing). Screens were performed on all patients at entry into care; 13/34 at ≤13 and 21/34 at 14-27 weeks. At entry, 3 patients tested positive for chlamydia (all 1st trimester). Of 33 patients who delivered >32 weeks, 28 had routine 3rd trimester screening. None of these screens were positive. For the remaining 5/33, 1 was non-compliant with antenatal care, 1 delayed treatment for earlier positive test, (delaying test-of-cure (TOC) until 3rd trimester), 1 delivered before a scheduled 3rd trimester screen, 1 continued to be positive for Chlamydia (despite treatment for earlier positive test and treatment for positive TOC) and 1 screen was not performed by provider (an oversight).

Conclusions: In this Adolescent OB Clinic, routine 3rd trimester screening failed to identify any new or recurrent C or G infections that would not have been identified otherwise. Some communities may not get the same benefit from routine C or GC 3rd trimester screening of their adolescent obstetrics population.

Funding source: Queen’s Work-study Program

[Return to Morning Session]
Objective: (1) Report the incidence of urinary retention (UR) after midurethral sling (MUS) procedures, (2) identify risk factors for postoperative UR, and (3) validate a voiding trial algorithm previously proposed, whereby post op trial of void (TOV) was successful if the voided volume was ≥200mL, or 100-199ml with PVR <50%, against our local TOV.

Study Methods: A retrospective cohort study was conducted on patients’ charts who had an outpatient MUS procedure between January 2010 – June 2017 by a Urogynaecologist. Patients were excluded if the patient was male, or if the chart lacked a first void voided volume or PVR. If a patient had a repeat MUS in the study period, only the first one was included. Baseline data, urodynamic reports, surgical records, and outpatient records were reviewed. Urinary retention (UR) was defined as being discharged from day surgery needing catheterization if after retrograde filling with 300ml, the patient could not void at least 150ml on up to two separate attempts. Logistic regression was utilized to determine factors influencing UR. Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were calculated to determine screening value of a 1st voided volume of ≥200mL or 100-199 with PVR <50% as ‘no retention’. A \(p\) value <0.05 was used to denote statistical significance.

Results: Of 303 women who received a MUS, we included 201 patient charts, of which complete voiding trial data was available for 166 women. Mean age was 54 years (SD=10), median BMI was 29 (IQR=26-34), and 93% of patients for whom the information was available self-identified as Caucasian (113/122). Incidence of UR after surgery was 17% (35/201). Patients presenting with UR were significantly older [median (IQR) 55 years old (50-62) vs. 51 yo (46-61)], and more likely to have had a retropubic MUS (51% vs 16%, adjusted OR 5.4 [2.4-11.9]) than a transobturator MUS. Spinal anesthesia, BMI, weight, race, operative time, and urodynamic factors were not associated with UR.

Table 1. Post-operative trial of void results by our local protocol versus the proposed algorithm.

<table>
<thead>
<tr>
<th>Algorithm Retention: &lt;100 or 100-199 with PVR of &gt;50%</th>
<th>UR</th>
<th>NO UR</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>23</td>
<td>13</td>
<td>36</td>
</tr>
<tr>
<td>Algorithm No Retention: ≥200 or 100-199 with PVR &lt;50%</td>
<td>1</td>
<td>129</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>142</td>
<td>166</td>
</tr>
</tbody>
</table>

In our study, the proposed algorithm therefore has sensitivity of 96% (95% CI 79-100), specificity of 91% (95% CI 85-95), PPV 64% (95% CI 46-79), and NPV 99% (95% CI 96-100) when compared to our local TOV protocol.

Conclusions: Overall, 17% of our patients had UR postoperatively. The proposed algorithm appeared to be reliable for those identified as having no retention, incorrectly classifying only one woman out of 130. However, the PPV was poor as the proposed algorithm would have incorrectly identified 36% (13/36) of women as having UR. Advancing age and retropubic route were associated with increased UR, but not spinal anesthetic, BMI or OR time.
Objectives: To determine the prevalence, impact and management of urinary incontinence (UI) among Rope Skipping (RS) athletes.

Study Methods: Survey #1 (current athletes) – Competitive female RS athletes ages ≥13 years, attending the 2017 Rope Skipping Canadian Championships in Kingston, ON received a questionnaire that was collected during the competition. Primary outcome was the prevalence of UI during RS (yes to the question, “Do you leak urine during Rope Skipping activities?”). An 11-point Likert scale (0-10) was used to assess interference with RS activities: “Overall, how much does leaking urine interfere with your Rope Skipping activities?” We used the ICIQ-SF to evaluate quality-of-life. An unvalidated sport-specific questionnaire assessed UI prevalence and bothersomeness for each RS event type (“not at all-0”, “slightly-1”, “moderately-2”, “greatly-3”). Data was collected on UI management while RS and UI risk factors.

Survey #2 (retired athletes) – Retired RS athletes were invited to complete an online survey on their reasons for retiring from RS, with UI listed as one of the options. The questionnaire was disseminated by Rope Skipping Canada via email and social media, May-August, 2017.

Results: Survey #1 – 162 athletes were approached; 89 surveys were completed (55%). Results are reported as median (IQR). The median age was 16 years (14-20) and BMI was 21 kg/m² (20-23). Subjects practiced RS 360 minutes/week (240-360), 88% were menarchal and 93% nulliparous. Seventy-five percent reported UI during RS. Among those athletes, 21% (14/67) indicated that the overall interference of UI with RS was moderate or greater (score of ≥ 4 on the interference question). The ICIQ-SF score in incontinent athletes was 4 (3-6). Consecutive ‘double unders’ and ‘triple unders’ were associated with the greatest prevalence of UI during competition, 67% (36/54) and 86% (48/56), respectively. During competition and practice, 6% (4/67) and 16% (11/67) respectively ceased participation in these two events due to UI. Athletes managed their UI with containment products (38%), fluid limitation (20%) or by voiding before (72%), or between RS events (71%). Despite the significant impact of UI on some athletes, none were receiving treatment for it. Menstruating athletes were 8 times more likely to have UI than premenarchal athletes (95% CI 1.5 – 56).

Survey #2 – Seventy-four females and 3 males completed the online questionnaire. Only one (female) athlete (1%) identified that UI was one of several reasons for retiring from RS.

Conclusions: Similar to other high-impact sports, female RS athletes experience a very high rate of UI while participating in RS, which can lead to sport attrition. This research will help guide UI awareness, prevention, and management strategies for RS athletes, coaches, parents and organizations.

Funding Source: Rope Skipping Canada
Objective: Reliable long acting reversible contraception (LARC), such as intrauterine contraceptives (IUCs), is essential to preventing unintended and subsequent termination of pregnancy. Education on current and planned future contraception is routinely provided at the time of first trimester therapeutic abortion (TA). The purpose of this study was to (1) compare characteristics and contraception choice among patients presenting for a repeat vs first-time TA and (2) to examine predictors of reliable contraception choice.

Study Methods: A retrospective chart review was performed with data collected from an intake sheet between January 1, 2016 and December 31, 2016. Age, gravidity, parity, weeks gestational age, previous number of TAs, smoking status, postal code, contraception used at time of current pregnancy and intended future contraception were collected. Information from Statistics Canada was used to estimate income quartile based on postal code. Student’s t-test, the Mann Whitney U test and the chi-square test were used, as appropriate, to compare groups. Fisher’s exact test was used when cell counts were less than 5. All multiple comparisons were corrected using Bonferroni’s multiple comparisons test. Logistic regression was used to examine predictors of reliable contraception choice post TA. P<0.05 was considered statistically significant. The analysis was completed using SPSS v24 and GraphPad Prism v6.07.

Results: 528 patients with a median age of 24 years [IQR 21-29] presented for a TA. 66% of all patients were not using any contraception at time of presentation. Among those using contraception at presentation, the pill/patch/ring was the most common choice 102/183 (56%). Overall, 55% of all patients chose an IUC for contraception following TA, with 255/292 (87%) of those inserted immediately following the procedure.

151/528 (29%) of patients presented for repeat TA. Differences between the repeat and first TA populations included an older median age (28 [IQR 24-32] vs 23 [IQR 21-28]), a higher gravidity and parity, an increased prevalence of smoking (57% vs 37%), and lower income (p<0.05). A lesser proportion of repeat vs first TA patients (20% vs 29%) chose a pill/patch/ring method for future contraception (p<0.05). In contrast, a greater proportion of repeat vs first TA patients (7% vs 1%) chose permanent sterilization for future contraception (p<0.05). No difference in the proportion choosing IUC (58% vs 54%) or injection (9% vs 6%) was observed (p>0.05). Gravidity was found to be the only statistically significant predictor of reliable contraception choice. For each one-unit increase in gravidity, the odds of choosing sterilization or LARC versus any other method (including none) increased by 15%.

Conclusion: LARC was the most common choice for future contraception, regardless of the number of previous TA, and the rate of insertion at time of procedure was high. Increasing gravidity was associated with increased odds of choosing a reliable form of future contraception. Furthermore, a greater proportion of first TA patients chose a pill/patch/ring method for future contraception. Additional education and interventions among the first TA and/or lower gravidity patient population may improve the uptake of reliable contraception.

