DALHOUSIE UNIVERSITY
Inspiring Minds

Department of Obstetrics and Gynaecology

29th Annual Research Day

Friday, April 24, 2015

Parker Reception Room
IWK Health Centre

Program Sponsorship

We gratefully acknowledge financial support for this program from:

Research Services, IWK Health Centre

Atlantic Society of Obstetricians and Gynecologists

Medical Dental and Scientific Staff at the IWK

and

Canadian Foundation for Women's Health

Thank you to our Judges:

Dr. William Buckett,
Medical Director, MUHC Reproductive Centre
McGill University

Dr. Michele Molinari,
Division of Surgical Oncology
Dalhousie University

Dr. Renda Bouzayen
Dalhousie University

Research Day
Department of Obstetrics and Gynaecology
Dalhousie University

April 24, 2015

0830 Reception with Coffee/Muffins/Fruit

0845 Welcome – Dr. B.A. Armson
Professor and Head,
Department of Obstetrics and Gynaecology
Dalhousie University

Session I: Moderator,

0900 **INVITED SPEAKER**
Dr. Michele Molinari, Dalhousie University
Pancreatic Cancer in Nova Scotia: Are we There Yet?

0945 Dr. Megan Dufton, Post Doc Fellow
"*Establishing a Preimplantation Genetic Testing Program at Atlantic Assisted Reproductive Therapies"*

1000 Dr. Anca Matei, PGY3
"Has Knowledge Changed Outcomes? Loop Electrosurgical Excision Procedure, Abnormal Cervical Histology, and Risk of Preterm Delivery"

1015 Dr. Seirin Goldade, PGY4
Effect of Excisional Treatments for Cervical Dysplasia and Treatment-to-Pregnancy Interval on Adverse Pregnancy Outcomes: A Systematic Review and Meta-analysis

1030 Dr. Catherine Arkell, PGY1
Engendering change: Participant career experiences after MicroResearch workshop participation

1045 Dr. Elizabeth Randall, PGY4
Global Women's Health Education in Canadian Obstetrics and Gynaecology Residency Programs: a survey of program directors and senior residents

1100 NUTRITION BREAK

1115 Dr. Amanda Moore, PGY3
A Qualitative Assessment to Determine the Usability, Feasibility and Acceptability of the WHO Safe Childbirth Checklist at the University Teaching Hospital of Kigali, Rwanda

1130 Dr. Heather Stone, PGY1
Does Training in Simulation Result in Long-term Retention of Skills in Obstetrics and Gynecology Residents?

1145 Dr. Maeghan Keddy, PGY3
In patients with a previous history of a loop electrosurgical excision procedure (LEEP) that have had a subsequent term pregnancy, is their second pregnancy associated with adverse outcomes compared to patients with a previous term delivery and no history of LEEP?

1200 Dr. Gillian MacMullin, PGY1
Incidence of Neural Tube Defects in Nova Scotia After Folic Acid Fortification

1215 Dr. Naila Ramji, PGY3 Memorial University
The Impact of Maternal Obesity on Breastfeeding

1230 Dr. Brittany Black, PGY1
Compliance with Fetal Fibronectin Recommendations at the IWK Health Centre

1245 Dr. Kiel Luhning, PGY1
Potential Benefit of Medical Termination of Pregnancy in Halifax, Nova Scotia.

1300 LUNCH (Classroom B&C)

Session II: Moderator: Dr. Renda Bouzayen

1345 INVITED SPEAKER:
Dr.William Buckett, McGill University
Fertility Preservation

1445 Kayla Balderston, MED2
The impact of gestational weight gain on perinatal outcomes in adolescent mothers: a retrospective cohort study

1500 Martina De Sousa, MED2
Gestational diabetes as a predictor of hypertension risk in women

1515 Natasha MacInnes, MED2
"Population attributable risk fractions of maternal obesity for adverse perinatal outcomes"

1530 Dr. Maureen Okonkwo, PGY5
Correlation between follicular fluid and serum concentrations of ghrelin and in vitro fertilization outcome

1545 Emily Whalen, MED2
The association between gestational weight gain and maternal and neonatal outcomes in mothers with Class I, II, and III obesity

1600 **Awards Presentation**
Refreshments to be served in the Parker Reception Room

