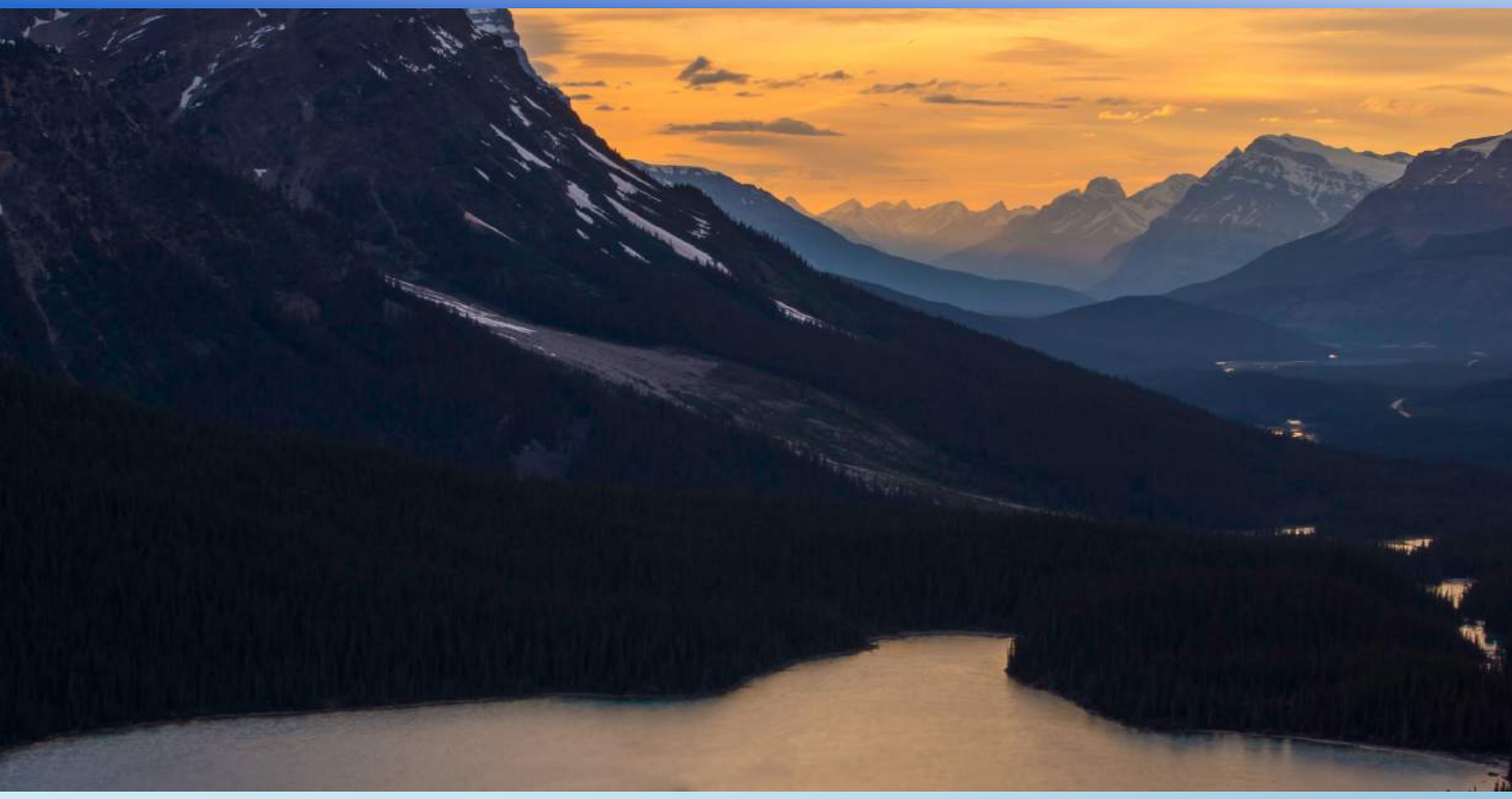
CNPRM

February 14-17th, 2018

5th CANADIAN NATIONAL PERINATAL RESEARCH MEETING

Banff, Alberta, Canada



Sponsored by:

DEVOTION

Developmental Origins of Chronic Diseases in Children Network

the Children's Hospital Research Institute of Manitoba

a division of the Children's Hospital Foundation of Manitoba

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Welcome Delegates!

Welcome to the Banff Centre for Arts and Creativity, Feb 14 – 17 2018, for the 5th annual Canadian National Perinatal Research Meeting (CNPRM).

Since amalgamating established Eastern and Western regional conferences into a national effort, the CNPRM has become the largest conjoint Perinatal / Neonatal research gathering in Canada, with an annual attendance of nearly 400 clinical and fundamental science faculty and trainees from the fields of obstetrics and gynecology, reproductive medicine, maternal and child health, nursing and midwifery, neonatology, nutrition and developmental biology. Every year, CNPRM features stellar international speakers, and creates a unique interface between obstetrical and neonatal, clinical and bench research. Satellite meetings for 2018 include Developmental Origins of Health and Disease Canada, the Canadian Neonatal Network, and the Canadian Pediatric Surgery Network. Drawing together this diverse range of health care players, CNPRM will be a birthplace for best practices and innovations leading to better postnatal outcomes, and lead to a better understanding of maternal physiology, parturition, newborn physiology and early life origins of disease.

The theme of the 2018 CNPRM is 'the unbroken thread', following the connections between maternal care, fetal physiology and neonatal outcomes. We took an unusual approach to programming interdisciplinary themed plenary sessions: Thursday morning on *Obstetrical and Neonatal Best Practices*; Friday morning *Antenatal and Postnatal Inflammation*; and Saturday morning *Stress and Resilience*. Each keynote address derives from a different discipline or sphere of practice, but each talk serves to connect one piece of this puzzle with the next – effectively each speaker delineates a part of the overall plenary topic, and then tosses the ball into the hands of the next speaker.

This year's CNPRM features a record 294 abstracts, with 94 presented at the podium and 200 in two research poster sessions. We are delighted to present 26 renowned keynote speakers, during three plenary sessions and sixteen concurrent thematic research sessions. The meeting also features 11 special interest workshops by national and international experts.

Huge thanks to the Theme Convenors and their committees for their enthusiasm in adjudicating so many abstracts and crafting the content of these sessions! We also pick up the tradition of honoring a "CNPRM Voyageur", an individual whose scientific journey set the landscape for perinatal research in Canada . This years voyageur is Dr. William Fraser.

Finally, science is not a discipline behind closed doors; the better we learn to communicate to the public our excitement in carrying out curiosity-driven research, the more society will value the work of creating new knowledge. This year's banquet speaker, Torah Kachur is a science professor and radio personality who knows how to bridge that gap.

As always, the heart of the CNPRM is the trainee. CNPRM continues to support trainees to present their work in a nurturing and supportive environment. Trainee research awards for best poster and best oral presentation are sponsored by CIHR Institute of Human Development, Child and Youth Health. CNPRM can only do this through the generous financial support of sponsors from research institutes, university departments, foundations and industry. We are grateful for their contributions of over $180,000 this year. We also gratefully acknowledge the logistical and organizational support of Tannis Erickson and the DEVOTION research cluster in the Children's Hospital Research Institute of Manitoba, without whom this year's organizers would have been at sea. We thank the Banff Centre staff, the CNPRM Organizing Committee, all the guest speakers and presenters, Thematic Committees, workshop organizers, judges and session Moderators – and above all, all the attendees: you make this meeting what it is.

On behalf of the 2018 CNPRM Organizing Committee, we encourage you to listen, argue, learn, mingle and network, and hear new perspectives. Enjoy yourself, be inspired, and go home energized to do great new work… ready to present at CNPRM next year!

Sincerely,



Shyamala Dakshinamurti Vern Dolinsky Richard Keijzer

2018 CNPRM Organizing Committee Co-chairs

Bienvenue!

Bienvenue chères participantes et chers participants! Bienvenue au Banff Center pour les arts et la créativité du 14 au 17 février 2018 pour le 5e Congrès annuel canadien en recherche périnatale (CACRP).

Depuis la fusion des congrès régionaux ouest et est en un effort national, ce congrès est devenu la plus grande réunion des principaux joueurs en recherche périnatale/néonatale canadienne, réunissant en moyenne presque 400 professeur(e)s et étudiant(e)s en sciences cliniques et fondamentales provenant des disciplines de la gynécologie-obstétrique, de la médecine reproductive, de la santé mère-enfant, des sciences infirmières et de sages-femmes, de la néonatalogie, de la nutrition et de la biologie du développement. Chaque année, le CACRP met à l'honneur des chercheures et chercheurs internationaux de premier plan et crée une interface unique entre les recherches obstétricales et néonatales, cliniques et fondamentales. L'édition 2018 inclue les rencontres satellites du chapitre canadien sur les origines développementales de la santé et des maladies (DOHAD Canada), du Réseau néonatal canadien, et du Réseau canadien de chirurgie pédiatrique. Point commun à toutes ces actrices et acteurs en sciences de la santé, ce congrès sera l'origine des futures bonnes pratiques et des innovations conduisant à une santé postnatale améliorée et à une compréhension plus complète de la physiologie maternelle, de la grossesse, de la physiologie du nouveau-né et de l'origine des maladies.