Funding source: None
(O7) A comparison of contraception choices following therapeutic abortions performed in 2011 and 2016 in Kingston, Ontario
Lauren Wilson (Meds 2019), Jessica Pudwell, Ashley Waddington

Background
Over the years, there has been a growing recognition of the use of long-acting reversible contraception (LARC) to reduce rates of unintended pregnancy, as they are more effective methods of contraception compared to all other methods. Intrauterine contraceptives (IUC), including both progestin-containing intrauterine systems and copper intrauterine devices, are types of LARC. The purpose of this study is to 1) compare the contraception choices of women after a TA in 2011 with the choices in 2016 and 2) compare the post-TA contraception choices of repeat terminations in 2011 with those of 2016.

Methods
A retrospective chart review of therapeutic abortions completed at the Women’s Clinic at Kingston General Hospital was performed. Charts were compiled from two different time periods: January 1, 2011 to December 31, 2011 and January 1, 2016 to December 31, 2016. Age, gravidity, parity, gestational age, previous number of therapeutic abortions, smoking status, postal code, contraception use at the time of current pregnancy, intended future contraception were collected

Results
A total of 330 patient charts were reviewed for the 2011 cohort, and 528 were reviewed for the 2016 cohort. For both cohorts, the most common choice of contraception of the individuals using contraception at the time of the TA was the pill, patch or ring with 77/147 (52%) of individuals in 2011 and 102/183 (56%) in 2016. Following the TA, in 2011, 43% of individuals chose to use the pill, patch, or ring, 12% chose Depo-Provera and 41% chose an IUC. In 2016, following the TA, 26% of individuals intended to use the pill, patch or ring, 7% chose Depo-Provera and 55% chose an IUC. Of note, for those who chose an IUC as their contraception, in 2011, 67/135 (50%) of IUCs were inserted the same day after the procedure whereas in 2016, 255/292 (87%) were inserted on the same day. In 2011, among individuals using the pill, patch or ring at the time of TA, 30% of individuals having their first TA switched to an IUC or sterilisation and 65% stayed with the pill, patch or ring. This is statistically significant (p<0.05) when compared to those having a repeat TA and using the pill, patch, or ring where 61% switched to an IUC or sterilisation and 26% continued with the pill, patch, or ring. Of those using no contraception at the time of TA, 33% of individuals having their first TA chose IUC or sterilisation, and 54% of individuals having a repeat TA chose an IUC or sterilisation. Data comparisons for 2016 are pending.

Conclusion
There was an increase in the number of IUCs chosen as the method of contraception in 2016. Individuals presenting for a repeat TA were more likely to choose an IUC. There has also been an increase in the number of IUCs inserted on the same day of the TA in 2016 when compared to 2011.
No woman left behind: Moving toward a pan-Canadian strategy for universal BRCA testing in ovarian cancer. A retrospective study of the Kingston Regional Cancer Centre

Alida Pokoradi (PGY-2), Angela Hui, Jagdeep Walia, Julie-Ann Francis

**Objective:** Ovarian cancer represents 2.9% of all cancers in Canadian women and accounts for 4.7% of all cancer deaths in Canadian women. Inherited BRCA1/2 mutations account for 13-15% of high-grade ovarian cancer cases. The Society of Gynecologic Oncology of Canada recently published a position statement recommending BRCA mutation testing as part of the ovarian cancer care pathway. This study aimed to determine the proportion of women cared for at the Kingston Regional Cancer Centre (KRCC) who have been diagnosed with ovarian carcinoma and subsequently referred for genetic testing from March 31, 2012 until April 1, 2017.

**Study methods:** Potential patients were identified from the Cancer Care Ontario database. Patients were included if they had a recorded diagnosis of ovarian, fallopian tube, or primary peritoneal cancer. Cancer diagnosis was confirmed by pathology documentation on PCS. Referral to Medical Genetics and gene testing in Kingston were also confirmed through PCS.

**Results:** 219 women were diagnosed with high-grade serous ovarian cancer (HGSOC) during the study period, of whom approximately 10% were BRCA mutation positive. Trends were seen for increasing annual rates of HGSOC diagnoses and of BRCA mutation detection. The referral rate to Medical Genetics was approximately 70% at the study’s initiation to 100% in 2017. Approximately 95% of patients referred pursued genetic testing. The time from Medical Genetics referral to clinical appointment and testing time is 6-9 months.

**Conclusions:** With the referral rate and uptake of genetic testing approaching 100%, the workload attributable to HGSOC is increasing for both Gynecologic Oncology and Medical Genetics. The efficiency of facilitating Medical Genetics referral for appropriate patients at KRCC has been improved by introduction of a research coordinator.

**Funding source:** None
(O9) Correlation of POPQ Points C and D with Cervical Width and Length in Hysterectomy Patients – Oral Presentation Preference
Andrew McNaughton (Meds 2019), Jessica Pudwell, Marie-Andrée Harvey
Kingston General Hospital, Queen’s University.

Objectives: The Pelvic organ quantification system (POPQ) is a standardized examination method for pelvic prolapse. However, misclassification can potentially occur in women with larger cervix, assigning these as having stage 1 prolapse despite absence of true prolapse. We sought to determine, in patients with pelvic organ prolapse, whether cervical width rather than cervical length was more accurately described by the measurements obtained on POPQ.

Study Methods: We reviewed charts from women who underwent hysterectomy at this academic center. Cervical length and width were obtained from pathology reports. POPQ points C and D and their difference was recorded and calculated from preoperative examination. A linear regression was performed comparing cervical length and width to POPQ points C, D, and D-C to determine correlation and control for risk factors for prolapse (age, BMI, parity and hormonal status).

Results: Out of 118 charts, 108 charts had complete data. The most common surgical indication was prolapse. No significant correlation was found between cervical length and POPQ measurements. Cervical width showed a nonsignificant mild correlation with POPQ point C. No significant correlation was noted with other measurements. Results were similar when controlling for age, vaginal parity, and apical POPQ stage.

Conclusions: This challenges the assumption that the distance between POPQ points C and D reflects cervical length. The results do suggest that these points may best reflect cervical width, the implications of which would affect POPQ staging.

Funding Source: William Samuel Thomas Connell Memorial Studentship

[Return to Afternoon Session]
Objectives - Pre-eclampsia (PE) is a maternal hypertensive disorder associated with elevated lifetime risk for cardiovascular disease through mechanisms poorly understood. Microvascular dysfunction-imbalances in vasodilatory potential- has been reported in women following a pregnancy complicated by PE. It is hypothesized that microvascular dysfunction precedes later life macrovascular dysfunction, which manifests clinically as cardiovascular disease. Postpartum microvascular assessment could characterize the microvascular changes that occur after PE. This study aims to use laser speckle contrast imaging (LSCI) to determine the extent to which PE is associated with endothelial-dependent and endothelial-independent microvascular changes in the postpartum. The degree of correlation of microvascular variables to macrovascular indicators of vascular health will also be assessed.

Methods - Women with previous PE (N=6) and normotensive controls (N=6) between 6 months and 5 years postpartum have been recruited. All participants delivered singleton pregnancies and had a medical history free of cardiovascular disease, hypertension, or diabetes. Participants were sorted into high- and low-risk groups using lifetime cardiovascular risk scores derived from chart review. Microvascular reactivity in the right volar forearm was assessed using laser speckle contrast imaging (moorFLPI-2, Moor Instruments Inc, Axminster, UK). Iontophoresis of 1% acetylcholine and sodium nitroprusside solutions, which elicit endothelial-dependent and –independent vasodilation respectively, was performed in electrode chambers affixed to the forearm. Stepwise application of current (20 µA, 50 µA, and 2 applications of both 100 µA and 120 µA) was conducted using an iontophoresis controller (MIC2, Moor Instruments Ltd, Axminster, UK). Finally, a three-minute post-occlusive reactive hyperaemia test was employed to test endothelium-dependent flow-mediated vasodilation using a blood pressure cuff inflated to suprasystolic pressures (moorVMS-PRES, Moor Instruments Ltd, Axminster, UK). A two-dimensional carotid ultrasound scan was conducted on both left and right carotid arteries using a Vivid E9 Echocardiography Machine (GE Healthcare, Wisconsin, USA) to assess carotid intima media thickness (CIMT), plaque burden, and carotid strain (a marker of vessel wall stiffness).

Results - Analyses of high- and low-risk groups for cardiovascular disease and macrovascular measures are forthcoming. There were no significant differences between preeclamptic and normotensive participants save for GA at delivery and systolic BP (P<0.05). Vasodilation significantly increased with iontophoretic dose among both groups compared to 20 µA of current (P<0.05). Preeclamptic women trended towards greater vasodilation than normotensive women at higher doses of ACH. This trend reached significance at the second application of 120 µA (P<0.05). There were no significant differences between subject groups in SNP-mediated vasodilation (P<0.05). No significant differences were found between preeclamptic and normotensive participants in post-occlusive vasodilation or time to half recovery.

Conclusions - Preeclampsia during pregnancy may be associated with changes in endothelium-dependent microvascular reactivity. The precise relationship of preeclampsia and the microvasculature may be masked by low participant numbers at this preliminary stage.
Objective: In Canada, thyroid cancer is the fifth most common cancer diagnosed among women and has the most rapidly increasing incidence rate among all major cancers. An estimated 5,400 women will be diagnosed with thyroid cancer in 2017, with most of the cases occurring in women 15-49 years of age. The rates of thyroid cancer among women increased 6.5% per year between 1992 and 2013. This change is likely a result of increased surveillance and use of diagnostic technologies leading to diagnosis of more early stage, asymptomatic thyroid cancers. Unnecessary treatment as a result of increased surveillance is associated with substantial side effects, often without improvements in survival rates. Preliminary analyses by our team, using ICES data, suggest an association between thyroid cancer diagnosis in women 15-39 years old and subsequent infertility diagnosis (ICD-9 code for infertility). The main objective of this study is to expand on this finding and examine factors that might influence the relationship between thyroid cancer and subsequent infertility diagnosis, specifically cancer stage and type of treatment.