ABSTRACTS

Establishing a Preimplantation Genetic Testing Program at Atlantic Assisted Reproductive Therapies

Dufton M, Brock JK, Young DC

Background: The field of assisted reproduction is a relatively new area of science, with rapidly evolving treatments. Atlantic Assisted Reproductive Therapies (AART) is the only major facility located in the Atlantic provinces. While AART offers a wide range of services, there is a group of individuals that AART cannot currently help: those who carry a known genetic condition or have suffered repeated miscarriages require testing. Preimplantation Genetic Diagnosis (PGD) is genetic testing performed on embryos, prior to their transfer to the uterus, in order to determine if an embryo carries a genetic disease which has been identified in the parents or their immediate family. Preimplantation Genetic Screening (PGS) is genetic screening performed during an IVF cycle in order to confirm chromosome number, since chromosomal abnormalities or aneuploidies are believed to be responsible for recurring miscarriages, and repeated IVF failures.

Objectives: The objectives of this project are: 1) to determine the feasibility (time, cost and probability of success) of offering PGD and PGS services at AART; 2) to conduct an extensive literature review to determine the best techniques for embryo biopsy and molecular genetic analysis; and 3) to implement the techniques required for PGD/S at AART.

Conclusions: Trophectoderm biopsy was selected from the currently accepted methods of embryo biopsy, and a reference centre that performs Quantitative Polymerase Chain Reaction was identified. After the feasibility of implementing these procedures had been determined, new equipment was acquired and extensive training of the laboratory scientists was conducted. AART is currently in the final stages of implementing PGD and PGS testing, with the first clinical cases expected soon.

Has Knowledge Changed Outcomes? Loop Electrosurgical Excision Procedure, Abnormal Cervical Histology and Risk of Preterm Delivery.

Matei A, Bentley J, Coolen J, Fahey J

Background: Loop electrosurgical excision procedure (LEEP) is currently the standard of care for treatment of cervical dysplasia. Previous literature suggests that LEEP is associated with preterm delivery. Prematurity is associated with serious complications in the neonate. Interventions that lower the rate of preterm birth among at risk women would result in significant reductions in perinatal morbidity and mortality, and health care costs. Based on these results, at our centre, treatment of cervical dysplasia has become more conservative and pregnant women with prior LEEP undergo vigilant surveillance. But are these changes clinically significant? The purpose of this study is to estimate whether, since the implementation of these changes, a history of cervical abnormalities with or without treatment with LEEP is associated with an increased risk of preterm birth in the first pregnancy post-colposcopy.

Methods: This will be a retrospective cohort study. The data will be obtained from two provincial databases: the Provincial Cytology/Colposcopy Registry and the Nova Scotia Atlee Perinatal Database. By linking the databases, it will be possible to extract information on those women less than 45 years of age who had a history of LEEP or abnormal cervical histology between 1995 and 2012 and who had a subsequent pregnancy of greater than 20 weeks of gestation. Only the first delivery post-colposcopy will be considered. This group will be compared to women in the same age range who had abnormal cervical histology without LEEP and to women who never had cervical abnormalities prior to their delivery. The primary outcome will be overall rate of preterm birth at less than 37 weeks of gestations. Secondary analyses will consider neonatal and maternal mortality and morbidity.

Effect of Excisional Treatments for Cervical Dysplasia and Treatment-to-Pregnancy Interval on Adverse Pregnancy Outcomes: A Systematic Review and Meta-analysis

Goldade S, Hayden J, Woolcott C

Background: While associations between excisional treatments for cervical dysplasia and certain adverse pregnancy outcomes have been well established, the effect of excisional procedures on miscarriage rates is less clear. Recently, an increased risk of miscarriage has been reported in women with a short LEEP-to-pregnancy interval.

Objectives: Our primary objective is to determine whether women who have previously undergone excisional treatment(s) for cervical dysplasia are at an increased risk of adverse pregnancy outcomes. A secondary objective is to determine whether treatment-to-pregnancy intervals of less than 12 months are associated with an increased risk of adverse pregnancy outcomes compared with treatment-to-pregnancy intervals of greater than 12 months.