Le thème du CACRP 2018, « Le fil ininterrompu », fait référence aux liens tangibles entre les soins de santé maternelle, la physiologie fœtale et la santé néonatale. Nous avons utilisé une approche inédite en planifiant des séances plénières interdisciplinaires incluant les *Meilleures pratiques en obstétrique et en néonatalogie* jeudi matin; l'*Inflammation prénatale et postnatale* vendredi matin; et *Stress et résilience* samedi matin. Chaque présentateur de marque provient d'une discipline ou sphère clinique différente, mais chaque présentation permet de connecter une pièce du casse-tête avec la suivante – de fait, chaque invité(e) élucide sa partie du thème puis remet le relai au prochain.

Ce congrès a reçu un nombre record de 294 résumés scientifiques dont 94 seront présenté à l'oral et 200, par affiche lors de deux séances au contenu très varié. Nous sommes ravi(e)s de présenter 26 chercheures et chercheurs de renommée au cours de trois séances plénières et 16 sessions thématiques simultanées. Onze sessions de formation visant des intérêts particuliers seront données par des expertes et experts nationaux et internationaux. Nous remercions spécialement les sous-comités thématiques ayant jugé autant de résumés et ayant savamment concocté les différentes sessions!

Nous avons continué la tradition d'honorer un « Pionnier CACRP », soit un individu dont l'aventure scientifique est devenue une référence pour la recherche périnatale au Canada. Le pionnier de cette année est Dr. William Fraser.

En outre, rappelons-nous que la science n'est pas conduite dans une tour d'ivoire; meilleures sont nos capacités à communiquer au public notre excitation à poursuivre nos recherches poussées par la curiosité, le plus la société appréciera la valeur des nouvelles connaissances que nous façonnons. L'oratrice invitée pour le banquet de cette année est Torah Kachur, une professeure en sciences de la vie et une personnalité radiophonique qui sait comment franchir ce pont.

Néanmoins le cœur du CACRP reste la relève scientifique et le CACRP continue de faciliter le partage de leurs travaux dans un environnement propice à leur développement scientifique. Les prix de présentation sont offerts par l'Institut du Développement et de la Santé des enfants et des adolescents des IRSC. Nous sommes reconnaissant(e)s des contributions généreuses d'instituts de recherche, de départements universitaires et de partenaires privés, qui dépassent 180, 000$ cette année. Nous reconnaissons également le support organisationnel et logistique de Tannis Erickson et du groupe de recherche DEVOTION du Children's Hospital Research Institute of Manitoba, sans qui les organisatrices et organisateurs de la présente édition auraient été complètement démunis. Nous remercions le Banff Center, le comité organisateur, toutes les présentatrices et présentateurs invités, les sous-comités thématiques, les organisatrices et organisateurs des formations, les juges, les modératrices et modérateurs et, plus que tout, les participantes et participants : c'est vous qui faites de ce congrès un véritable succès.

Au nom du comité organisateur 2018, nous vous encourageons à écouter, argumenter, apprendre, réseauter, découvrir de nouvelles perspectives et proposer les vôtres. Amusez-vous, soyez inspiré(e)s et retourner chez vous rempli(e)s d'énergie pour continuer votre travail…et le présenter au CACRP l'an prochain!

Sincères,

Shyamala Dakshinamurti Vern Dolinsky Richard Keijzer

2018 CNPRM Organizing Committee Co-chairs

Greetings from the DEVOTION Network

Welcome to the 5th annual Canadian National Perinatal Research Meeting (CNPRM)! The Developmental Origins of Chronic Diseases in Children (DEVOTION) Network is pleased to host our friends and colleagues from across Canada and around the world here in Banff for another year of knowledge sharing and networking.

DEVOTION is comprised of four teams working together to accelerate knowledge to action within the areas of maternal and child health, and to promote wellness and prevent chronic disease. As such, we are very proud to be the program hosts of CNPRM, the largest perinatal/neonatal research conference in Canada!

Each year, we are thrilled to welcome 400 guests hailing from both clinical and fundamental science backgrounds, and trainees from obstetrics and gynecology, reproductive medicine, maternal and child health, nursing and midwifery, neonatology, nutrition and development and biology.

This year, 26 world renowned speakers will weave together the story of "the unbroken thread" – the connection between health at every stage of life, from prenatal to adult. Each speaker will offer insight into a different chapter of the story, via three plenary sessions and 16 concurrent thematic research sessions, as well as 11 special interest workshops.

We encourage you to familiarise yourselves with the program to customize and maximize your CNPRM experience.

Thank you to everyone who has contributed their time and efforts to help organize another spectacular event. A special thank you to the trainees, who are not only central to this event but to the future of maternal and child health. And of course, thank you to all of our speakers and guests for making CNPRM such a huge success year after year.

Enjoy the event!

Jon McGavock
Co PI, DEVOTION Network
CIHR Applied Chair in Resilience & Childhood Obesity
Associate Professor, Pediatrics and Child Health
Faculty of Medicine, University of Manitoba
Scientist, Children's Hospital Res. Inst. Manitoba

Andrew Halayko
Co PI, DEVOTION Network
CRC in Airway Cell and Molecular Biology
Professor, Physiology and Pathophysiology
Faculty of Medicine, University of Manitoba
Scientist, Children's Hospital Res. Inst. Manitoba

Greetings from the Children's Hospital Research Institute of Manitoba

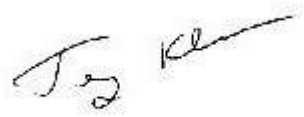
Welcome to the Canadian National Perinatal Research Meeting (CNPRM)! Thank you for coming together here in beautiful Banff, Alberta for four days of learning and collaboration with researchers from around the world. This year's theme of "the unbroken thread" is an exciting opportunity to connect obstetrical and neonatal, and clinical and bench research, and to explore the complex and critical links between maternal physiology, fetal and newborn physiology, and adult health and disease.

Over the next four days, you'll hear from a fantastic lineup of speakers providing their unique perspectives and expertise on this year's theme, and breaking down each part of the maternal-infant-adult health thread. I am especially excited to welcome speakers who have travelled from as far as Australia and Amsterdam to share their work and experiences from different corners of the globe.

Together with DEVOTION, the Children's Hospital Research Institute of Manitoba (CHRIM) is proud to once again host this great event. CHRIM strives to be a leader in child health, setting a standard of excellence and ensuring that every child receives the best, most informed treatment and care based on current, cutting-edge research that happens at our facility every day.

We know that in order to maintain this standard, we need to examine child health from every angle and work together with experts from all disciplines to understand the overall picture. CNPRM gives us a unique and valuable opportunity to do exactly that, with 400 researchers, clinicians, nurses, trainees, and policymakers together in one place!

I hope everyone takes advantage of the wonderful resources and networking opportunities that will be available throughout the conference. I wish each of you a rewarding, inspiring, and enjoyable CNPRM 2018.



Dr. Terry P. Klassen, MD
CEO and Scientific Director, CHRIM
Medical Director, Child Health Programme, WRHA
Professor and Head, Dept. of Pediatrics & Child Health
Max Rady College of Medicine, Rady Faculty of Health Sciences, University of Manitoba

CIHR IRSC | Institute of Human Development, Child and Youth Health
Institut du développement et de la santé des enfants et des adolescents

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IHDCYH supports research that ensures the best start in life for all Canadians and the achievement of their potential for optimal growth and development.

Funding Opportunities

Receive news and information about CIHR-IHDCYH funding opportunities by emailing IHDCYH-IDSEA@cihr-irsc.g.ca to subscribe to our mailing list.

Regular funding programs

CIHR Early Career Investigators in Maternal, Child and Youth Health
A program of operating grant funding for early career investigators in maternal, reproductive, child and youth health research.
http://bit.ly/ECI_MRCYH

IHDCYH Talks Video Competition
A unique opportunity to submit a short video that has an evidence-based message about the value of reproductive, child and youth health research.
http://bit.ly/IHDCYHTalks_En

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Twitter: @LeeShoo
http://www.cihr-irsc.gc.ca/e/8688.html

L'IDSEA appuie la recherche qui assure le meilleur début dans la vie pour tous les Canadiens et les Canadiennes et la réalisation de leur plein potentiel pour une croissance et un développement optimaux.

Possibilités de financement

Pour recevoir des nouvelles et de l'information sur les possibilités de financement de l'IDSEA des IRSC, abonnez-vous à notre liste de diffusion en écrivant à IHDCYH-IDSEA@cihr-irsc.gc.ca.