Study methods: We have assembled a population-based matched cohort study using health care databases in the province of Ontario through the Institute for Clinical Evaluative Sciences (ICES) Data Repository. The cohort includes 5144 women with thyroid cancer, and 21,846 cancer-free women to serve as matched controls. Controls and women with a diagnosis of infertility previous to cancer diagnosis were excluded from the cohort. Log-binomial regression models will be used to calculate the risk of infertility diagnosis according to stage of thyroid cancer, and type of treatment controlling for income quintiles, immigration status, and health seeking behaviour. The potential interaction of parity, and infertility diagnosis will be tested via inclusion of cross products in the model.

Expected results: It is hypothesized that the type of treatment received will be associated with subsequent risk of infertility. More specifically, it is expected that exposure to radioactive iodine treatment will be associated with an increased risk. It is also hypothesised that parity will be an effect modifier of this relationship.

Conclusion: In a recent survey, female cancer patients aged 15-45 years rated the impact of cancer treatment on fertility to be of utmost importance. Our study has the potential to increase understanding regarding the reproductive health needs of young adult females with thyroid cancer and provide information that could improve reproductive health outcomes for young adult females with cancer.

Funding source: Queen’s University
A study of coping with fear of cancer recurrence among ovarian cancer survivors living outside of large metropolitan centres: The FEARLESS Study
Jacqueline Galica (Postdoctoral Fellow), Jan Giroux, Julie Ann Francis, Christine Maheu
Cancer Centre of Southeastern Ontario and McGill University

Objective: Fear of cancer recurrence (FCR) is a paramount concern among ovarian cancer survivors. It is suggested that cancer survivors living outside of large metropolitan centres have higher psychological morbidity, however, no known studies have explored the methods by which ovarian cancer survivors living outside of large metropolitan centres cope with FCR. This study’s overall objective is to examine how ovarian cancer survivors living in the Kingston and surrounding area cope with FCR. Specific study objectives are: i) to explore the resources used by ovarian cancer survivors to cope with FCR; and ii) to explore ovarian cancer survivors’ styles of coping with FCR.

Study methods: Eligible participants were English-speaking women greater than 18 years of age who had a diagnosis of ovarian cancer and treatment at the Cancer Centre of Southeastern Ontario. Eligible, consenting participants completed a demographic form and Fear of Cancer Recurrence Inventory, and clinical information was extracted from hospital charts. Participants engaged in semi-structured focus groups at Kingston Health Sciences Centre or 1:1 telephone interviews. Verbatim transcripts were analyzed using qualitative descriptive methods and discussed in relation to a common conceptualization of coping.

Results: Fifteen participants consented to participate for whom quantitative data was collected. The average age of the sample was 62.8 years (range 51-76 years) and the mean time since diagnosis was 2.6 years (range 1-19 years). Sixty percent of participants had been diagnosed with FIGO stage 3, and over 90% of the sample had a level of FCR that was clinically-significant. Five participants engaged in one of 2 focus groups, while nine participants answered these same questions via 1:1 telephone interview. Open codes were categorized, and categories revealed themes from study data that will be described in alignment with a common conceptualization of coping (e.g., coping resources and coping styles). Clinical implications will be discussed.

Conclusions: This descriptive study fills an important gap in the existing literature. Results are intended to serve as a catalyst for program development and/or subsequent research using integrated knowledge translation strategies. It is intended that this approach will meet the psychosocial needs of patients and survivors receiving care at the Cancer Centre of Southeastern Ontario.

Funding Sources: Ovarian Cancer Canada Visiting Trainee Award; Sigma Theta Tau International/Canadian Nurses Foundation Research Grant; Réseau de recherche en interventions en sciences infirmières du Québec/Québec Network on Nursing Intervention Research Postdoctoral Fellowship.

[Return to Afternoon Session]
Prenatal Zika Virus Infection in Brazil, 2016: the year that it was declared a Public Health Emergency of International Concern

Luciana Guerra Gallo (Visiting Research Student)¹,²,³, Henry Maia Peixoto¹, Wildo Navegantes de Araújo¹, Maria Velez²,³.
1 - Tropical Medicine Post Graduate Department, University of Brasilia - Brazil
2 - Department of Public Health Sciences, Queen’s University.
3 - Department of Obstetrics and Gynecology, Queen’s University

Objectives: In 2015, Brazil experienced a Zika virus outbreak. Women exposed to ZIKA virus during pregnancy are at risk of Prenatal Zika Virus infection (PZIKV), that can result in microcephaly, intrauterine growth restriction, miscarriage, and stillbirth. The objective of our study is to describe the epidemiological profile of the suspected cases of PZIKV reported in the Public Health Event Registry (RESP) during 2016 in Brazil.

Methods: Descriptive statistics of all suspected cases of PZIKV registered in the National Public Health Event Registry (RESP) in 2016, in Brazil. We used StataSE 15 to conduct the analysis.

Results: A total of 7407 suspected cases of PZIKV were registered in RESP during 2016. Mean maternal age was 25 years (SD7.2), 3,687 (50%) were considered as black women and 1145 (15%) as white. The geographical distribution was: Northeast, 4025 cases (54%) - Incidence Rate of 5.16 per 1,000 births; Southeast, 2079 (28%) - 1.87 per 1,000 births; North, 545 (7%) - 1.92 per 1,000 births; Central-West, 518 (7%) - 2.21 per 1,000 births; and 240 (3%) - 0.61 per 1,000 births, in the South Region. In terms of time of diagnosis, 6,734 (91%) were considered suspected cases after delivery, while 489 (7%) were considered suspected cases and notified during pregnancy – 101 (21%) of them based on exanthema during pregnancy. There were 116 (2%) stillbirths and 68 (1%) miscarriages. A total of 847 (11.44%) women had reported symptoms of Zika virus infection during pregnancy. Of the 7,407 cases, 1,113 (15%) were tested for Zika virus and 433 (39%) of them were positive. Regarding ultrasound during pregnancy, 1,235 women (17%) had at least one abnormality reported, 1,074 (14%) had normal ultrasound report and 5,098 (69%) did not have information available. Microcephaly was diagnosed in 4,123 (56%) of the 7,407 suspected PZIKV cases. Of these, 2,876 (70%) had microcephaly detected at birth or during the neonatal period, of which 845 (29%) had normal ultrasound reports during pregnancy. There was information available for 6358 live births (86% of the suspected cases). Mean birth weight was 2,640g (SD484) and 1,097 (17%) were preterm births.

Conclusion: Corroborating with other authors, our study showed a high incidence of PZIKV in the Northeast region of Brazil, the region of highest socioeconomic disadvantage in Brazil. The suspicion of PZIKV infection during pregnancy and a timely diagnosis is a challenge in Brazil.

Funding Sources: CNPq/CAPES/MS; FAP-DF. The first author is sponsored by the Brazilian Federal Agency for Support and Evaluation of graduate Education - bolsista da Capes/PDSE/Processo n°88881.133664/2016-01.
Background: The patterns of sexual behaviour in adolescents have evolved and continues to evolve. While changes in the Ontario secondary school curriculum have aimed to address gaps in sexual and reproductive health (SRH) education, limited research has been conducted on the SRH life experiences of students. Recent studies report teens that have completed their high school sexual education requirements lack knowledge about sexually transmitted infections and their consequences, reproductive physiology, contraception, HIV/AIDS and sexual assault. Additionally, 45% of Ontario students have indicated that SRH education classes did not address their concerns. A key characteristic discussed in the United Nations’ International Technical Guidance on Sexuality Education was the importance of assessing the social, SRH needs and behaviours of adolescents in the development of educational programming. In Ontario, this characteristic is not being met actively, as SRH education is not effectively evaluated or built on the perceived experiences of students themselves. Concurrently, young girls have complicated SRH needs coupled with early physical development and social pressures. BLISS – building lessons in sexual health stories aims to address this evolving landscape and give voice to student’s experiences, especially young girls, by evaluating the effectiveness of SRH education in Kingston while also providing useful indicators to future SRH program developers.

Objective: This study aims to assess adolescent sexual and reproductive health needs, design programming and create a learning space for high school girls in the Kingston community by building lessons on sexual health stories.

Study methods: To evaluate SRH educational experiences, we will complete a mixed-methods needs assessment, focusing primarily on qualitative data. This approach will utilize Grounded and Eisner’s Inquiry Theory. This study will utilize primary elements of participatory methods to speak to the autonomy of the young girl target population whilst incorporating stakeholder voices. This participatory perspective will utilize a culturally-centered dynamic, putting the social and cultural needs of the girls in conjunction with their SRH education needs. We plan to:
1) Conduct a review of literature on SRH education within the Ontario education system and community networks.
2) Design and conduct an assessment of knowledge and retrospective needs through lived experiences of university students in the Kingston community.
3) Design and conduct a needs assessment of SRH knowledge perceptions, gaps and lived experiences of high school girls in the Kingston community.
4) Identify the unmet SRH needs to inform the design of SRH programming for high school girls.
5) Implement and evaluate the SRH program on effectivity, efficiency, impact and relevance to create an informative report to improve and develop the program further.