Methods: We performed a systematic review and meta-analysis of observational studies. PubMed and Embase were searched for studies published to March 2015, with terms related to excisional procedures (e.g. LEEP, conization, etc.) or cervical dysplasia, and pregnancy. A risk of bias assessment using the Newcastle-Ottawa scale was performed on all studies meeting selection criteria. Pooled odds ratios will be calculated for studies without significant clinical or statistical heterogeneity.

Selection Criteria: Studies were included if the odds of miscarriage, preterm birth, or preterm rupture of membranes were reported for women who had previously undergone any excisional treatment for cervical dysplasia as well as women who had not received treatment. Studies were excluded if >20% of untreated women had undergone ablative procedures, or if the excisional treatment occurred during pregnancy. A sensitivity analysis will be performed excluding studies with a high risk of bias.

Results: A total of 4,714 reports were identified. Future reports will elaborate on the studies selected for inclusion, risk of bias assessments, and results of the planned meta-analysis.

Engendering change: Participant career experiences after MicroResearch workshop participation

C. Arkell, N. MacDonald, H. Scott

Background/Objective: There is a clear need for locally driven and conducted research in the developing world, however there is not sufficient capacity to meet the need. To help address this, in 2008, MicroResearch (MR) was created - a program that conducts research training workshops in East Africa, providing project funding grants and implementation support to foster local ability to research sustainable solutions for maternal and child health issues. The purpose of this study is to seek to understand the impact of MR, by defining the work experiences and career trajectories of participants who have taken part in the workshops, with attention to possible differences between gender.

Study method This will be a qualitative study using an online focus group format. Members of the MR LinkedIn group will be invited to participate in online, real-time focus groups to discuss their career trajectories and work experiences following participation in MR workshops. Topics such as self-perception, approach to engaging in research, and career opportunities will be explored. Raw data will be collected in the form of verbatim transcripts. Participants will be de-identified for data analysis, except for by gender, so that possible differences between the experiences of the male and female participants can be identified. The data will be analysed via inductive content analysis to identify overarching themes in each focus group, then across the entire sample and finally by gender. To improve reliability, a minimum of two members of the research team will analyse the data separately and then discuss and consolidate their findings. Finally, member checking will be employed, whereby the findings will be presented to participants for review and feedback regarding their representativeness.

Global Women's Health Education in Canadian Obstetrics and Gynaecology Residency Programs: a survey of program directors and senior residents.

Millar H, Randle E, Scott H, Shaw D, Kent N, Nakajima A, Spitzer R

Introduction: To become culturally competent practitioners with the ability to care and advocate for vulnerable populations, residents must be educated in global health priorities. In the field of obstetrics and gynaecology (ObGyn) there is minimal information about global health education and interest within residency programs.
Objectives: To determine within ObGyn residency programs across Canada: 1) current global health teaching and support; 2) the importance of global health to residents and program directors; 3) the level of interest in a national postgraduate global women's health curriculum.
Methods: An online survey was administered across Canada to program directors and senior ObGyn residents.
Results: 101/297 (34.0%) residents replied to the survey [76/297 completed the full survey (26%)]. 11/16 (68.8%) program directors replied [10/16 complete (62.5%)]. 4/11 (36.4%) of programs have a global health curriculum; 2/11 (18.2%) have a global health budget; 4/11 (36.4%) have a global health chairperson. 9/10 (90%) program directors and 68/79 (86.1%) residents feel that an understanding of global women's health issues is important for all Canadian ObGyn trainees. Only 1/10 (10%) program directors and 11/79 (13.9%) residents feel that their program offers sufficient education in these issues. Of residents in programs with a global health curriculum, 12/19 (63.2%) felt that residents in their program who did not do an international elective would still learn about global women's health, versus only 9/50 (18.0%) of residents in programs without a curriculum.
Conclusions: ObGyn residents and program directors feel that global health education is important for all trainees and is currently insufficient. There is a high level of interest in a national postgraduate global women's health curriculum.