Programmes réguliers de financement

Chercheurs en début de carrière en santé génésique et en santé des mères, des enfants et des adolescents des IRSC
Programme de subventions de fonctionnement à l'intention de chercheurs en début de carrière en santé génésique et en santé des mères, des enfants et des adolescents. http://bit.ly/ECI_MRCYH_Fr

Concours de vidéos Entretiens de l'IDSEA
Occasion unique de présenter une courte vidéo comportant un message fondé sur des données probantes pour démontrer la valeur de la recherche en santé reproductive et en santé des enfants et des adolescents http://bit.ly/IHDCYHTalks_Fr

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Pour vous abonner à notre liste de diffusion, écrivez à
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Twitter : @LeeShoo
http://www.cihr-irsc.gc.ca/f/8688.html

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Canada

Program at a Glance

Wednesday, February 14	
15:30-21:30	Registration Professional Development Centre Central Foyer
16:00-17:00	Workshop 1: Cell Therapies for BPD: Criteria for Early Phase Clinical Trials Max Bell Room 252 Workshop 2 Perinatal Epidemiology Methods: Modeling Time-Varying Covariates and Time Varying Effects Max Bell Room 253
17:00-19:00	Dinner (Vistas Dining Room)
19:00-21:30	Poster Session 1 Kinnear Centre 2nd Floor

Thursday, February 15	
7:00-8:00	Breakfast (Vistas Dining Room)
8:30-10:30	**Opening Ceremonies** Husky Great Hall (1st Floor Kinnear Centre) **Plenary Session: Obstetrical & Neonatal Best Practices** **Keynote 1:** *Pre-term Birth Prevention Initiative - John Newnham* **Keynote 2:** *Antenatal Corticosteroids in Moderate/Late Preterm Infants - Lucky Jain* **Keynote 3:** *Perinatal Practices and Outcomes of ELGA Neonates in Canada: An Introspection- Prakesh Shah*
10:30-11:00	Nutrition Break (Kinnear Centre Foyer)
11:00-12:00	**Trainee Presentations** **Hot Topic Panel Discussion: Antenatal Steroids in Late Pre-term - Should We or Shouldn't We?** Panelists: John Newnham, Lucky Jain, Prakesh Shah Moderator: Alan Jobe
12:00-13:00	Lunch (Vistas Dining Room)
13:00-15:00	**Concurrent Sessions:** **1A Perinatal Epidemiology - Enrique Schisterman** Max Bell Room 252 **1B Neonatal Epidemiology - Lucky Jain** Max Bell Room 253 **1C Reproductive Sciences - Wendy Robinson** Max Bell Room 251 **1D Maternal Fetal Medicine - Isabel Fortier** Max Bell Auditorium
15:00-15:30	Nutrition Break (Max Bell Central Foyer)
15:30-17:30	**Concurrent Sessions:** **2A Neonatology Physiology - Michael Castaldo, Dany Weisz, Patrick McNamara** Max Bell Room 253 **2B Maternal Fetal Medicine - Stefania Ronzoni** Max Bell Auditorium **2C Nursing Midwifery** Max Bell Room 251 **2D DOHaD - Tracey Galloway** Max Bell Room 252
17:30-19:00	Dinner (Vistas Dining Room)
19:00-21:30	**Poster Session 2** Kinnear Centre 2nd Floor

Friday, February 16	
7:00-8:00	Breakfast (Vistas Dining Room)
8:00-9:00	**Workshop 3: Inviting Indigenous Community Engagement in Research - Jon McGavock** Max Bell Room 253 **Workshop 4: Successes, Perils & Pitfalls in Echocardiology-Based Hemodynamic Research - Amish Jain, Patrick McNamara, Danny Weisz** Max Bell Room 252 **Workshop 5: Clinical Trials Design: Theory and Practice - KS Joseph, Eileen Hutton** Max Bell Auditorium
9:00-10:30	**Plenary Session: Antenatal and Postnatal Inflammation** **Keynote 1:** *Inflammation & Infection and the Risk of Adverse Pregnancy Outcomes - Gordon Smith* **Keynote 2:** *Placental Inflammation: A Cause or Consequence of Placental Dysfunction? - Rebecca Jones* Husky Great Hall (1st Floor Kinnear Centre)
10:30-11:00	Nutrition Break (Kinnear Centre Foyer)
11:00-12:00	**Trainee Presentations** **Keynote 3:** *Pulmonary Vascular Disease and BPD: Role of Growth, Inflammation & the Microbiome - Robin Steinhorn* **Keynote 4:** *The Impact of Nutrition and Growth on Bronchopulmonary Dysplasia - Brenda Poindexter*
12:00-13:00	Lunch (Vistas Dining Room)
13:00-15:00	**Concurrent Sessions:** **3A Neonatal Epidemiology - Stephen Pearlman** Max Bell Room 253 **3B Maternal Fetal Medicine - Nir Melamed** Max Bell Auditorium **3C DOHaD - Pathik Wadhwa, Piush Mandhane** Max Bell Room 252 **3D Neonatal Physiology - Satyan Lakshminrusimha** Max Bell Room 251
15:00-15:30	Nutrition Break (Max Bell Central Foyer)
15:30-17:30	**Concurrent Sessions:** **4A Perinatal Epidemiology - Gordon Smith** Max Bell Auditorium **4B Neonatal Neurology - Deanne Thompson** Max Bell Room 253 **4C Placental Physiology - Rebecca Jones** Max Bell Room 252 **4D Special Topic: NEC - Agostino Pierro, Susan Albersheim** Max Bell Room 251
17:30-18:30	**Workshop 6: Translating Science Towards Health Policy - Jan Sanderson** Max Bell Room 253 **Workshop 7: Cutting Edge Technology: Bioinformatics - Prasoon Agarwal** Max Bell 251 **Workshop 8: Quality Improvement Research, and How to Publish It - Stephen Pearlman** Max Room 252
19:00-21:30	Banquet & Trainee Awards (Husky Great Hall, Kinnear Centre)

Saturday, February 17	
7:00-8:00	Breakfast (Vistas Dining Room)
8:00-9:00	**Workshop 9: How to Write a Research Grant Application and Tell Your Story to the Reviewers** Max Bell Room 253 **Workshop 10: Communicating Science to the Public** Max Bell Auditorium **Workshop 11: Cutting Edge Technology: Quantitative Neuroimaging** Max Bell Room 252
9:00-10:30	**Plenary Session: Stress and Resilience** **2018 CNPRM Voyageur -** *Gordon Smith* **Keynote 1:** *Intrauterine Examination of the Human Fetal Brain Functional Connectome - Moriah Thomason* **Keynote 2:** *Immediate and Long-term Impact of Painful Procedures on Hospital Neonates - Bonnie Stevens* Husky Great Hall (1st Floor Kinnear Centre)
10:30-11:00	Nutrition Break (Kinnear Centre Foyer)
11:00-12:00	**Keynote 3:** *Long Term Consequences of Early Life Stress: Lessons from the Dutch Famine (1944-1945)-Tessa Roseboom* **Keynote 4:** *Lasting Effects of Antenatal Steroids - Alan Jobe*
12:00-13:00	Lunch & Farewell (Vistas Dining Room)

ACCREDITATION

This event has been approved for a maximum of 20 credit hours as an Accredited Group Learning Activity (Section 1) as defined by the Maintenance of Certification Program of the Royal College of Physicians and Surgeons of Canada.

Organizing and Theme Committees:

Organizing Committee:

Co-chairs:

Shyamala Dakshinamurti, University of Manitoba

Vern Dolinsky, University of Manitoba

Richard Keijzer, University of Manitoba

Organizing Committee Members:

Jon Barrett, University of Toronto

Po-Yin Cheung, University of Calgary

Venu Jain, University of Alberta

Pascale Lavoie, University of British Columbia

Tim Regnault, Western University

Deborah Sloboda, McMaster University

Theme Committees:

DOHaD:

Convenor: Meghan Azad, University of Manitoba

Angela Devlin, University of British Columbia

Deb Sloboda, McMaster University

Vern Dolinsky, University of Manitoba

Daniel Hardy, Western University

Kristin Connor, Carleton University

Maternal Fetal Medicine:

Convenor: Jon Barrett, University of Toronto

Nir Melamed, University of Toronto

Doug Wilson, University of Calgary

Graeme Smith, Queen's University

Barbra de Vrijer, Western University

Leanne Dahlegren, University of British Columbia

Line Leduc, Université de Montréal

Neonatal Clinical/Epidemiology:

Convenor: Abhay Lodha, University of Calgary

Deepak Louis, University of Manitoba

Prakesh Shah, University of Toronto

Ayman Abou Mehrem, University of Calgary

Balpreet Singh, Dalhousie University

Marc Beltempo, McGill University

Kumar Kumaran, University of Alberta

Krystyna Ediger, University of Calgary

Neonatal Neurosciences:

Co-convenor: Jong Rho, University of Calgary

Co-convenor: Gregory A. Lodygensky, Université de Montréal

Bryan Richardson, Western University

Gerlinde Metz, University of Lethbridge

Vann Chau, University of Toronto

Section of Neonatology
Calgary Zone

Alberta Health Services

UNIVERSITY OF CALGARY
CUMMING SCHOOL OF MEDICINE

The Department of Pediatrics **Section of Neonatology** covers all five acute care hospitals in the Calgary Zone, providing comprehensive care to the sickest babies born in Southern Alberta with various cutting edge programs, including: the Neonatal Follow-Up Clinic, Southern Alberta Neonatal Transport Program, Antenatal Consultation, and world-class research.