Conclusions: This research will ultimately work towards improving the SRH landscape (education and learning spaces) for adolescent high school girls in the Kingston and subsequently Southern Ontario throughout the next five years.

Funding Sources: Women’s College Hospital Women’s xchange (Pending), Indigo Girls Group
(O15) Exploring the early postnatal period as a potential time for correction of cognitive and neuroanatomical alterations in preeclampsia-affected offspring using a mouse model

Vanessa R. Kay¹ (MD/Ph.D. candidate 2020), Lindsay Cahill², Anas Hanif³, John G. Sled², Chandra Tayade¹, B. Anne Croy¹

¹Department of Biomedical and Molecular Sciences, Queen’s University, Kingston, ON, Canada
²MICe, Hospital for Sick Children, Toronto, ON, Canada

Background: Offspring born to preeclamptic pregnancies have cognitive alterations and higher risk of stroke later in life subsequent to developmental insult. However, treatment of PE-offspring in utero is complicated by the barrier function of the placenta. We hypothesized that the neonatal period of brain plasticity is a potential window for supplementation of infants born to PE-affected mothers to reduce long-term preeclampsia consequences. Placental growth factor (PGF), known to be deficient in preeclampsia, influences brain development suggesting that the altered adult behaviour, neuroanatomy and brain vascularization in Pgf⁻/⁻ mice can model the offspring effects of a PE-gestation experience. Here we investigate if treatment with recombinant PGF over a short postnatal period can correct, either partially or completely, the behavioural, neuroanatomical and cerebrovascular deficits seen in Pgf⁻/⁻ mice.

Objective: To assess behavioural, brain structural, and cerebrovascular changes in adulthood after treatment of early postnatal Pgf⁻/⁻ mice with PGF.

Methods: C57BL/6-Pgf⁻/⁻ mouse pups were weighed and treated daily with phosphate-buffered saline (PBS) or PGF at doses of 10 pg/g (physiological), 70 pg/g (peak gestational) or 700 pg/g (supraphysiological) i.p. from postnatal day (P) 1-10. As adults, mice underwent behavioural testing including the Open Field Test (OFT), Tail Suspension Test (TST) and Y-maze Spontaneous Alternation Test (YMSAT). Subsequently, mice were perfused with gadolinium contrast for magnetic resonance imaging of the neuroanatomy or with Microfil for micro-computed tomography imaging of the cerebral vessels. One-way ANOVAs or Kruskal-Wallis tests were used to compare adult weights and performance on behavioural testing. Two-way ANOVAs were used to examine pup weights over the treatment period and sex-differences.

Results: Pup weights were significantly decreased in the treated groups beginning on P7 but there was no difference in adult weight. In the OFT, 10 pg/g-treated male and female mice exhibited significantly decreased time moving (p<0.0001), total distance travelled (p=0.0033) and percent of time spent in the centre (p=0.0003) suggesting decreased exploratory and increased anxiety-like behaviour. In the TST, time to immobility showed a sex-specific, dose-dependent increase and was significantly higher in 700 pg/g treated females (p<0.0001) suggesting less depressive-like behaviour. There was no difference in performance on YMSAT. MR and μCT image analyses are continuing.

Conclusion: PGF replacement altered adult behaviours in Pgf⁻/⁻ mice suggesting the postnatal time period is a viable window for intervention to correct developmentally-induced deficits.

Funding sources: Supported by awards from NSERC (BAC), CIHR (CT) and a CIHR training stipend (VRK)
(O16) IL-13 and IL-33 polarize macrophages to the M2 phenotype and contribute to endometriosis pathophysiology
Ryan M. Marks (B.Sc. Candidate)\textsuperscript{1}, Jessica M. Miller\textsuperscript{1}, Vanessa Kay\textsuperscript{1}, Lindsey Symons\textsuperscript{1}, Asgerally T. Fazlebas\textsuperscript{2}, Chandra Tayade\textsuperscript{1}
\textsuperscript{1} Department of Biomedical and Molecular Science, Queen’s University, Kingston ON, Canada
\textsuperscript{2} Obstetrics, Gynaecology and Reproductive Biology, Michigan State University, Lansing MI, USA

**Objectives:** Endometriosis is a chronic, inflammatory, gynaecological disease characterized by the presence of ectopic, endometrial-like lesions. It has been observed that patients with endometriosis have aberrant cytokine profiles in both serum and peritoneal fluid (PF) compared to healthy women which may be conducive to lesion establishment and proliferation. Additionally, endometriosis patients have increased macrophage infiltration into the peritoneal environment, however they are alternatively activated. IL-13 and IL-33 are observed in the patient PF and are hypothesized to synergistically contribute to the polarization of macrophage to the alternatively activated (M2) phenotype. M2 macrophage are implicated in disease pathophysiology by contributing to lesion neoangiogenesis, a hallmark in endometriosis pathology. The stimulus for M2 polarization has yet to be elucidated in the context of endometriosis and is thus under investigation.

**Study Methods:** The ability of IL-13 and IL-33 to promote angiogenesis was determined using a HUVEC tube formation assay. Using the Incucyte platform, the effect of IL-13 and IL-33 on endometriotic epithelial cell proliferation was determined. To examine the effect of IL-13 and IL-33 in vivo, endometriosis was induced in C57BL/6 mice by surgically grafting syngeneic uterine fragments from donor mice. Post-recovery, mice are subjected to IL-13 and/or IL-33 or control (PBS) treatments via intraperitoneal injection. Plasma is collected weekly and PF fluid is collected by peritoneal lavage at the time of sacrifice. Both plasma and PF samples are analyzed by a commercially available 32-cytokine multiplex. Lesion proliferation and vasculature are assessed using immunohistochemistry with anti-Ki-67 and anti-CD31, respectively.

**Results:** In vitro evidence suggests that supernatants from macrophage treated with IL-13+33 are able to synergistically promote tube formation in a HUVEC angiogenesis assay compared to recombinant cytokines (p<0.05). Neither IL-13 and/or IL-33 contributes to the proliferation of endometriotic epithelial cells in vitro. The administration of IL-13 and IL-33 produces a peritoneal environment that is significantly increased cytokines involved in macrophage activation/recruitment (GM-CSF, MCP-1), Th2 (IL-4, IL-5, IL-10) responses which may polarize M2 macrophage, and VEGF (p<0.05). IL-13+33 treated lesions appear qualitatively larger and hemorrhagic, as well as score higher for proliferative and vasculature markers.

**Conclusions:** IL-13 and IL-33 are potent cytokines in the pathophysiology of endometriosis which are able to stimulate a local peritoneal environment conducive to lesion proliferation and neoangiogenesis. Inhibiting putative M2 polarizing cytokines (i.e. anti-IL-33) may prove therapeutically valuable as modulating the dysfunctional immune system observed in endometriosis is currently an unexploited therapeutic modality.

**Funding Sources:** CIHR
Characterizing Exosome Production and immunogenicity in Genetically Distinct High Grade Serous Carcinoma of the Ovaries (HGSC) cells.

Objectives(s):
1. Develop and validate a protocol to isolate exosomes from HGSC Cells
2. Compare exosome production in \( BRCA1^{null} \) and \( BRCA1^{intact} \) intact HGSC cells
3. Investigate the immunostimulatory capacity of \( BRCA1^{null} \) and \( BRCA2^{null} \) HGSC derived exosomes

Study Methods:
- 4 distinct human HGSC cell lines were used
  - \( A2780: TP53^{null} \)
  - \( PEO1: TP53^{null} BRCA2^{null} \)
  - \( UWB1.289: TP53^{null} BRCA1^{null} \)
  - \( UWB1.289+: BRCA1: TP53^{null} BRCA1^{intact} \)
- Exosome isolation was performed using differential ultracentrifugation
- Exosome fractions were characterized for purity by immunoblot
- Exosome production was visualized in cells using immunofluorescence
- Exosome immunogenicity was assessed by multiplex cytokine analysis

Results:
- Purified exosomes can be isolated from human HGSC cells
- \( BRCA1^{null} \) HGSC cells show a trend towards higher exosome production than \( BRCA1^{intact} \) intact HGSC cells
- \( BRCA1^{null} \) HGSC cells show a trend towards higher exosome production than \( BRCA1^{intact} \) intact HGSC cells after carboplatin treatment
- Exosome treatment results in activation of monocytes \textit{in vitro}
- Exosome treatment may promote the differentiation of monocytes into macrophages

Conclusions:
We describe and validate an exosome isolation protocol in this pilot study. This will be used in future investigation to study the relative contribution of exosomes to the inflamed tumor microenvironment of some ovarian cancers. This may help provide foundational basic science knowledge towards patient stratification and drug development in immunotherapeutics for HGSC.
Investigating the role of the cGAS-STING pathway in *BRCA1* mutated ovarian cancer cells

Michael Puopolo (B.Sc. candidate), Natasha Vitkin, Nichole Peterson, Madhuri Koti
Cancer Research Institute, Queen’s University.