A Qualitative Assessment to Determine the Usability, Feasibility and Acceptability of the WHO Safe Childbirth Checklist at the University Teaching Hospital of Kigali, Rwanda

Moore A, Scott H

Background: Around the globe women and newborns continue to die from complications related to childbirth; the vast majority of these deaths are preventable through simple, proven interventions. Yet in resource-poor countries such as Rwanda, maternal and infant mortality remain far above those targets set by the Millennium Development Goals, and the risks of childbirth remain unjustifiably high. In 2008, the World Health Organization developed a 29-item Safe Childbirth Checklist to optimize compliance with widely accepted best practices in obstetrical care. To determine whether the Checklist can be adapted to different health care climates, the WHO has created the SCC Collaboration to conduct small-scale feasibility studies in culturally, geographically and socioeconomically diverse settings.
Objective: This study will examine the usability, feasibility and acceptability of the WHO Safe Childbirth Checklist at the University Teaching Hospital of Kigali, Rwanda.
Study method: This qualitative study will utilize focus groups and key informant interviews to determine the perceived benefits of, and barriers to, adoption of the SCC Checklist. Key stakeholders will be identified by the local research team and all levels of healthcare personnel will be included. Information regarding current resource availability and utilization on the labour and delivery ward will be collected and, together with the data gathered from key informants, used to develop an overall impression regarding the Checklist's feasibility. A pilot of the Checklist will be rolled out over a six-month period, and a second set of focus groups and interviews conducted to assess stakeholders' perceptions of the Checklist's relevance to local health needs, assets and priorities following implementation. The data will be synthesized to identify any recurring themes and comparisons made between attitudes pre- and post-intervention.

Does Training in Simulation Result in Long-term Retention of Skills in Obstetrics and Gynecology Residents?

Stone H, Crane J, Johnston K, Craig C

Background: Teaching residents skills used in rare but high-risk situations is challenging; simulation training is becoming increasingly popular as a solution to this challenge. However, there are few studies looking at the long-term retention of these simulation-taught skills. "Shoulder Dystocia*" is a low frequency, high-risk event that is well suited to simulation-based education.
Objective: The objective of this research project is to demonstrate that simulation teaching of shoulder dystocia will allow for not only immediate retention, but also long-term retention of these important skills
Study Method: Residents from the Obstetrics and Gynecology program at Dalhousie University will be recruited to participate in this study. Exclusion criteria include the study author, and those away on leave/electives/research/equivalent. Residents' proficiency in managing shoulder dystocia will be assessed before, immediately after, and a delayed time period** after a simulated teaching session on this topic. Proficiency will be measured by a checklist developed from current obstetrics textbooks, with consensus from two obstetrician and gynecologists. Comfort levels of the residents will also be assessed through self-reported Likert scales, along with a demographics questionnaire including Post Graduate Year (PGY) level and previous exposure to shoulder dystocia. The Paired-Sample Wilcoxon Signed Rank test will be used to compare checklist scores for each resident before, immediately after, and after a delayed time period assessment after the teaching session. Multivariate and univariate analysis will be used to assess for variation in demographics/prior exposure on the proficiency of shoulder dystocia management.

* Shoulder dystocia: this is not the actual scenario to be used. This is used as a cover for research day. The residents who will participate in this study will be present at research day; therefore, critical elements of this study have been excluded to reduce confounding.
** Delayed time period: the exact time period has not be illustrated here due to the reasons mentioned above.

In patients with a previous history of a loop electrosurgical excision procedure (LEEP) that have had a subsequent term pregnancy, is their second pregnancy associated with adverse outcomes compared to patients with a previous term delivery and no history of LEEP?

Keddy M, Coolen J

Objective/Background: It has been previously established that women who have undergone a LEEP are at increased risk of preterm delivery in their first pregnancy following this procedure. Because of this, current standard of care is for women with a prior history of LEEP to undergo a transvaginal ultrasound to assess cervical length at approximately 20 weeks of gestation. The need for this assessment becomes less clear in pregnant women who have previously had a LEEP followed by a term delivery. Therefore, we intend to determine whether LEEP is associated with adverse outcomes in a second pregnancy once women have had a successful term delivery in the first pregnancy following LEEP.