Neonatal Physiology & Therapeutics:

Convenor: Pascal Lavoie, University of British Columbia

Yasser Elsayed, University of Manitoba

Amish Jain, Mount Sinai Hospital

Robert Jankov, University of Toronto

Thierry Lacaze, University of Calgary

Richard Taylor, Victoria General Hospital

Georg Schmoelzer, University of Alberta

Martin Post, University of Toronto

Nursing/Midwifery Research:

Convenor: Shahirose Premji, University of Calgary

Karen Lasby, Alberta Health Services

Sharon Dore, McMaster University

Gisela Becker, Mount Royal University

Perinatal Epidemiology:

Convenor: KS Joseph, University of British Columbia

Linda Dodds, Dalhousie University

Deshayne Fell, University of Ottawa

Jennifer Hutcheon, University of British Columbia

Eileen Hutton, McMaster University

Michael Kramer, McGill University

Suzanne Tough, University of Calgary

Placental & Fetal Physiology:

Convenor: Venu Jain, University of Alberta

Tim Regnault, Western University

Andy Watson, Western University

Denise Hemmings, University of Alberta

Kamran Yusuf, University of Calgary

Reproductive Sciences:

Convenor: Serge McGraw, Université de Montréal

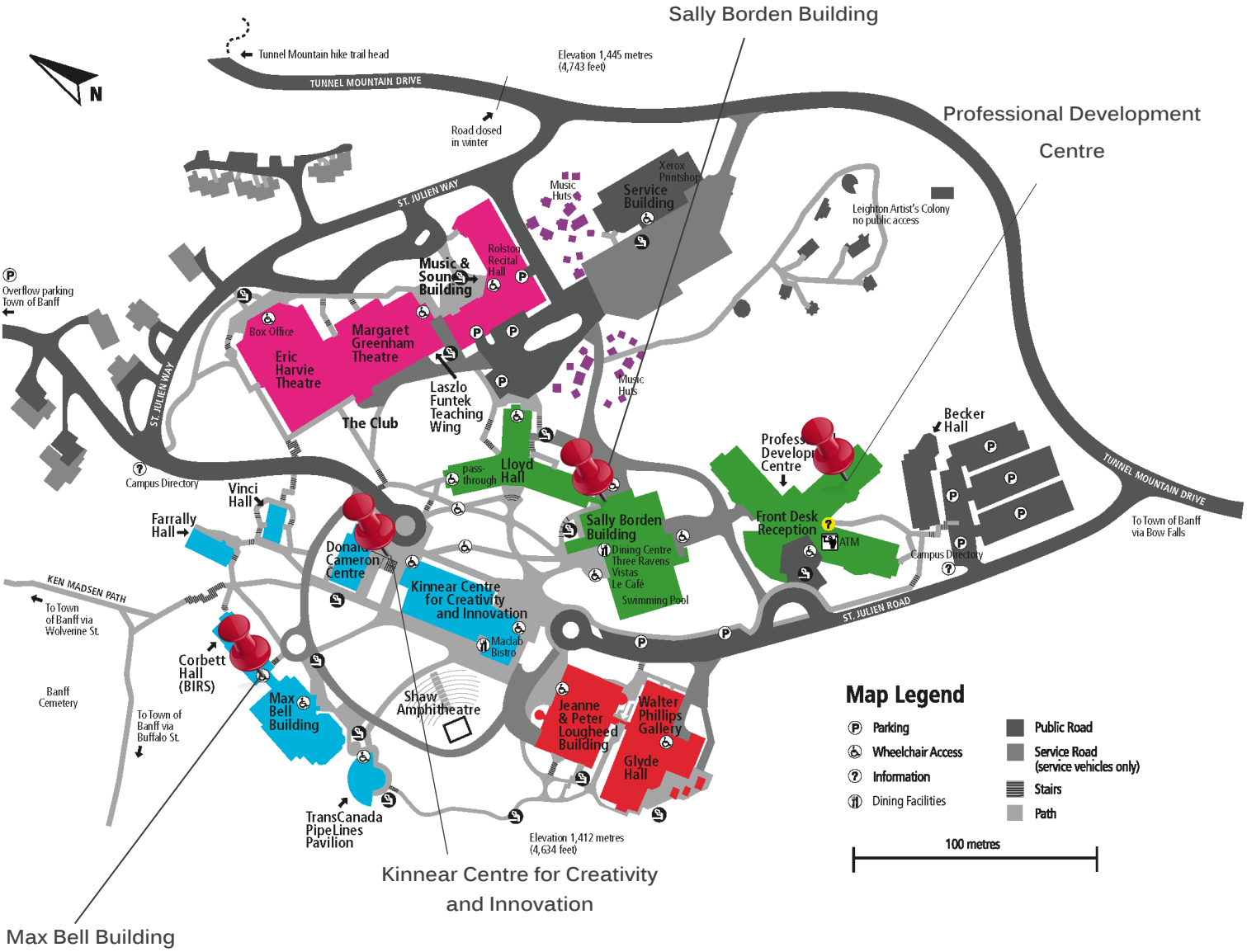
Deb Sloboda, McMaster University

Pablo Nepomnaschy, Simon Fraser University

Wendy Robinson, University of British Columbia

Sylvie Girard, Université de Montréal

The Banff Centre for Arts and Creativity Information & Map



BANFF CENTRE FOR ARTS AND CREATIVITY

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PO Box 1020 Banff, Alberta, Canada, T1L 1H5
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www. banffcentre.ca

*__Discover Banff Tours__ is offering discounts to all CNPRM attendees on winter activities in Banff. For more information, please visit the CNPRM Website

Notes for Presenters

Oral Presentations

All plenary session keynote lectures will take place in the Kinnear Centre Husky Great Hall (first floor). All discipline-specific concurrent presentations on Thursday and Friday will be held in designated breakout rooms in the Max Bell Centre (see the program schedule for room locations.)

Oral presentations will be 10 minutes in duration, allowing 5 additional minutes for moderated questions. Time will be strictly enforced.

Some orals will be presented during the plenary sessions, while others will be selected for presentation during the concurrent thematic sessions. Please refer to the program schedule to verify the presentation time.

Poster Presentations

Poster abstracts will be displayed in Rooms 201-205 in the Kinnear Centre from 7:00-9:30 pm on Wednesday, February 14, 2018 and Thursday, February 15, 2018.

Presenters in the poster sessions are asked to put up their posters between **6:00 pm and 7:00 pm** on their assigned day. Posters must be taken down after each poster session.

The format will be a mix, mingle, question, and answer style event. During the poster session, the presenting author is expected to be in attendance at his/her poster for the majority of the session and must be there for adjudication

CNPRM 2018 Abstract Presentation Awards

The 2018 Canadian National Perinatal Research Meeting Scientific Committees are pleased to announce the following trainee awards:

Best CNPRM Poster Presentations - *Four Awards*

Best CNPRM Oral Presentations - *Four Awards*

Through the sponsorship of CIHR-IHDCYH, presentations will also be selected for the Canadian Institutes of Health Research Presentation Awards:

Best Poster Presentations - *Two Awards*

Best Oral Presentations - *Two Awards*

The awards ceremony will take place during the Banquet on **Friday, February 16th in the Kinnear Centre Husky Great Hall.**

Welcome delegates to the

5th Annual Canadian National Perinatal Research Meeting

The Molly Towell Perinatal Research Foundation is proud to be a Founder's Circle sponsor

- 2018 is the 30th anniversary of the Molly Towell Foundation, over which time research grants have exceeded $2 million to provide funding of graduate and undergraduate fellowships for students in the field of fetal and neonatal medicine
- To provide start-up operating funds to assist in research and education in the field of fetal and neonatal medicine

Applications are now being accepted for the 2018/19 years

Visit *MTPRF.ORG* for details.

Detailed Program

Wednesday, February 14TH

3:30 - 9:30 pm	**Registration** (Professional Development Centre)
4:00 - 5:00 pm	**Workshop 1: Cell Therapies for BPD: Criteria for Early Phase Clinical Trials** (MB 252) **Bernard Thebaud, Ottawa Hospital Research Institute** *Sponsored by: University of Manitoba Neonatology* **Workshop 2: Perinatal Epidemiology Methods: Modeling Time-Varying Covariates and Time-Varying Effects** (MB 253) **Robert Platt, & Jennifer Hutcheon, McGill University** *Sponsored by: Women and Children's Health Research Institute (WCHRI)*
5:30 - 7:00 pm	**Dinner** (Vistas Dining Room)
7:00 - 9:30 pm	**Poster Session 1** (Kinnear Centre, 201-205) Themes: Maternal Fetal Medicine, Neonatal Epidemiology, Nursing/ Midwifery, Reproductive Sciences

*Text highlighted in blue is hyperlinked for easy navigation throughout this program

Thursday, February 15TH

7:00-8:00 am	**Breakfast** (Vistas Dining Room)
8:30 am	Opening Ceremonies (Husky Great Hall, Kinnear Centre) *Welcome to the Territory & Opening Ceremony: Elder Helmer Twoyoungmen* *Welcome & Opening Remarks: Dr. Vern Dolinsky, Dr. Richard Keijzer, Dr. Shyamala Dakshinamurti, CHRIM, Co-chairs, CNPRM 2018* *Greetings on Behalf of Ministry of Health, Government of Canada: Dr. Shoo Lee; Scientific Director, IHDCYH-CIHR*
9:00 am-12:00 pm	**Plenary Session:** **Obstetrical & Neonatal Best Practices** Moderator: Jon Barrett
9:00-9:30 am	Keynote 1: Preterm Birth Prevention Initiative John Newnham, University of Western Australia *Sponsored by: Canadian Institutes of Health Research (CIHR)*
9:30-10:00 am	Keynote 2: Antenatal Corticosteroids in Moderate and Late Pre-term Infants Lucky Jain, Emory University *Sponsored by: Mallinckrodt Pharmaceuticals*
10:00-10:30 am	Keynote 3: Perinatal Practices and Outcomes of ELGA Neonates in Canada: An Introspection Prakesh Shah, University of Toronto
10:30-11:00 am	**Nutrition Break** (1st floor foyer, Kinnear Centre)
11:00-11:15 am	Abstract Presentation (227) Risk of Anorexia Nervosa with Overweight and Obese Severity: A Population Based Cohort Study in Sweden Neda Razaz, Karolinska Institutet
11:15-11:30 am	Abstract Presentation (307) Intrauterine Growth Restriction and Antenatal Corticosteroids: What are the Effects on Childhood Growth Trajectories? John Snelgrove, University of Toronto
11:30-12:00 pm	Hot Topic Debate: Use of Antenatal Corticosteroids in Late Pregnancy **Panelists:** John Newnham (University of Western Australia), Lucky Jain (Emory University), Prakesh Shah (University of Toronto) **Moderator:** Alan Jobe (University of Cincinnati)
12:00 - 1:00 pm	**Lunch** (Vistas Dining Room)