**Objective:** The purpose of this study is to determine if constitutive cGAS-STING pathway activation in *BRCA1* mutated high grade serous carcinoma of the ovary (HGSC) is associated with increased levels of the CD8+ T cell recruiting chemokine CXCL10. Specifically, this study aims to:

1. Determine the expression of STING protein in *BRCA1* mutated and intact HGSC cell lines.  
2. Compare activity of STING pathway induced IFN-α/β, a stimulator of CXCL10, produced by *BRCA1* null and intact HGSC cells.  
3. Compare CD8+ T cell chemotactic ability of CXCL10 produced by *BRCA1* null and intact HGSC cells

**Study Methods:** All experiments took place in the Cancer Research Institute at Queen’s University. Differences in STING protein expression in UWB1.289 *BRCA1* null and UWB1.289+*BRCA1* human HGSC cell lines was determined via immunoblot. IFN-α/β activity of these cell lines was assessed using HEK-Blue™ reporter cells. CD8+ T cells were isolated from donor peripheral blood. Chemotaxis of these cells in response to *BRCA1* null and intact conditioned media was assessed by transwell chemotaxis assay. IFN-α/β activity and chemotaxis data were analyzed by one-way ANOVA. Data were considered significant when \( p < 0.05 \).

**Results:** Immunoblot revealed that *BRCA1* intact HGSC cells exhibited lower STING protein levels than *BRCA1* null cells. No significant differences were observed in IFN-α/β activity nor in CD8+ T cell chemotactic ability of both cell lines. However, there was a slight insignificant decrease in T cell migration in the *BRCA1* intact group compared to the null group \( (p=0.2891) \).

**Conclusion:** No significant evidence was found for an association between STING pathway activity and IFN-α/β activity nor CD8+ T cell migration. This study serves as a pilot study to provide further justification for a STING-silencing experiment that aims to establish a causal link between STING activity and CD8+ T cell migration in *BRCA1* mutated HGSC. Findings from that study may contribute to the understanding of intrinsic mechanisms of cancer cells that can contribute to clinical chemosensitivity in HGSC. In the long-term, such studies may aid in patient stratification for immunomodulatory treatment strategies.

[Return to Poster Session]
(P2) STAT1 associated immune checkpoint gene expression indicates adaptive immune resistance in chemotherapy sensitive high grade serous ovarian tumours

Thiago Vidotto¹ (International Visiting Ph.D. Candidate), Nichole Peterson², Barbara Vanderhyden³, Manon de Ladurantaye⁴, Anne-Marie Mes-Masson⁴, Julie-Ann Francis², Madhuri Koti¹,²,⁵
¹Department of Biomedical and Molecular Sciences, Queen’s University
²Department of Obstetrics and Gynecology, Queen’s University
³Ottawa Hospital Research Institute, University of Ottawa
⁴Centre de recherche du Centre hospitalier de l’Université de Montréal (CRCHUM)/Institut du cancer de Montréal and Université de Montréal, Montreal, QC, Canada.
⁵Division of Cancer Biology and Genetics, Cancer Research Institute, Queen’s University

Objectives: Resistance to platinum chemotherapy, leading to an incurable disease after recurrence, occurs in the majority of patients with high-grade serous ovarian cancer (HGSC). In a cohort of 734 HGSC patient tumours, we previously demonstrated that IFN-induced Signal Transducer and Activator of Transcription (STAT1) is a chemotherapy response predictor and a prognostic biomarker. We also showed that high STAT1 expression enhances the prognostic relevance of CD8+ tumour infiltrating lymphocyte density. The goal of this study was to determine STAT1 associated whole transcriptomic alterations in chemosensitive and resistant HGSC tumours.

Methods: A total of 60 pre-treatment tumour specimens obtained from the Ottawa Health Research Institute, Ontario Tumour Bank and Centre hospitalier de l’Université de Montréal, were used in the study. We hypothesized that increased IFN-γ as a result of pre-existing Th1 type immune response induces the expression of immune checkpoint genes and eventual adaptive immune resistance in HGSC tumours. We performed sequencing of RNA from a pre-selected subset of 43 sensitive (high STAT1 protein) and 17 resistant (low STAT1 protein) pre-treatment HGSC tumours that were previously characterized for STAT1 expression and CD8+ tumour infiltrating lymphocyte density. Bioinformatics analysis of RNA-Seq data was performed using R Bioconductor based tools.

Results: STAT1 expression significantly correlated with immunomodulatory genes, including both immune checkpoints and activators in chemosensitive and resistant tumours. Findings were independently validated in a cohort of 379 HGSC tumour RNA-Seq profiles from The Cancer Genome Atlas Network ovarian cancer dataset.

Conclusions: These results provide further evidence for the complex roles of STAT1 in the tumour microenvironment and evidence for potential adaptive immune resistance in pre-treatment HGSC tumours. Findings will potentially inform rationalized immunotherapy trials for HGSC patients.

Funding: The Cancer Research Society and Nancy Sutherland Ovarian Cancer Fund.

[Return to Poster Session]
(P3) A novel STING agonist in combination with immune checkpoint blockade therapy enhances response to carboplatin chemotherapy in a high-grade serous ovarian cancer model
Abdi Ghaffari¹, Nichole Peterson², Kasra Khalaj³, Andrew Robinson¹, Julie Ann-Francis², Madhuri Koti¹,²,³
¹Department of Biomedical and Molecular Sciences, Queen’s University
²Department of Obstetrics and Gynecology, Queen’s University
³Division of Cancer Biology and Genetics, Cancer Research Institute, Queen’s University

Objectives: High Grade Serous Carcinoma of the ovary (HGSC) is mostly diagnosed at late stages and primarily treated with surgery followed by platinum/taxane-based chemotherapy. Unfortunately, majority of the patients exhibit resistance to chemotherapy and ultimately succumb to the disease. Our previous findings, based on 734 chemotherapy naïve HGSC patient tumours, demonstrated that tumours from patients with early recurrence show an immunosuppressed pre-existing tumour immune microenvironment with decreased expression of genes involved in Type I Interferon (IFN1) and T helper type 1 response. We thus tested the efficacy of a novel “Stimulator of Interferon Genes” agonist in the ID8-Trp53⁻/⁻ immunocompetent mouse model of HGSC.

Methods: In this pre-clinical study, a novel STING agonist was evaluated in immunocompetent mice implanted with ID8-Trp53⁻/⁻ mouse ovarian cancer cells. Immune response was measured using NanoString assay based tumour immune transcriptome profiling. Systemic immune response was measured using a combination of flow cytometry and CyTOF based immunophenotyping of splenocytes and multiplex cytokine analysis of plasma samples, at various time points post treatment.

Results: Tumours collected at endpoint showed higher intra-tumoural PD-1⁺ and CD69⁺CD62L⁻, CD8⁺ T cells, increased expression of IFN response, antigen presentation and MHCII, genes, in tumours from STING agonist treated mice compared to those from vehicle treated mice, respectively. Myeloid derived suppressor cells in spleen showed significant increases in PD-L1 expression post treatment. Similarly, significant increases in PD-1⁺CD8⁺ T cells in spleen were observed a mid-time point post carboplatin and STING agonist treatment. In addition to significantly decreased ascites accumulation and decreased tumour burden, survival of mice treated with a combination of carboplatin + STING agonist + anti-PD-1 therapy was significantly longer compared to carboplatin + STING agonist, carboplatin only, STING only and vehicle treated mice.

Conclusion: Results from this study for the first time establish the potential of STING agonists in ovarian cancer treatment. Findings are foundational to future clinical trials aimed at combinatorial immunomodulatory therapies to improve chemotherapy response and survival in HGSC patients.

Funding: Nancy Sutherland Ovarian Cancer Fund
Differential Inflammasome Pathway Activation in Endometriosis

Kiera Liblik (B.Sc. Candidate 2018), Vanessa Kay, SooHyun Ahn, and Chandrakant Tayade
Department of Biomedical and Molecular Sciences, Queen’s University

The mechanism of the chronic inflammation in endometriosis is poorly understood but increased proinflammatory cytokines in the peritoneal fluid and blood of affected women has been well-documented. Inflammasomes are cytoplasmic complexes of the innate immune system that can be activated by danger signals to stimulate the release of proinflammatory cytokines. Recent evidence has established causal link of inflammasome activation in chronic inflammatory conditions. However, even though innate immune cell functions are impaired in endometriosis, there is no information on inflammasome contribution to disease pathophysiology.

**Objectives:** 1. To determine if inflammasome activation differs between control eutopic tissue, patient eutopic tissue, and patient ectopic tissue 2. To investigate which specific inflammasome pathways are dysregulated in patient ectopic and eutopic tissue 3. To get mechanistic insight into the activation of inflammasome pathways in endometriotic epithelial cells *in vitro*

**Hypothesis:** Inflammasome activation is involved in the pathophysiology of endometriosis.

**Study methods:** Tissue samples were collected from patients who underwent laparoscopic surgery for endometriotic lesion removal at Greenville Hospital (SC, USA). Endometriotic lesions (n=9) and eutopic endometrial samples (n=9) were collected from each patient. Control endometrial samples (n=6) were obtained from healthy, fertile volunteers at University of North Carolina School of Medicine (NC, USA). Endometriotic epithelial cells (12Zs, generously provided by Professor A. Starzinski-Powitz) were treated with media (n=3), lipopolysaccharide (LPS, inflammasome primer, n=3), LPS + MCC950 (inflammasome inhibitor, n=3), or LPS + ATP (inflammasome activator, n=3). RNA was extracted from the tissue and cell samples for cDNA synthesis. The Human Inflammasomes RT² Profiler PCR Array (Qiagen, #330231) was used to determine expression of 84 inflammasome-related genes in the tissue and cell samples. Data was analyzed using the Qiagen RT²-PCR Data Analysis software with the ΔΔCT method.