Study Method: This will be a retrospective cohort study, with data linkage between two databases: the Provincial Cytology/Colposcopy Registry and the Nova Scotia Atlee Perinatal Database. This will identify our exposed group, all women residing in Halifax County who have had a LEEP, followed by term delivery at the IWK, as well as a second singleton pregnancy beyond 20 weeks of gestation since 1992. The unexposed group will be from the Atlee Database and include all women residing in Halifax County who had a term delivery at the IWK followed by a second singleton pregnancy beyond 20 weeks. Exclusion criteria will include a history of prior preterm delivery, multiple gestation, history of cerclage, and iatrogenic preterm delivery for maternal and/or neonatal indications. The primary outcome will be preterm delivery (<37 weeks gestation), with a subgroup analysis to examine preterm delivery <34 weeks. Secondary outcomes will include adverse maternal and neonatal outcomes in the second pregnancy.

Incidence of Neural Tube Defects in Nova Scotia After Folic Acid Fortification

MacMullin G, Van den Hof M

Background: Folic acid fortification was introduced in Nova Scotia in 1998 as a population-wide intervention aimed at reducing the rate of open neural tube defects. Within 4 years, the incidence of open neural tube defects had decreased by 54%. However, it is unclear whether the effect was more pronounced on rates of certain types of neural tube defects (i.e. anencephaly vs. spina bifida). Further, most studies looking at the effect of folic acid fortification were performed within 2 to 4 years of implementation and therefore are unable to demonstrate ongoing benefit from folic acid fortification.

Objective: The purpose of this study is to determine whether folic acid fortification has resulted in a greater reduction in the incidence of anencephaly compared to the incidence of spina bifida in Nova Scotia, as well as to confirm ongoing benefit of folic acid fortification in Nova Scotia on the incidence of open neural tube defects.

Study Method: Data on pregnancies and terminations will be obtained from the Nova Scotia Atlee Perinatal Database and the Surveillance for Congenital Anomalies in Nova Scotia Database. Subjects will be divided into three groups based on date of birth: pre-fortification, partial fortification, and full fortification. Incidence of spina bifida, anencephaly, and total open neural tube defects will be reported as cases of open neural tube defects (spina bifida, anencephaly, or total) per 1000 births. Multinomial logistic regression will be performed to compare the odds of neural tube defects following folic acid fortification to the odds pre-fortification, controlling for potential confounders such as maternal BMI, maternal age, and pre-gestational diabetes.

The Impact of Maternal Obesity on Breastfeeding

Ramji N , Quinlan J , Murphy P, Burrage L , Goodridge JM, Newhook LA , Twells L , Crane J
Memorial University, Newfoundland and Labrador

Background: Newfoundland and Labrador has the highest prevalence of obesity and the lowest breastfeeding rates in Canada. There have been no studies on the impact of maternal obesity on breastfeeding in Newfoundland and Labrador.

Objective: To compare the rate of any breastfeeding on postpartum hospital discharge between obese (BMI $\geq$30.00 kg/m^2) and normal body mass index (BMI 18.50-24.99 kg/m^2) women.

Methods: We conducted a population-based retrospective cohort study using the Newfoundland and Labrador Perinatal Database, including women with live, singleton pregnancies who delivered in St. John's, Newfoundland and Labrador between January 1, 2002 and December 31, 2011. Secondary outcomes of interest included comparison of breastfeeding rates by obesity class, as well as sub-cohort analysis of breastfeeding intent, initiation and exclusive breastfeeding on discharge for available 2011 data. Additional maternal and neonatal outcomes were compared between those breastfeeding on discharge and those not. Univariate and multivariate logistic regression analyses were performed for the primary outcome, controlling for pregnancy, obstetric, maternal and neonatal factors. Adjusted odds ratios (aORs) and 95% confidence intervals (CI) were calculated.

Results: A total of 12,831 women with BMI data available were included in the study: 8,676 breastfed and 4,155 did not breastfeed on postpartum hospital discharge. Obese women were less likely to breastfeed on discharge than normal weight women (33.0% vs 67.0%) (aOR 0.624, 95%CI 0.548-0.710). Patient age (aOR 1.033, 95%CI 1.019-1.049), nulliparity (aOR 1.722, 95%CI 1.502-1.974), being partnered (aOR 1.568, 95%CI 1.337-1.837), working (aOR 1.102, 95%CI 1.023-1.188), higher education level (aOR 1.486, 95%CI 1.379-1.601), smoking (aOR 0.356, 95%CI 0.296-0.430), gestational diabetes (aOR 0.695, 95%CI 0.524-0.923), pre-existing hypertension (aOR 0.584, 95%CI 0.392-0.871), gestational hypertension (aOR 0.677, 95%CI 0.554-0.827) and general anesthetic (aOR 0.412, 95%CI 0.220-0.772) were found to significantly impact the primary outcome and were controlled for in multivariate logistic regression analysis.