Thursday, February 15TH contin-

1:00 - 3:00 pm	Concurrent Sessions **Session 1A I Perinatal Epidemiology** (MB 252) Moderator: Linda Dodds *Sponsored by: Faculty of Health Sciences, McMaster University*
1:00 - 1:30 pm	The Role of Inflammation on Conception and Pregnancy Outcomes Enrique Schisterman, NICHD
1:30 - 1:45 pm	Abstract Presentation (120) Preterm Birth and Neonatal Health Outcomes: Canadian Trends in 2004-2015 Lindsay Richter, University of British Columbia
1:45 - 2:00 pm	Abstract Presentation (315) The Impact of Funded NIPT on the Utilization of Prenatal Screening and Diagnostic Testing in Ontario Nan Okun, Mount Sinai Hospital
2:00 - 2:15 pm	Abstract Presentation (124) Chronic Medical Conditions and Perinatal Mental Illness: A Systematic Review and Meta-Analysis Hilary Brown, University of Toronto
2:15 - 2:30 pm	Abstract Presentation (176) Social Support and Maternal Mental Health at 4 months and 1 year Post-partum: Analysis from the All Our Families Cohort Erin Hetherington, University of Calgary
2:30 - 2:45 pm	Abstract Presentation (329) Severe Perinatal and Maternal Morbidity and Mortality Associated with Operative Vaginal Delivery, by Pelvic Station, Compared with Cesarean Delivery in the Second Stage of Labour Giulia Muraca, University of British Columbia
2:45 - 3:00 pm	Abstract Presentation (169) Disparities in Caesarean Section Rates by Maternal Socioeconomic Status across Diverse Obstetric Indications Kamala Adhikari Dahal, University of Calgary

	Session 1B I Neonatal Epidemiology (MB 253) Moderators: Abhay Lodha, Joseph Ting
1:00 - 1:30 pm	Burnout in NICU Lucky Jain, Emory University
1:30 - 1:45 pm	Abstract Presentation (137) Meta-Analysis of Neurodevelopment Outcomes at 4-10 Years of Age in Children Born at 22-25 Weeks Gestational Age Gregory Moore, Children's Hospital of Eastern Ontario
1:45 - 2:00 pm	Abstract Presentation (181) Split-week Gestational Age Better Predicts Outcomes in Preterm Infants at the Extremes of Viability Sumesh Thomas, University of Calgary
2:00 - 2:15 pm	Abstract Presentation (368) Pre-natal and Early Postnatal Predictors of Child Communicative Trajectories from 12-36 Months Rochelle F Hentges, University of Calgary
2:15 - 2:30 pm	Abstract Presentation (027) Does Presence of Down Syndrome Increase Respiratory Syncytial Virus (RSV) Related Hospitalization in Children Less than 2 Years of Age? Souvik Mitra, Dalhousie University & IWK Health Center
2:30 - 2:45 pm	Abstract Presentation (254) The Incidence of Adverse Neonatal Outcomes in Indigenous Pregnancies in Canada, the United States, Australia and New Zealand Marissa Anne Nahirney, University of Calgary
2:45 - 3:00 pm	Abstract Presentation (238) Validation of a Preference-Based Scoring System for Health Status Classification System-Preschoolers (HSCS-PS) Satvinder Ghotra, IWK Health Center

	Session 1C I Reproductive Sciences (MB 251) Moderator: Serge McGraw
1:00 - 1:30 pm	Genetic and Epigenetic Studies of the Placenta Wendy Robinson, University of British Columbia
1:30 - 1:45 pm	Abstract Presentation (243) Activation of Uterine Natural Killer Cells and Impairment of Spinal Artery Remodeling in Early-mid Pregnancy as a Consequence of Maternal Obesity in Mice Jennet Baltayeva, The University of British Columbia
1:45 - 2:00 pm	Abstract Presentation (296) Maternal Obesity Alters Uterine Natural Killer (uNK) Activity through a Functional KIR2DL1/S1 Imbalance Barbara Castellana, British Columbia Children's Hospital Research Institute
2:00 - 2:15 pm	Abstract Presentation (038) Co-culture of Human Fetal Membranes and Uterine Myocytes Induce Synergistic Release of a Series of Pro-Inflammatory Cytokines and Chemokines Kelycia Leimert, University of Alberta
2:15 - 2:30 pm	Abstract Presentation (274) Uterine Natural Killer Cells Prevent Fetal Growth Restriction Following Maternal Polyinosinic-Polycytidylic Acid Exposure Kelly Baines, The University of Western Ontario
2:30 - 2:45 pm	Abstract Presentation (260) Roles of Prostaglandin E2 (PGE2) in Pregnancy- New Perspectives on the Pro-Quiescent Roles of the Downstream Target RGS2 Daniela Urrego, University of Calgary
2:45 - 3:00 pm	Abstract Presentation (091) Obesity Alters Monocyte Profiles in Reproductively Cycling Non-Pregnant and Pregnant Mice at Mid-Gestation Jessica Breznik, McMaster University

Session 1D I Maternal Fetal Medicine

(Max Bell Auditorium)

Moderator: Venu Jain

1:00 - 1:15 pm	How to Leverage Multi-Study DOHaD Research Projects: Overview of the ReACH Resources Isabelle Fortier, ReACH/IDCYH
1:15 - 1:30 pm	Abstract Presentation (374) First-Trimester Screening for Fetal Aneuploidies using Placental Growth Factor: the Great Obstetrical Syndrome (GOS) Study Amélie Boutin, CHU de Québec - Université Laval Research Center
1:30 - 1:45 pm	Abstract Presentation (331) Laser Treatment of Twin Anemia-Polycythemia Sequence: A Single Institution Experience Sebastian Hobson, Mount Sinai Hospital, University of Toronto
1:45 - 2:00 pm	Abstract Presentation (067) Trends in the Prenatal Diagnosis of Vascular Rings in Alberta and Rate and Timing of Postnatal Intervention Aisling Young, University of Alberta
2:00 - 2:15 pm	Abstract Presentation (312) Fetal Myelomeningocele Repair in Canada Alyaa Al-Refai, Mount Sinai Hospital and University of Toronto
2:15 - 2:30 pm	Abstract Presentation (034) Interventions to Try to Prevent Preterm Birth in Women with a History of Conization: a Systematic Review and Meta-Analyses Marinela Grabovac, McMaster University
2:30 - 2:45 pm	Abstract Presentation (341) First and Second Trimester Feto-Placental Biomarkers in Women Living with HIV According to Antiretroviral Therapy Exposure Isabelle Boucoiran, CHU Sainte-Justine, Université de Montréal
2:45 - 3:00 pm	Abstract Presentation (258) Risk of Preterm Birth in a Singleton Pregnancy Following Prior Pre-term Twin Birth: a Cohort Study Rebecca Menzies, University of Toronto
3:00 - 3:15 pm	**Nutrition Break** (Max Bell Centre Central Foyer)

	Session 2 A I Neonatal Physiology (MB 253) Moderator: Patrick McNamara *Sponsored by: Methapharm Curosurf*
3:30 - 4:00 pm	Surgical Treatment for Patent Ductus Arteriosus and Clinical Outcomes of Extreme Preterm Infants: Is Ligation Still an Option? Dany Weisz, University of Toronto
4:00 - 4:30 pm	Management of the PDA: An Alternative Approach Michael Castaldo, BC Children's Hospital Research Institute
4:30 - 4:45 pm	Abstract Presentation (229) Defending the Neonatal Heart: Misoprostol Prevents Bnip3-Induced Cardiometabolic Dysfunction During Hypoxia Matthew D. Martens, University of Manitoba
4:45 - 5:00 pm	Abstract Presentation (204) Does the Timing of Initiation of Therapeutic Hypothermia Influence MRI Findings and Outcomes in Encephalopathic Babies? Mireille Guillot, Children's Hospital of Eastern Ontario
5:00 - 5:15 pm	Abstract Presentation (228) The Outcomes of Prenatally Diagnosed Hemoglobin Barts Disease With or Without Intra-Uterine Transfusion in Ontario, Canada Hui Jue Zhang, University of Toronto
5:15 - 5:30 pm	Abstract Presentation (351) Maternal Diet-Induced Obesity (mDIO) Induces Maternal Intestinal Inflammation and Altered Placental Vascularization and Placental Hypoxia Jessica Wallace, McMaster University
	Session 2B I Maternal Fetal Medicine (Max Bell Auditorium) Moderator: Graeme Smith *Sponsored by: Lawson Health Research Institute (Children's Health Research Institute)*
3:30 - 4:00 pm	The Inverted Pyramid in Maternal Fetal Medicine Stefania Ronzoni, University of Toronto