**Results:** Inflammasome pathways were activated in patient ectopic and eutopic tissue (Ectopic: NLRP9, NLRC4, NLRP6, NLRP12, NLRP5, NLRP1, NLRP3, AIM2, and PYRIN, Eutopic: NLRP9, NLRC4, and NLRP6, p < 0.05) compared to healthy control tissue. Inflammasome activity was also upregulated in the patient eutopic compared to eutopic tissue (p <0.05). Endometriotic epithelial cells *in vitro* did not show inflammasome activation in response to LPS or LPS + ATP (p <0.05).

**Conclusions:** Inflammasome activation is present in both the ectopic and eutopic tissue of endometriosis patients as compared to healthy controls, indicating a role in endometriosis pathophysiology. However, endometriotic epithelial cells did not activate inflammasome pathways in response to stimulators *in vitro*, indicating that inflammasome activation may be traced to infiltrating immune cells rather than epithelial cells. The presence of inflammasome activation in endometriosis could have implications for understanding the pathogenesis of endometriosis and developing new therapeutics to alleviate endometriosis symptoms.

**Funding source:** Supported by awards from CIHR (CT).
Introduction: Preeclampsia (PE) is a hypertensive disorder that complicates 5-7% of pregnancies and is the leading cause of maternal and fetal morbidity worldwide. Carbon monoxide (CO) is actively being studied as a potential therapeutic for PE due to its proposed vasodilatory, angiogenic, and anti-inflammatory properties. CO has been shown to increase uteroplacental vascular growth and perfusion in normotensive mice, and prevent hypertension and proteinuria in PE-like mice. However, we lack an understanding as to which pathways are activated by this gasotransmitter. The overall objective of this study is to investigate the effects of low dose CO on markers of angiogenesis and inflammation, both locally and systemically during pregnancy.

Hypotheses: It is hypothesized that the administration of CO will increase angiogenesis and decrease inflammation through major angiogenic and inflammatory pathways, both locally in the placenta (Study Aim 1) and systemically in the maternal circulation (Study Aim 2). Further, we hypothesize that CO will alter the placental vasculature, analyzed using histology (Study Aim 3).

Methods: (Study Aim 1) On gestation day (GD) 0.5, dams will be placed in a CO-dosing chamber and receive 250 ppm CO until sacrifice at either GD10.5 (n=5) or GD16.5 (n=5). Five controls per time point will receive normal air. Immediately following sacrifice, RNA will be extracted from one placenta per dam using RNeasy Mini Kit (Qiagen, USA) and converted to cDNA using RT² First Stand Kit (Qiagen, USA). A custom 96 well RT² PCR Array (Qiagen, USA) will be used to quantify mRNA gene expression. Data will be analyzed using the ΔΔCt method. (Study Aim 2) Using dams from aim 1, plasma samples will be collected on GD0.5, GD5.5, GD10.5, and GD16.5. The plasma cytokine levels will be analyzed using a mouse multiplex chemokine assay (Qiagen, USA). Statistical analysis will be performed using a two-way analysis of variance (ANOVA) with repeated measures. (Study Aim 3) Placentas will be stained using hematoxylin and eosin (H&E) for gross morphological analysis. Immunohistochemistry (IHC) will be used to identify the following cell markers: cytokeratin (trophoblasts), Ki67 (cell proliferation), alpha smooth muscle actin (smooth muscle cells) and Dolichos Biflorus Agglutinin (DBA) lectin (uterine natural killer cells). For IHC markers, differential cell counting analyses will be conducted using NIH ImageJ. Student’s t-test will be used to compare placentas from control and CO treated dams.

Expected Results: Based on previous work demonstrating augmented uteroplacental vascular diameter and branching following CO exposure, we expect to see an upregulation of genes involved in angiogenesis. Further, CO has improved clinical outcomes in models of inflammatory disorders suggesting that CO may suppress inflammation. Thus, we predict that CO will increase the expression of anti-inflammatory markers and decrease the expression of pro-inflammatory markers. Lastly, we expect that CO will increase trophoblast invasion and promote vascular remodeling.

Significance: Understanding how CO may modulate angiogenesis and inflammation during pregnancy is crucial prior to therapeutic use. However, to elucidate exact mechanisms of CO during pregnancy, future studies will be needed.

Funding source: CIHR
(P6) Neutrophils and the Endometriotic Lesion Immune Microenvironment
Lindsey K Symons (M.Sc. Candidate), Soo Hyun Ahn, Bruce A Lessey, Steven L Young, Madhuri Koti & Chandrakant Tayade
1Department of Biomedical and Molecular Sciences, Queen’s University, Kingston, ON, CAN
2Department of Obstetrics and Gynecology, Greenville Health System, Greenville, USA
3Department of Obstetrics and Gynecology, University of North Carolina, Chapel Hill, USA

Objectives: Endometriosis is a chronic-inflammatory, estrogen-dependent disease characterized by the growth of endometrial tissue outside of the uterus. Affecting 6-10% of reproductive-aged women, endometriosis is a leading cause of chronic pelvic pain and infertility. Although the etiology of endometriosis remains elusive, previous studies indicate that endometriotic lesion survival is associated with immunological dysfunction involving pronounced inflammation and innate immune cell infiltration within the peritoneal cavity. Notably, neutrophil recruitment is increased in the peritoneal fluid (PF) of endometriosis patients compared to disease-free women. Emerging evidence has revealed roles for neutrophils in cancer and chronic inflammatory conditions; however, the functional role of neutrophils in endometriosis pathophysiology has not been established. Thus, the main objectives of this study were as follows: to elucidate factors within human endometriotic lesions that may influence neutrophil recruitment, to characterize neutrophil infiltration within endometriotic lesions, and to determine the endometriosis-specific neutrophil transcriptome to identify pathways underlying neutrophil heterogeneity and function in endometriosis.

Study Methods: A quantitative real-time PCR array was performed to determine expression levels of neutrophil-related genes in stage III/IV matched human ectopic and eutopic endometriotic tissue samples (n=7) and healthy control endometrium (n=6). To characterize neutrophil infiltration within endometriotic lesions (n=19) compared to matched eutopic (n=19) and control endometrium (n=26), a tissue microarray (TMA) was constructed and immunohistochemistry was performed using anti-human neutrophil elastase antibody. Peripheral blood neutrophils were isolated from endometriosis patients and healthy control women via negative immunomagnetic selection to perform subsequent RNA sequencing.

Results: Human ectopic endometriotic tissue expressed elevated levels of genes encoding neutrophil chemo-attractants such as CXCL2 and CXCL3 compared to matched eutopic and healthy control endometrium. No differences in the expression of neutrophil-specific markers such as neutrophil elastase (ELANE) and myeloperoxidase (MPO) were observed. Similarly, TMA immunohistochemical analysis revealed that few neutrophils infiltrate ovarian endometriotic lesions and eutopic/control endometrium. Further analyses in progress.

Conclusion: Factors expressed by stage III/IV endometriotic lesions may contribute to increased neutrophil recruitment to the peritoneal cavity, thereby enhancing the cycle of dysregulated immune responses in endometriosis patients. Given the poorly understood functional role of neutrophils in endometriosis, further studies are required to establish the systemic/peritoneal neutrophil phenotype in endometriosis patients and determine whether neutrophils modulate inflammation and angiogenesis in vivo.

Funding source: CIHR (CT), NIH (BAL, SLY)
**Introduction:** Pre-eclampsia (PE) is a multifactorial disease affecting 5-8% of pregnancies worldwide. Previous work has shown that women who smoke have a significantly decreased risk of PE, which has been attributed to an increase in carbon monoxide (CO) concentration in the body, up to 14% carboxyhemoglobin (%COHb). Menadione (MD), a synthetic form of vitamin K, has been shown to increase endogenous CO production in tissues of non-pregnant mice in a previous dose-response study using 0 – 6.5 g/L MD. Thus, the use of MD as an alternative method of inducing endogenous CO production in pregnant mice was investigated.

**Objective:** To determine maternal and fetal outcomes after a week-long maternal exposure to a high dose of oral MD.

**Methods:** Pregnant CD-1 mice (Charles River, USA) were given 6.5 g/L menadione sodium bisulfite (Sigma-Aldrich, Oakville) in drinking water from gestational day (GD) 10.5 – 17.5. Water was provided *ad libitum* to all mice and measured as average daily water intake per gram of body weight (mL/24 hr:g). Baseline water intake was measured for four days prior to MD treatment to monitor for signs of taste aversion to the drug. %COHb levels for the treated and control groups were calculated from CO peak area values, using gas chromatography (GC) to quantify the change in %COHb after daily MD administration. 20% w/w sonicates of perfused liver, kidney, placenta and spleen tissue were also analyzed using GC to quantify tissue CO levels in the control and treatment groups. Data were presented as means ± standard deviation (SD). Water intake, change in body mass, and maternal Hb & %COHb were analyzed using two-way ANOVAs, followed by Dunnett’s multiple comparisons tests. Overall maternal growth during gestation was compared using nonlinear regression. Litter sizes between groups were compared using chi-square analysis. All other data were analyzed by Mann-Whitney t tests. P<0.05 was considered statistically significant.

**Results:** Daily MD administration to pregnant mice resulted in a positive trend of CO production in all sampled maternal tissue, with a significantly higher tissue CO level in the spleen (p<0.0001) compared to the control. %COHb did not increase above 1% in treated dams. Placental efficiency and maternal weight gain during the gestational period were significantly lower in the treatment group (p<0.05).