Conclusion: Obesity is an independent risk factor for not breastfeeding on hospital discharge, even after adjusting for many potential confounders. It is important to counsel all women on the benefits of breastfeeding, emphasizing these particularly for women who have high pre-pregnancy BMIs. Further research is needed to evaluate other breastfeeding outcomes and to determine what can be done to help improve breastfeeding rates in this population.

Compliance with Fetal Fibronectin Recommendations at the IWK Health Centre

Black B, Dodds L, Armson A

Objectives/Background: Current recommendations for fetal fibronectin (fFN) testing in Nova Scotia support its use in women between 24^0 and 34^6 weeks, who present with symptoms of preterm labour. However, there is currently no data as to how fFN testing is actually being used by physicians. Inappropriate use of the test, or failure to properly interpret its results to inform practice decisions, can result in unnecessary interventions and risks for patients, not to mention increased costs to the health care system. Therefore, it is important that we develop a better understanding of local clinical practices. The purpose of this study is to assess physician compliance with fFN testing recommendations at the IWK Health Centre. Secondarily, we will gather information relating to maternal factors that could be influencing physician compliance with testing recommendations.

Study Methods: This will be a retrospective cohort study. Data will be obtained from a review of patient charts, which will be identified through the Early Labour Assessment Unit Patient records, after Ethics Board approval. Women presenting with symptoms of preterm labour at 24^0 to 34^6 weeks will be included in this study. Those who have any contraindication to fFN testing will be excluded. The primary outcome of physician compliance will be evaluated at two separate points in the testing recommendations. First, we will determine the number of eligible women who actually received fFN testing. Second, we will examine whether physicians are appropriately using fFN results to inform their clinical decision-making with regards to admission to hospital and subsequent interventions. Descriptive statistical analysis will be used to report the rates of compliance. Logistic regression will be used to identify any maternal variables strongly associated with physician compliance.

Potential Benefit of Medical Termination of Pregnancy in Halifax, Nova Scotia.

Luhning K, Brooks M.

Objective/Background:

Medical termination of pregnancy (ToP) is a safe, and reliable alternative to surgical ToP. It is technically simpler, and can be widely used (geographically) to improve access to abortion services. In fact, England encourages its use to decrease wait times for abortion services. Although multiple approved protocols exist, this alternative is under-utilized in Nova Scotia. This study aims to assess the potential benefit of offering medical ToP by estimating: 1) the proportion of those eligible for medical ToP among women seeking ToP in Halifax:, and 2) the difference between the wait time for services between women who are eligible and women how are not eligible for medical ToP .

Study Method:

After research approval, this retrospective chart review will review all cases of ToP in 2014 at the Halifax Termination of Pregnancy Unit (TPU). Demographic data will be collected. The gestational age (ga) at first ultrasound will be recorded to determine if each patient was eligible for medical termination (ga <56 days), or not eligible (ga > 56 days). Secondarily, the number of days from first ultrasound to termination procedure will be recorded, and referred to as "wait time." Given an approximate prevalence of 50%, a sample size of 384 patients will allow the researchers to estimate the proportion of patients eligible for medical ToP to within +/- 5%. A two sample t-test will be used to compare the mean wait times and the mean difference between wait times of those eligible and those not eligible for medical ToP with 95% confidence intervals.