4:00 - 4:15 pm	Abstract Presentation (224) **Impact of Publicly-Funded Non-Invasive Prenatal Testing on the Utilization of Invasive Diagnostic Testing in British Columbia** Scally Chu, University of British Columbia; Perinatal Services BC, Provincial Health Services Authority
4:15 - 4:30 pm	Abstract Presentation (332) **Phenotype Analysis of Women with Preclampsia: Implications for Disease Pathogenesis and Screening** Sebastian Hobson, Mount Sinai Hospital, University of Toronto
4:30 - 4:45 pm	Abstract Presentation (154) **Nonpresenting Dichorionic Twins and Placental Vascular Malperfusion** Eran Weiner, Sunnybrook Health Sciences Center
4:45 - 5:00 pm	Abstract Presentation (308) **Placental Growth Factor for Predicting Adverse Outcomes Resulting from Hypertensive Disorders of Pregnancies: A Systematic Review** Ugochinyere Vivian Ukah, University of British Columbia
5:00 - 5:15 pm	Abstract Presentation (222) **Effect of Cigarette Smoking on Insulin like Growth Factor-1 Levels in Pregnant Women** Smita Roychoudhury, University of Calgary
5:15 - 5:30 pm	Abstract Presentation (326) **Cyclooxygenase Inhibitors for Treating Preterm Labour? A Review of the Scientific Evidence** Daniela Urrego, University of Calgary

Session 2C I Nursing Midwifery (MB 251)

Moderator: Shahirose Premji

Sponsored by: Calgary Faculty of Nursing

3:30 - 3:45 pm	Abstract Presentation (334) **Antenatal Midwifery Care and Reduced Prevalence of Small-for-Gestational-Age Birth and Other Adverse Infant Birth Outcomes for Women of Low Socioeconomic Position** Daphne N. McRae, University of British Columbia

Thursday, February 15TH continued

3:45 - 4:00 pm	Abstract Presentation (006) The Impact of the Helping Babies Survive Program on Neonatal Outcomes and Health Provider Skills: A Systematic Review and Meta-Analysis Justine Dol, Health, Dalhousie University
4:00 - 4:15 pm	Abstract Presentation (058) Reigning in Wild Effect Estimates: Using Bayesian Models for Exploratory Analyses in NICU Timothy Disher, Dalhousie University
4:15 - 4:30 pm	Abstract Presentation (190) A Parent Targeted and Mediated Video Intervention to Improve Uptake of Pain Treatment for Babies During Newborn Screening: A Pilot Randomized Controlled Trial Carolina Lavin Venegas, University of Ottawa
4:30 - 4:45 pm	Abstract Presentation (119) Barriers to Addressing Perinatal Mental Health Issues in Midwifery Settings Hamideh Bayrampour, University of British Columbia
4:45 - 5:00 pm	Abstract Presentation (158) Exposure to Violence During Pregnancy and its Association with Maternal Prenatal Care Utilization Brittany Jamieson, Ryerson University
5:00 - 5:15 pm	Abstract Presentation (255) Evidence-based Strategies for Increasing Engagement and Recruitment of Males in Mental Health Research- A Systematic Literature Review Katherine Bright, University of Calgary
5:15 - 5:30 pm	Abstract Presentation (200) Reducing Neonatal Abstinence Syndrome in Babies Born to Mothers Enrolled in Opioid Replacement Therapy Programs Denise Clarke, Alberta Health Services

	Session 2D I DOHaD (MB 252) Moderator: Deb Sloboda
3:30 - 4:00 pm	A Framework for Intervention Research that Shifts Trajectories of Health for Indigenous People Tracey Galloway, University of Toronto
4:00 - 4:15 pm	Abstract Presentation (142) Gestational Diabetes Alters Mitochondrial Bioenergetics in Early-Life and Impairs Cardiac Function in the Rat Offspring Stephanie Kereliuk, CHRIM
4:15 - 4:30 pm	Abstract Presentation (117) Perinatal Iron-Deficiency and a Secondary High-Salt Diet Stressor Cause Sex-Dependent Cardiovascular Dysfunction and Vasoconstrictor Hypersensitivity in Adult Offspring Andrew Woodman, University of Alberta
4:30 - 4:45 pm	Abstract Presentation (321) MicroRNA miR-200b Knockout Mice have Pulmonary Hypertension Associated with Higher Endothelin Receptor-A Expression Chelsea Day, CHRIM
4:45 - 5:00 pm	Abstract Presentation (219) Human Milk Fatty Acids: Associations with Maternal Characteristics and Infant Body Composition Kozeta Miliku, CHRIM
5:00 - 5:15 pm	Abstract Presentation (343) TNF Mediates Impact of Maternal Obesity on Fetal Gut Development Kate Kennedy, McMaster University
5:15 - 5:30 pm	Abstract Presentation (237) The Impact of Maternal Malnutrition on Gut Barrier Defense. Implications for Pregnancy Health and Fetal Development? Sebastian Srugo, Carleton University
5:30 - 7:00 pm	**Dinner** (Vistas Dining Room)
7:00 - 9:30 pm	**Poster Session 2** (Kinnear Centre, 201-205) Themes: DOHaD, Neonatal Neurology, Neonatal Physiology and Therapeutics, Perinatal Epidemiology, Placental and Fetal Physiology

Friday, February 16TH

7:00 - 8:00 am	**Breakfast** (Vistas Dining Room)
8:00 - 9:00 am	**Workshop 3: Inviting Indigenous Community Research in Research** (MB 253) Jon McGavock, University of Manitoba **Workshop 4: Successful, Perils & Pitfalls in Echocardiology-Based Hemodynamic Research** (MB 252) Patrick McNamara (Sick Kids) Amish Jain (University of Toronto) , Dany Weisz (University of Toronto) *Sponsored by: University of Montreal ObGyn* **Workshop 5: Clinical Trial Design: Theory & Practice** (MB Auditorium) KS Joseph & Eileen Hutton, University of British Columbia, *Sponsored by: Calgary Neonatology*
9:00 - 10:30 am	**Plenary Session:** **Antenatal & Postnatal Inflammation** (Husky Great Hall, Kinnear Centre) **Moderator: Pascal Lavoie**
9:00 - 9:30 am	**Keynote 1: Inflammation, Infection and the Risk of Adverse Pregnancy Outcomes** **Gordon Smith, University of Cambridge** *Sponsored by: Bles Biochemicals*
9:30 - 10:00 am	**Keynote 2: Placental Inflammation:** A Cause or Consequence of Placental Dysfunction? **Rebecca Jones, University of Manchester**
10:00 - 10:15 am	**Abstract Presentation (173)** **Neurodevelopment in 3 year-olds Following Prenatal Exposure to Maternal Gestational Hyperglycemia or Pre-Pregnancy Adiposity** John Krzeczkowski, McMaster University
10:15 - 10:30 am	**Abstract Presentation (166)** **Energy Intake for Preterm Infants Fed Donor Milk is Significantly Impacted by Feeding Technique** Marina de Sousa Castro, University of Toronto
10:30 - 10:45 am	**Nutrition Break** (1st floor foyer, Kinnear Centre)

11:00 - 11:30 am	Keynote 3: Pulmonary Vascular Disease and BPD: Role of Growth, Inflammation, and the Microbiome Mark Underwood, UC Davis Medical Centre
11:30 - 12:00 pm	Keynote 4: The Impact of Nutrition and Growth on Bronchopulmonary Dysplasia Brenda Poindexter, University of Cincinnati *Sponsored by: Mead Johnson Nutrition*
12:00 - 1:00 pm	**Lunch** (Vistas Dining Room)
	Session 3A I Neonatal Epidemiology (MB 253) Moderators: Aman Abou Mehrem, Balpreet Singh
1:00-1:30 pm	Disruptive Innovation: Are we Ready? Stephen Pearlman, Thomas Jefferson University
1:30-1:45 pm	Abstract Presentation (257) Cost-Effectiveness of Pulse Oximetry Screening for Critical Congenital Heart Defects in Ontario Prakeshkumar Shah, University of Toronto
1:45-2:00 pm	Abstract Presentation (184) Is Early Extubation Associated with Increasing Risk of Short Term Neurological Outcome in Very Preterm Infants? Marie Chevallier, Grenoble University Hospital
2:00-2:15 pm	Abstract Presentation (044) Evaluation of Smart Device Applications Targeted to Parents of Infants in the Neonatal Intensive Care Unit (NICU) Brianna Richardson, Dalhousie University
2:15-2:30 pm	Abstract Presentation (369) Estimating Umbilical Venous Catheter Insertion Depth in Newborns Using Birth Weight or Body Measurement; A Randomized Trial Ayman Sheta, Calgary University
2:30-2:45 pm	Abstract Presentation (249) Comparison of Three Cooling Methods for Neonatal Therapeutic Hypothermia on Transport: a Single Centre Canadian Experience Khorshid Mohammad, University of Calgary

2:45 - 3:00 pm	Abstract Presentation (291) Development and Validation of a Screening Tool to Identify Newborn Infants at High Risk for Low Vitamin D Status Sharina Patel, School of Human Nutrition, McGill University