**Conclusion:** Overall, the findings demonstrate that MD is an alternative method of inducing CO production in pregnancy. However, further studies in a mouse model of PE at a safer dose must be done to establish the drug’s therapeutic potential.

**Funding Source:** CIHR Catalyst Grant – Catalyzing Innovation in Preterm Birth Research
(P8) Alterations in Blood Pressure of Pregnant CD-1 Mice Using Carbon Monoxide Releasing Molecules
Karalyn E McRae (Ph.D. Candidate)¹, Nichole Peterson¹, Megan A Dickson¹, and Graeme N Smith¹,²
¹Department of Biomedical and Molecular Sciences, Queen's University, Kingston, Ontario, Canada
²Department of Obstetrics and Gynaecology, Queen’s University, Kingston, Ontario, Canada.

Introduction: Pre-eclampsia (PE) is characterized by hypertension and maternal vascular dysfunction; a result of impaired arterial remodeling and inadequate placental perfusion. Women who smoke have a 33% reduced risk of developing PE. Carbon monoxide (CO), a gaseous byproduct of cigarette combustion, may be implicated in this risk reduction. CO, also produced endogenously through the catalytic degradation of heme, increases vasodilation and angiogenesis of placental vessels in a mouse model of PE. Carbon Monoxide Releasing Molecule-A1 (CORM-A1) delivers CO in vivo, resulting in moderately increased carboxyhemoglobin (%COHb), and has potential therapeutic value in the treatment of PE. This study aims to determine the effects of CORM-A1 on systolic blood pressure (SBP) and pregnancy outcomes in normotensive pregnant mice.

Methodology: CD-1 mice (Charles River, USA) (5-7 weeks) were mated. In a subset of dams, 5mg/kg CORM-A1 (Sigma Aldrich, USA) was delivered intraperitoneally on GD10.5 and blood was collected at 15 minute intervals by submandibular bleed. Blood %COHb was measured by head-space gas chromatograph CO analyzer (Peak Laboratories, USA). Another subset of dams were treated with 5mg/kg CORM-A1 or inactivated CORM-A1 (iCORM) on GD10.5-12.5 via tail-vein injection. Volume pressure recording SBP and heart rate (HR) were recorded on all gestational days (GD) pre-and post-treatment. On GD17.5, pregnancy outcomes, fetal and placental weights were collected. Data are presented as mean±SD. Analyses were performed by 2-way ANOVA and Kruskall-Wallis test, with significance of p<0.05.

Results: CORM-A1 increases %COHb from 0.67±0.10% at baseline (n=5) to 3.34±0.65% at 15 min post-injection (n=6). Both iCORM-A1 and CORM-A1 had no effect on SBP or HR immediately post-treatment or on any other gestational day in normotensive dams. Both treatment groups showed no effects on pregnancy outcomes, placental or fetal weight in normotensive mice. Mice receiving CORM-A1 had a significant increase in gestational weight gain (31.75±0.96g, n=4) compared to iCORM-A1 controls (24.33±4.04g, n=3).

Discussion: Preliminary data indicates that administration of CORM-A1 may have no effects on altering SBP or HR in normotensive dams, however the effects on hypertensive dams has not yet been investigated. A more thorough understanding of how CO alters placental vasculature and could alter SBP is needed before CORM-A1 can be used as a therapeutic for PE.

Funding: Supported by CIHR Catalyst Grant to Graeme N. Smith
(P9) Aberrant inflammation in rat pregnancy leads to persistence of risk factors for cardiovascular and metabolic disease in the offspring
Takafumi Ushida (Visiting Fellow), Tiziana Cotechini, Shannyn K. Macdonald-Goodfellow, M. Yat Tse, Louise M. Winn, Stephen C. Pang, Michael A. Adams, Maha Othman, Tomomi Kotani, Fumitaka Kikkawa and Charles H. Graham

Objective: Children of women with pre-eclampsia have increased risk of cardiovascular (CV) and metabolic disease in adult life. While aberrant maternal inflammation contributes to the pathophysiology of pregnancy complications, including pre-eclampsia, it is unclear whether maternal inflammation contributes to increased risk of CV and metabolic disease later in life in the affected offspring. This study determined whether aberrant maternal inflammation in pregnancy leads to increased risk of CV and metabolic disease in the offspring.

Study Methods: Pregnant rats were administered low-dose lipopolysaccharide (LPS; 10 – 40 μg/kg) or saline on gestational days 13.5-16.5. We previously reported that this model exhibits features of pre-eclampsia including elevated blood pressure, fetal growth restriction and proteinuria. Echocardiography, glucose tolerance test, and thromboelastography were performed on the offspring at 24 weeks of age; blood pressure and pulse-wave velocity were measured. Heart failure- and cardiac growth-related gene expression in the left ventricle was determined by qPCR. Histone modifications and global DNA methylation levels were assessed.

Results: Female offspring exhibited mild systolic dysfunction and increased cardiac growth-related gene expression; abnormal glucose tolerance, increased visceral fat accumulation and coagulopathy were found in male offspring. Male and female offspring had evidence of anemia. Furthermore, histone modifications persisting for at least 24 weeks were observed in the associated target organs in both male and female offspring.

Conclusion: Aberrant maternal inflammation can contribute to risk factors associated with CV and metabolic disease in affected offspring. These risk factors may be associated with epigenetic alterations in relevant organs.

Funding Source: Canadian Institutes of Health Research

[Return to Poster Session]
**Objective:** Thyroid cancer has undergone the most rapidly increasing incidence rate among all major cancers in Canada. Since most deaths due to thyroid cancer are relatively infrequent it is important to evaluate the effects of treatments such as radioactive iodine (RAI) therapy on potential reproductive issues such as fertility. Fertility potential has an enormous impact on the quality of life of cancer survivors. Therefore, understanding the impact of RAI treatment on fertility is vital. The purpose of this study is to systematically review the medical literature for studies examining the gonadal and reproductive effects of RAI therapy in patients with thyroid cancer, to garner information regarding implications of RAI therapy on fertility potential.

**Study methods:** An electronic search of the PubMed database was conducted to find relevant controlled studies that reported on the effect of RAI on infertility diagnosis or pregnancy rates. The effect of RAI on sex steroids and gonadotrophin levels. Specifically, for women, the effect of RAI on ovarian function, menses, age of menopause, and pregnancy outcomes.

**Results:** In total, 19 articles met all inclusion criteria. All of the 6 studies examining men only found a transient effect of RAI on testicular damage (serum FSH levels rise up until 6 months after treatment and then level off by 18 months). During, the FSH elevations spermatogenesis is severely impaired. There were no male specific studies examining effects of RAI on fertility. Studies examining women found no association with RAI treatment and adverse pregnancy outcomes. However, in the first year after RAI therapy, several studies reported increased rates of spontaneous and induced abortions. Transient amenorrhoea or menstrual irregularities lasting up to 12 months were experienced in 17-27% of women after their first year of RAI treatment, particularly in older women. Furthermore, women who underwent RAI treatment experienced menopause at a slightly younger age than women who were not treated with RAI for thyroid cancer. Lastly, for women specific studies only two actually looked at fertility rates (ratio of live births per 1000 fertile females per year, or number of live births per 1,000 women-years), both of which found no association with RAI treatment and fertility rates. A study examining both men and women also found no association with impaired gonadal function and RAI treatment. Furthermore, two studies examining both men and women found no difference in fertility rates (ability of a woman to become pregnant within a year while having intercourse regularly without use of contraceptives) between patients who underwent RAI therapy for thyroid cancer and those of the general population.

**Conclusion:** Evidence suggests that there is little to none adverse effects of RAI therapy on gonadal function, fertility or pregnancy outcomes beyond 12 months for both men and women. However, our main question of concern was fertility and only 3 studies measured the true outcome (inability to conceive after 12 months), of which most had a very small sample size. Therefore, it is vital to create new knowledge using a measure of outcome that will more appropriately measure the true effect of RAI therapy on fertility potential.
(P11) Safety and efficacy of menorrhagia treatments in women with bleeding disorders: a retrospective analysis
Shikha Kuthiala (Meds 2019), Nicole Relke, Julie Grabell, Wilma Hopman, Mariana Silva, Mary-Anne Jamieson, Paula James.
Kingston Health Sciences Centre, Queen’s University.

Introduction and Objective: Menorrhagia affects up to 90% of women with bleeding disorders (WBD) and has a significant negative impact on quality of life. Many treatments are used to manage menorrhagia in this population, however, there is a paucity of data assessing safety and efficacy. The objective of this study was to determine the effectiveness of commonly used medical treatments (alone or in combination) and their association with adverse events, particularly thrombosis.

Methods: Following REB approval, retrospective chart review was performed on patients attending the Women and Bleeding Disorders Clinic in Kingston, Ontario between 2005 and 2017. Data collected included medical history (bleeding disorder, comorbidities, hemoglobin and ferritin levels), age of menorrhagia onset, bleeding score and treatments used. Data regarding thrombotic outcomes was collected from physician reports of adverse events. Efficacy was determined by patient satisfaction as documented in clinic notes.