The impact of gestational weight gain on perinatal outcomes in adolescent mothers: a retrospective cohort study

Balderston K, Whelan E, Woolcott C

Background: Gestational weight gain (GWG) recommendations made by the Institute of Medicine state there may be variation due to age as many adolescent women grow themselves throughout pregnancy. Our objectives were to examine the associations between GWG and perinatal outcomes in adolescent women (<20 years) and determine whether they differ from adult women (20-35 years).
Methods: A retrospective cohort study was conducted including all live born, singleton deliveries to mothers ≤35 years in Nova Scotia between 2003-2013. GWG was categorized as below, within or above the recommendations. Primary outcomes included preterm birth, small for gestational age (SGA), large for gestational age (LGA) and Caesarean delivery. Logistic regression was used to estimate adjusted odds ratios (OR) with 95% confidence intervals (CI). The significance of the interaction term between GWG and age was determined to examine if GWG-outcome associations in adolescents differed from adults.
Results: This study included 3,243 adolescent and 43,979 adult women. Adolescent mothers who gained above the recommendations had increased odds of LGA (OR, 2.12; 95% CI, 1.50-2.98) and Caesarean section (OR, 1.31; 95% CI, 1.01-1.69), but decreased odds of SGA (OR, 0.65; 95% CI, 0.49-0.85). Adolescent mothers with low GWG had decreased odds of LGA (OR, 0.40; 95% CI, 0.21-0.76) and increased odds of SGA (OR, 1.73; 95% CI, 1.27-2.35). Associations in adolescent women were similar to those in adult women for SGA, preterm birth, and Caesarean section (p-interaction=0.99, 0.25, and 0.70, respectively), but were stronger in adolescents than in adults for LGA (p-interaction<0.05).
Conclusion: GWG was significantly associated with SGA, LGA, and Caesarean delivery among adolescents, but these finding do not suggest that the recommendations be increased for adolescent women relative to adult women.

Gestational diabetes as a predictor of hypertension risk in women

De Sousa M, Woolcott C, Dodds L

Objective: To determine if gestational diabetes mellitus (GDM) is a predictor of increased risk of future hypertension.
Study Method: Data for this study included woman in Nova Scotia who gave birth between 1980 and 2012 and were in both the Nova Scotia Atlee Perinatal Database and the Atlantic Partnership for Tomorrow's Health (PATH) database. Women with pre-existing hypertension, pre-existing type I or type II diabetes, missing data on medications or self-reported diagnosis of hypertension and follow-up time of less than 1 year were excluded. Women who developed GDM during either the first pregnancy or any pregnancy were compared with women who did not develop GDM on the outcome of a diagnosis of hypertension that was diagnosed at least one year after delivery. Hypertension was based on either self-report or being prescribed an antihypertensive medication. Kaplan-Meier Curves and Cox-proportional hazard models were used to estimate relative risks comparing the risk of hypertension in women with, and without, a history of GDM.
Results: There were 2991 participants who met the inclusion criteria. Women who developed GDM in their first pregnancy were more likely to be older (p=0.011) and overweight or obese (p=0.007) pre-pregnancy. After adjusting for confounding variables, women who developed GDM during any pregnancy had a 62% increased risk of developing hypertension later in life (RR=1.62, 95% CI 1.02-2.59) compared to women who did not have GDM in any pregnancy.
Conclusion: A diagnosis of GDM in any pregnancy may signal a population of women who are at increased risk of developing hypertension. These women should be monitored more closely by their physicians for the onset of hypertension.

Population Attributable Risk Fractions of Maternal Obesity for Adverse Perinatal Outcomes

MacInnis N, Kuhle S

Background: In Canada, 13% of women of childbearing age are obese with Atlantic Canada having the highest rates in the country (23%). Compared to normal weight women, obese women are more likely to develop pregnancy complications such as gestational diabetes (GDM), require a cesarean section (CS), or deliver a large for gestational age (LGA) infant. However, the extent to which obesity contributes to the population burden of adverse perinatal outcomes in Canada has not been examined yet. Population attributable risk fractions (PARFs) allow to assess the relative reduction in outcomes that may be achieved if an exposure were reduced. Accordingly, the objective of the current study was to determine the PARFs of adverse perinatal outcomes for excess maternal pre-pregnancy weight.

Methods: We used data from the Nova Scotia Atlee Perinatal Database on 51,425 singleton term infants and their mothers born in Nova Scotia between 2004 and 2012. Univariate and multivariable-adjusted PARFs of maternal pre-pregnancy weight status were determined from a series of logistic regression models for adverse maternal and neonatal outcomes using a number of hypothetical scenarios that reduced the pre-pregnancy weight in overweight and obese women.