Session 3B I Maternal Fetal Medicine

(Max Bell Auditorium)

Moderator: Douglas Wilson

1:00 - 1:30 pm	Twins- What's new? Progesterone, GDM, Growth Nir Melamed, University of Toronto
1:30 - 1:45 pm	Abstract Presentation (100) Gestational Weight Gain in Twin Pregnancies Modeled as a Function of Gestational Age and Pre-pregnancy Body Mass Index Maya Ram, Sunnybrook Health Sciences Centre
1:45—2:00 pm	Abstract Presentation (209) A Randomized Controlled Trial on the Effect of Introducing a Daily Smartphone-based Feedback System between GDM Patients and Physicians on Patient Compliance, Glycemic Control, Patient Satisfaction, and Pregnancy Outcome Eran Weiner, Edith Wolfson Medical Center, Holon, Israel
2:00 - 2:15 pm	Abstract Presentation (046) Impact of Maternal Body Mass Index (BMI) and Gestational Weight Gain on Obstetrical and Perinatal Outcome Joffi Chacko, Christian Medical College and Hospital
2:15 - 2:30 pm	Abstract Presentation (148) Prediction of Spontaneous Preterm Birth Among Twin Gestations Using Machine Learning and Texture Analysis of Cervical Ultrasound Images Sandra Fiset, University of Toronto
2:30 - 2:45 pm	Abstract Presentation (208) To Have a C-Section of Not? Understanding Planned C-Section of Migrant and Canadian-born Women in Edmonton, Alberta Priatharsini (Tharsini) Sivananthajothy, University of Alberta

2:45 - 3:00 pm	Abstract Presentation (017) Women with Physical Disability in Pregnancy Resident Education: A National Survey as a Needs Assessment for Curriculum Improvement in Obstetrics and Gynaecology in Canada Gharid Nourallah, Mount Sinai Hospital and Institute of Medical Science
	Session 3C I DOHaD (MB 252) Moderator: Kozeta Miliku *Sponsored by: Society of Obstetrics and Gynecology of Canada (SOGC)*
1:00 - 1:30 pm	Does Aging Begin in Utero? The Fetal Programming of Telomere Biology Hypothesis Pathik Wadhwa, University of California, Irvine
1:30 - 2:00 pm	Sleep and Neurobehavioural Development in the First Two Years of Life: Results from the Child Study Piush Mandhane, University of Alberta
2:00 - 2:15 pm	Abstract Presentation (316) Biological Determinants of Type 2 Diabetes in Offspring Born to Mothers with Type 2 Diabetes: The Next Generation Cohort Farrah Jabar, CHRIM
2:15 - 2:30 pm	Abstract Presentation (320) Trauma-Informed Care and Natural Disasters: Preliminary Results from Pregnant Women post-2016 Fort McMurray Wildlife Ashley Pike, University of Alberta
2:30 - 2:45 pm	Abstract Presentation (344) Paternal Obesity Disrupts Placental Development and is Associated with Hepatic ER Stress in a Murine Model Brendan Patterson, McMaster University
2:45 - 3:00 pm	Abstract Presentation (325) Investigating the Role of the HNF-1αG319S Polymorphism in Early-Onset Type 2 Diabetes (T2D) in Manitoban Indigenous Youth Taylor Simone Morriseau, University of Manitoba

	Session 3D I Neonatal Physiology (MB 251) Moderator: Richard Taylor *Sponsored by: Prolacta Bioscience*
1:00-1:30 pm	Oxygen Saturation Targets– Myth or Reality? Satyan Lakshminrusimha, UC Davis
1:30-2:00 pm	Pulmonary Hypertension of Chronic Lung Disease– Can the RV Help Us? Amish Jain, University of Toronto
2:00-2:15 pm	Abstract Presentation (026) Hypoxia Directly Inhibits Adenylyl Cyclase Catalytic Activity in Persistent Pulmonary Hypertension of the Newborn Anurag Singh Sikarwar, University of Manitoba
2:15-2:30 pm	Abstract Presentation (037) Clinical and Echocardiographic Predictors of Response to Inhaled Nitric Oxide Therapy in Preterm Neonates less than 32 week with Hypoxic Respiratory Failure Mohamed Ibrahim, University of Toronto
2:30-2:45 pm	Abstract Presentation (239) Impacts of High Levels of Continuous Positive Airway Pressure on Cardiac Output in Preterm Neonates: A Prospective Physiological Study Souvik Mitra, Dalhousie University
2:45-3:00 pm	Abstract Presentation (250) Umbilical Cord Blood Levels in Angiogenic and Growth Factors and Risk of Retinopathy of Prematurity in Preterm Infants Lubaba Khan, University of Calgary
3:00-3:15 pm	**Nutrition Break** (Max Bell Central Foyer)
	Session 4A I Perinatal Epidemiology (MB Auditorium) Moderator: Michael Kramer *Sponsored by: University of Calgary*
3:30-4:00 pm	Developing Novel Methods for Screening and Fetal Growth Restriction Gordon Smith, University of Cambridge

Friday, February 16TH continued

4:00 - 4:15 pm	Abstract Presentation (216) Cardiovascular-Related Morbidity and Mortality in Women with a History of Pregnancy Complications: A Systematic Review Sonia Grandi, McGill University
4:15 - 4:30 pm	Abstract Presentation (107) Operative Vaginal Delivery, Obstetric Trauma, and Birth Trauma Giulia M Muraca, University of British Columbia
4:30 - 4:45 pm	Abstract Presentation (311) Normative Data for Lean Mass in Healthy Term Infants from 1 Month to 3 Years of Age Olusola Funmilayo Sotunde, McGill University
4:45 - 5:00 pm	Abstract Presentation (251) An Integrative and Collaborative Approach to Associating Adverse Birth Outcomes and Industrial Air Pollution Charlene Nielsen, University of Alberta
5:00 - 5:15 pm	Abstract Presentation (232) Factors Associated with Between-Hospital Differences in Uptake of the Maternal Newborn Dashboard Across Ontario Deborah Weiss, Better Outcomes Registry & Network (BORN) Ontario
5:15 - 5:30 pm	Abstract Presentation (069) Incidence of Surgical Errors During and Complications after Caesarean Section in the United States Manal Sheikh, University of Calgary
	Session 4B I Neonatal Neurology (MB 253) Moderator: Greg Lodygensky
3:30 - 4:00 pm	How has Neuroimaging Improved our Understanding of Brain Development in Premature Infants? Deanne Thompson, University of Melbourne, AU
4:00 - 4:15 pm	Abstract Presentation (096) Non-Invasive Assessment of Hippocampal Metabolism During the Acute Period of Inflammation in an Animal Model of Periventricular Leukomalacia Wyston Pierre, Université de Montréal

Friday, February 16TH continued

4:15 - 4:30 pm	Abstract Presentation (317) Cephalocentesis in the Management of Severe Fetal Hydrocephalus Alyaa Al-Refai, Mount Sinai Hospital, University of Toronto
4:30 - 4:45 pm	Abstract Presentation (118) Sildenafil as a Possible Treatment for Retinopathy of Prematurity Alexandra Bélanger, Montreal Children's Hospital
4:45 - 5:00 pm	Abstract Presentation (352) Epigenetic Programming of Ancestral Stress Accelerates Age-Related Physical and Mental Health Decline Mirela Ambeskovic, University of Lethbridge
5:00 - 5:15 pm	Abstract Presentation (040) Effects of Maternal Stress on Offspring Development and Adult Behaviour in a Rat Two-Hit Stress Model are Gender-Specific Barbara Verstraeten, University of Alberta and Ghent University
5:15 - 5:30 pm	Abstract Presentation (366) Neurodevelopment and Growth Outcomes of Preterm Infants Born Outside Tertiary Perinatal Centers Compared to Inborn Infants Ayman Sheta, Calgary University
	Session 4C I Placental Physiology (MB 252) Moderator: Venu Jain
3:30 - 4:00 pm	Placental Mechanisms for Susceptibility of Women of Advanced Age to Stillbirth Rebecca Jones, University of Manchester
4:00 - 4:15 pm	Abstract Presentation (193) Treating the Placenta with a Nanoparticle-Linked Antioxidant to Improve Pregnancy Outcomes in a Rat Model of Fetal Hypoxia Esha Ganguly, University of Alberta
4:15 - 4:30 pm	Abstract Presentation (357) Umbilical Arterial Blood Flow in the 3rd Trimester and it's Association with Neurodevelopmental Outcomes in Children with Congenital Heart Disease Jayani Abeysekera, University of Alberta
4:30 - 4:45 pm	Abstract Presentation (084) Small for Gestational Age in the Absence of Hypertensive Disorders in Singletons- can Pathology Define What is Early On-set? Amir Aviram, Sunnybrook Health Sciences Centre