Results: 126 females with bleeding disorders with a mean age of 29 (range 9–52 years) were included. Treatments analyzed included combination oral contraceptive pills (COPC), progesterone only pills (POP), tranexamic acid (TA), 52mg Levonorgestrel intrauterine system (LIUS), depomedroxyprogesterone acetate (DMPA), vaginal rings, desmopressin and contraceptive patches. In all subjects, no thrombotic events occurred. 72 (57.1%) subjects were effectively medically managed; 29 (23%) required surgical management and 25 (20%) were lost to follow-up. Of the subjects managed medically, 32 (44.4%) subjects were managed with LIUS, 16 (22.2%) with OCP, 10 (13.9%) with TA, 4 (5.6%) with combined COPC and TA, 2 (2.8%) with POP, 1 (1.4%) with combined POP and TA, 5 (6.9%) with DMPA, 1 (1.4%) with contraceptive patch, and 1 (1.4%) with desmopressin. Hemoglobin and ferritin levels were not significantly altered by treatment. When categorized by bleeding score, those with higher scores did not require more treatments (p=0.48) and the LIUS remained the most efficacious.

Conclusions: Commonly used treatments for menorrhagia are safe in WBD and do not correlate with an increased risk of thrombosis. Of the commonly used treatments LIUS was associated with the most patient satisfaction regardless of bleeding score.

Funding source: Brown Fund, Queen’s University

[Return to Poster Session]
High Sensitivity C-reactive protein as a Postpartum Biomarker for Cardiovascular Disease Risk

Katherine Rabicki (Meds 2019), Jessica Pudwell, Graeme Smith
Department of Obstetrics & Gynaecology, Queen’s University

Objective: Women with hypertensive disorders of pregnancy (HDP) are at increased risk for cardiovascular disease (CVD). This study examined postpartum hsCRP levels in women with HDP to determine the correlation between hsCRP and CVD risk, and assess the utility of using hsCRP to identify women who should have a full biochemical/physical workup.

Study Methods: Data from 215 patients with HDP (preeclampsia, HELLP syndrome, and gestational hypertension) referred to a specialized clinic and 36 normotensive controls were used to calculate 10-year, 30-year, and lifetime CVD risk estimates, and presence of metabolic syndrome.

Results: Demographic characteristics were equivocal between groups. The HDP group had higher BMI pre-pregnancy (median=26.4 [IQR 23.1-31.9kg/m²]) and postpartum (median=29.0 [IQR 24.9-35.2kg/m²]) compared to the control group (median=24.7 [IQR 31.5-28.9kg/m²] and median=25.4 [IQR 23.2-29.7kg/m²], respectively).

The median hsCRP in the HDP group was 2.3mg/L (IQR 1.0-7.0), compared to 1.5mg/L (IQR 0.5-4.9) in the control group (p=0.07). HDP participants with elevated hsCRP (≥3.0mg/L) had higher 10-year (p<0.01) and 30-year (p<0.05) CVD risk scores, and a higher proportion of metabolic syndrome (35.0% vs. 11.6%, p<0.0001), compared to HDP participants with normal hsCRP.

Ten-year and 30-year CVD risk scores and BMI were all correlated with hsCRP (p<0.05). In multivariate regression, the 10-year and 30-year CVD risk scores were not significantly correlated after controlling for participant BMI.

Conclusions: Postpartum hsCRP levels may have potential as a biomarker to identify women who should receive a full workup for CVD, but these results are confounded by the correlation with BMI. Further studies with larger populations are recommended.
Objective: Create a NICU orientation module for parents of extremely premature infants in the NICU, with the goal of reducing stress and enhancing knowledge. This may lead to improved parent-infant attachment, enhanced patient safety and consequently, improved outcomes.

Study methods: An orientation module was developed, consisting of a primary informal interview with key members of the healthcare team at a local Level III NICU, the creation of an introductory video, and incorporation of key parent literary resources given out by the NICU. The information collected from the interviews, surveys, and literature review, was analyzed by the study investigators to be developed into the orientation module. A secondary formal feedback survey on the initial module was given to the same healthcare team members for preliminary evaluation. The inductive method of qualitative analysis was used to evaluate interview and survey responses.

Feedback on the module is now being elicited from current and veteran NICU families. The surveys consist of questions examining demographic information, literacy level (REALM-SF), and module evaluation.

Results: The module was made to consist of an introductory video, and an in-depth module consisting of text, visuals and diagrams, regarding various orientation topics, including an introduction to the members of the healthcare team, the NICU environment, common complications of prematurity, and care goals. Feedback and evaluation of the module will dictate any changes that may need to be made to more accurately fit the needs of the parent community at our local NICU.

Conclusion: Conclusions will be drawn after the orientation module has been evaluated by both current and veteran parents in the NICU.

Funding source: Canadian Premature Babies Foundation (CPBF)
(P14) Cause or Coincidence? Spontaneous Hematometra in Young Women on Depomedroxyprogesterone Acetate: A Small Case Series
Julie G Thorne, Elizabeth H Russell (PGY-4), Danielle Rumbolt, Mary-Anne Jamieson

Background: Abdominal pain, secondary amenorrhea and abnormal uterine bleeding (AUB) are common gynecologic presentations in adolescence. Rarely this can be associated with an acquired hematometra. Hematometra is a condition of retained blood or clot within the uterus. High dose progestogenic agents in this age group have been implicated in the accumulation of a hematometra without other explanation.

Cases: We present 4 cases of hematometra following depomedroxyprogesterone acetate (DMPA) therapy in previously menstruating adolescents. All four presented with abdominal pelvic pain and/or persistent AUB, with the diagnosis confirmed via ultrasound. Suction D&C was required in each case.

Summary and Conclusion: DMPA is a possible cause of hematometra and should be considered in anatomically normal young women experiencing pain or abnormal bleeding out of character for typical long-term DMPA use.
(P15) Patient’s motivation for surgical vs medical abortion
Marie-Eve Murray (C.A.R.E. Fellow), Margaret Casson, Jessica Pudwell, Ashley Waddington

**Background:** Therapeutic abortion is the second most common reproductive health procedure in Canada. Among all Canadian women, 31% will have at least one therapeutic abortion in their life. Unfortunately, abortion services are disparate throughout the country. With the recent introduction of Mifepristone in Canada, it is hoped that access to abortion will be improved. Despite this, some women who are eligible for medical abortion with Mifepristone still choose surgical abortion.

**Objective:** The purpose of this study was to understand the patient’s motivation to choose surgical abortion instead of medical abortion. By appreciating their reasons, we might be able to improve and adapt our counseling and our care we provide to women seeking abortions.

**Study methods:** A survey was given to every woman coming to the Women’s Clinic at Kingston General Hospital for surgical abortion that qualified for medical abortion at the time their appointment was made. Mifepristone medical abortion is approved in Canada for gestations up to 63 days. The study achieved REB approval by the ethics committee of the Kingston Health Science Centre prior to data collection.

**Results/Conclusion:** This study is ongoing. We will have preliminary data to present on April 20, 2018 for J.A.Low Research Day.

**Funding source:** None
Keynote Speaker Biography

Dr. Stephen Wood

Stephen Wood is a Professor in the Department of Obstetrics and Gynecology and Community Health Sciences at the University of Calgary. Dr. Wood did his MD at Queen's University, Residency in Obstetrics and Gynecology at the University of Calgary and Masters of Epidemiology at the University of Calgary.

Title: Trial of Operative vaginal delivery versus CS for indicated 2nd stage deliveries.

Goals of Talk:
- Review trends in route of delivery for 2nd stage arrest/fetal distress in Alberta and impact on the Cesarean Section rate.
- Review why this has occurred.
- Maternal Outcomes with Operative Vaginal Delivery.
- Neonatal intercranial trauma by mode of delivery.
- Does the mode of delivery in the 2nd stage affect subsequent pregnancy outcomes?
We are pleased to announce the 2017 Oral and Poster Presentation Winners:

<table>
<thead>
<tr>
<th>BEST BASIC SCIENCE PRESENTATION</th>
<th></th>
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<tbody>
<tr>
<td><strong>ORAL</strong></td>
<td><strong>Poster – Undergraduate Level</strong></td>
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<tr>
<td>SooHyun Ahn (Ph.D. Candidate) Kasra Khalaj and Chandrakant Tayade  <em>Elucidating the Polarization of THP-1 cells by Interleukin-17A-Induced Cytokines From Peritoneal Endometriotic Epithelial Cells.</em></td>
<td>Megan Dickson (B.Sc. Candidate) Karalyn McRae, Nichole Peterson, Graeme Smith  <em>Effect of CORM-A1 Administration on Placental Hypoxia Levels in CD-1 Mice.</em></td>
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<tr>
<td><strong>Poster – Graduate Level (Co-recipients)</strong></td>
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<td>Karalyn McRae (PhD Candidate) Nichole Peterson, Graeme Smith  <em>CORM-A1 Treatment Leads to Increased Blood Carboxyhemoglobin in Pregnant CD-1 Mice.</em></td>
<td>Chioma Odozar (Msc Candidate) Nichole Peterson, Graeme Smith  <em>Menadione as an alternative method of endogenous carbon monoxide production in mice</em></td>
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<th>BEST CLINICAL PRESENTATION</th>
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<tr>
<td><strong>ORAL</strong></td>
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<tr>
<td>Robyn Jackowich (PhD Candidate)) Leah Pink, Allan Gordon, Caroline Pukall  <em>When feelings of genital arousal are unwanted: Symptom characteristics, medical and treatment histories of an online sample of women with persistent genital arousal.</em></td>
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