Results: The PARFs for GDM, CS, and LGA assuming that all overweight and obese women would become normal weight were 59%, 18%, and 7%, respectively. All women with excess pre-pregnancy weight losing 10kg would eliminate 15% (GDM), 3% (CS), and 1% (LGA) of adverse perinatal outcomes.

Conclusions: A substantial proportion of adverse perinatal outcomes may be prevented through reductions in excess maternal pre-pregnancy weight. Additional long-term benefits may be experienced by the offspring given the established association of maternal obesity with childhood obesity and other health outcomes.

Correlation between follicular fluid and serum concentrations of ghrelin and *in vitro* fertilization outcome

Okonkwo M, Anini Y, Bouzayen R

Aim: To evaluate the relationship between serum and follicular fluid (FF) ghrelin levels in infertile patients undergoing *in vitro fertilization* (IVF) and the correlation of these findings with assisted reproductive technology outcomes.

STUDY DESIGN: To evaluate the potential correlation in ghrelin levels between serum and FF, 20 infertile women undergoing IVF or intra-cytoplasmic sperm injection (ICSI) were enrolled for this prospective cohort study. Baseline patient characteristics, stimulation data, oocyte and embryo characteristics, and pregnancy rates were documented. Venipucture was used to collect fasting serum ghrelin levels prior to oocyte aspiration. Using ultrasound guided transvaginal puncture, the five largest follicles in each patient were targeted for study purposes. A total of 100 follicles were aspirated and 37 oocytes were retrieved. Serum and FF ghrelin levels were quantified by enzyme-linked immunosorbent assays.

RESULTS: Serum and FF ghrelin were positively correlated ($r=0.782$, $p < 0.001$). There was a negative correlation between the FF ghrelin concentration and the total number of zygotes cleaved ($r=-0.460$, $p=0.041$) and the total number of oocytes fertilized ($r=-0.490$, $p=0.028$). No correlation was found between serum or FF ghrelin and Day 3 follicle-stimulating hormone (FSH) levels, length of stimulation, total gonadotropin dose, or peak estradiol levels. Furthermore, there was no correlation between ghrelin, both serum or FF, and total number of follicles, total oocytes, oocyte fertilization rate, or number of viable embryos on day 5. There was no significant relationship between serum ($t= -1.809$, $p= 0.087$) and FF ($t= -0.870$, $p= 0.461$) ghrelin levels and clinical pregnancy rate.
CONCLUSIONS: Our results demonstrate a negative correlation between FF ghrelin concentrations and oocyte fertilization rate.

The association between gestational weight gain and maternal and neonatal outcomes in mothers with Class I, II, and III obesity

Whelan E, Balderston K, Woolcott C

Background: The 2009 Institute of Medicine recommendations for gestational weight gain (GWG) advise that all women with obesity gain 5-9 kg, but do not distinguish between the classes of obesity. Our objective was to examine the association between GWG and outcomes in mothers and children by class of obesity.

Methods: This retrospective cohort study included Nova Scotian women with class I, II, and III obesity who had singleton pregnancies resulting in live births between 2003 and 2013. GWG was investigated in relation to the primary outcomes, small for gestational age (SGA), large for gestational age (LGA), pre-term birth, and mode of delivery. The significance of an interaction term between obesity class and GWG was also determined in the logistic regression models.

Results: Included were 11,018 pregnancies. Class of obesity was an effect modifier for the association between GWG and having an LGA infant (P interaction= 0.044). The association with high GWG diminished with increasing obesity class (OR 1.8, CI 1.5-2.2; OR 1.6, CI 1.3-2.0; and OR 1.1, CI 0.8-2.0 for class I, II, and III, respectively). The reduced odds of LGA observed with GWG below the recommendations was observed in women with all classes of obesity (OR 0.7, 95% CI 0.5-0.9 for Class I, OR 0.6, 95% CI 0.4-0.8 for Class II, and OR 0.6, 95% CI 0.5-0.8 for Class III obesity). No effect modification was observed by obesity class for the associations GWG with SGA, preterm birth, and cesarean delivery (P interaction= 0.48, 0.38, and 0.59, respectively).

Conclusions: The data suggested that class of obesity modified the association between GWG and LGA. LGA should therefore be considered when re-examining the current GWG recommendations for women with obesity.