4:45 - 5:00 pm	Abstract Presentation (093) Maternal Diet-Induced Obesity (mDIO) Alters Maternal and Fetal Hepatic Gluconeogenesis at Embryonic Day 14.5 Yu Fei Xia, McMaster University
5:00 - 5:15 pm	Abstract Presentation (033) The Metabolic Response of Human Villous Trophoblasts to Prolonged Fatty Acid Exposure Zachary Easton, The University of Western Ontario
5:15 - 5:30 pm	Abstract Presentation (039) Validation of a Clinical and Sonographic Based Scoring System for Pre-natal Prediction of Morbidly Adherent Placenta in High Risk Populations Abrar Alsadah, The Ottawa Hospital, University Of Ottawa
	Session 4D I Necrotizing Enterocolitis (NEC) (MB 251) Moderator: Richard Keijzer
3:30 - 4:00 pm	Necrotizing Entercolitis: Innovative Treatment Strategies Agostino Pierro, University of Toronto
4:00 - 4:15 pm	Results from the National CNN/CAPS Surveys on the Management of Necrotizing Enterocolitis Richard Keijzer, University of Manitoba Prakesh Shah, University of Toronto
4:15 - 4:30 pm	Abstract Presentation (363) Mortality and Maternal Substance Use in Gastroschisis Melanie Morris, University of Manitoba
4:30 - 4:45 pm	Abstract Presentation (294) Effects of Stem Cells on Intestinal Epithelial Cells Carol M Lee, The Hospital for Sick Children
4:45 - 5:00 pm	Abstract Presentation (113) Stem Cells Isolated from Amniotic Fluid Rescue Necrotizing Enterocolitis by Restoring Intestinal Epithelial Homeostasis Marissa Cadete, The Hospital for Sick Children
5:00 - 5:30 pm	A Team Approach to Management of Babies at Risk for Intestinal Failure Susan Albersheim, University of British Columbia

Friday, February 16TH continued

5:30 - 7:00 pm	**Workshop 6: Translating Science Toward Health Policy** (MB 253) Jan Sanderson, Red River College **Workshop 7: Cutting Edge Technology: Bioinformatics** (MB 251) Prasoon Agarwal, University of Manitoba **Workshop 8: Quality Improvement Research, and How to Publish it** (MB 252) Stephen Pearlman, Thomas Jefferson University
5:30 - 7:00 pm	**CNPRM Business Meeting** (MB 252)
7:00 - 9:30 pm	**Banquet & Awards Presentation** (Husky Great Hall, Kinnear Centre)
7:00 - 9:30 pm	**Banquet** (Husky Great Hall, Kinnear Centre) **Guest speaker: Talk Science To Me** **Torah Kachur, University of Alberta/CBC Science Reporter** **Trainee Awards Presentation**

McMaster University

HEALTH SCIENCES

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Saturday, February 17TH

7:00 - 8:00 am	**Breakfast** (Vistas Dining Room)
8:00 - 9:00 am	**Workshop 9: How to Write a Research Grant Application and Tell your Story to the Reviewers** (MB 253) Richard Keijzer& Jon McGavock, University of Manitoba *Sponsored by: University of Manitoba Thorlakson Chair in Surgical Research* **Workshop 10: The Science of Communication** (MB Auditorium) Torah Kachur *Sponsored by: CHUS Centre De Recherche* **Workshop 11: Cutting Edge Technology: Quantitative Neuroimaging** (MB 252) Deanne Thompson, University of Melbourne, Gregory Lodygensky, Universite de Montreal
9:00 - 10:30 am	**Plenary Session:** **Stress and Resilience** (Husky Great Hall, Kinnear Centre) Moderator: Vern Dolinsky
9:00-9:30 am	**Invited Address: CNPRM 2018 Voyageur Keynote** DAHOD: An Alternate Hypothesis William Fraser, Université de Sherbrooke
9:30-10:00 am	**Keynote 1: Influence of Environmental Stress on the Fetal Brain Connectome** Moriah Thomason, Wayne State University *Sponsored by: Lawson Foundation*
10:00-10:30	**Keynote 2: Immediate and Long-term Impact of Painful Procedures on Hospitalized Neonates** Bonnie Stevens, University of Toronto
10:30 - 11:00 am	**Nutrition Break** (1st floor foyer, Kinnear Centre)
11:00 - 12:00 pm	**Keynote 3: Long Term Consequences of Early Life Stress: Lessons from the Dutch Famine 1944-1945** Tessa Roseboom, University of Amsterdam *Sponsored by: CHRIM* Keynote 4: **Lasting Effects of Antenatal Steroids** Alan Jobe, University of Cincinnati
12:00 - 1:00 pm	**Lunch & Farewell** (Vistas Dining Room)

Plenary & Thematic Speakers

Susan Albersheim, University of British Columbia

A Team Approach to Management of Babies at Risk for Intestinal Failure

Concurrent Session 4D– NEC

Friday, February 16, 5:00 pm, MB Auditorium

Susan Albersheim has worked as a Neonatologist at British Columbia Women's and Children's Hospitals for over 30 years and has a PhD in Bioethics. Throughout her career the management of NEC has remained a great challenge with significant mortality and morbidities, in part due to the lack of evidence-based guidelines for the ongoing management of babies at risk for intestinal failure. Based on the literature, a specialized Multi-disciplinary Team was established in the NICU in Vancouver in 2007, with weekly rounds on these high risk infants, and collaborative research to evaluate treatments and outcomes. Over the past 10 years Susan has been an active participant in the Western Canada Children's Intestinal Rehab Program (CHIRP) consortium. Susan has focused on the neonatal arm of this group (NeoCHIRP), accruing expertise and developing guidelines as part of the CHIRP Manual. However, many neonates with NEC have a host of other complications related to prematurity, providing ethical as well as clinical dilemmas. Dr. Albersheim has presented on intestinal failure at meetings internationally since 2014, discussing both medical management and ethical dilemmas, such as: "*How Short is Too Short?*" This question may be passé in 2018, or is it?

LEARNING OBJECTIVES:

- To identify the importance of understanding the intestinal anatomy and the anticipated NICU course, in the management of intestinal failure.
- To describe the essential nature of growth and nutrition, including starting enteral nutrition as soon as possible.
- To discuss decision-making in intestinal failure in the context of other complications of prematurity.

Michael Castaldo, BC Children's Hospital Research Institute

Management of the PDA: An Alternative Approach

Concurrent 2A– Neonatal Physiology

Thursday, February 15, 4:00pm, MB 251

My training as a Neonatologist began at the Hospital for Sick Children in Toronto. Initially I was enrolled as a Program Fellow in Neonatology and subsequently pursued additional interests by completing fellowship training in both Targeted Neonatal Echocardiography (TNE) and Transport Medicine.

I started my current position as a Staff Neonatologist at British Columbia Women's Hospital and Clinical Assistant Professor at Department of Pediatrics, University of British Columbia in March, 2017. A significant reason for my excitement in joining the team in Vancouver was to help broaden the TNE program for the Division of Neonatology. In addition, I accepted the role as co-chair for the Neonatal Transport Committee and assist in optimizing the delivery of neonatal care throughout British Columbia and Yukon territory.

LEARNING OBJECTIVES:

- Review of the Pharmacodyamics of the Medical Management of the PDA
- Explore the comparison of acetaminophen and NSAIDs in efficacy
- Identify a possible alternative treatment when faced with contraindications

Isabel Fortier, ReACH/IDCYH

How to Leverage Multi-Study DOHaD Research Projects: Overview of the ReACH Resources

Concurrent Session 1D– Maternal Fetal Medicine

Thursday, February 15, 1:00 pm, MB Auditorium

Dr. Isabel Fortier is a researcher at the Research Institute of the McGill University Health Centre (RI-MUHC) where she leads the Maelstrom Research project (www.maelstrom-research.org). Maelstrom Research provides the international research community with resources (expertise, methods, and software) to leverage and support data harmonization and integration across studies. The Maelstrom team develops methods and software; conducts methodological research; generates comprehensive catalogues of study metadata; and creates infrastructures supporting data management, harmonization, and co-analysis. Dr. Fortier is also leading data cataloguing or harmonization activities of a number of national and international projects such as the Research Advancement through Cohort Cataloguing and Harmonization (ReACH, 25 studies), the Integrative Analysis for Longitudinal Study Analysis (IALSA, more than a 100 studies), and the Canadian Partnership for Tomorrow Project (CPTP, 5 studies).

LEARNING OBJECTIVES:

- Learn about the design, content and use of the ReACH Catalogue.
- Learn about a suite of free open source software available to support data documentation, integration, harmonization, and co-analysis.
- Learn about how to use the available resources to develop new research collaborations.

Tracey Galloway, University of Toronto

A Framework for Intervention Research that Shifts Trajectories of Health for Indigenous People

Concurrent Session 2D– DOHaD

Thursday, February 15, 3:30pm, MB 252

Tracey Galloway is a community health scholar whose research program targets reduction of chronic disease through applied health policy research to reduce health inequities and promote health system improvement for Indigenous people. Current projects include evaluation of northern food subsidy programs, understanding the impact of health program funding models on Yukon First Nations, and qualitative assessment of Inuit people's journeys through cancer diagnosis and treatment. Galloway has a proven track record of respectful engagement and successful collaboration with northern communities and organizations. Through research and advocacy, she maintains close working relationships with health experts and policy-makers in Canada's Indigenous regions. This year Galloway was one of three Feature Scholars profiled by CIHR for Canada's National Aboriginal Day and in August of this year her co-authored paper "Hunger was never absent..." reached the top 5% of all articles tracked in the Canadian Medical Association Journal. She is a member of the Canadian Society for Circumpolar Health and an Editor for the International Journal of Circumpolar Health. A recognized scholar in the area of Indigenous chronic disease, Galloway leads a team of international scholars in ongoing comparison of obesity and metabolic risk among Inuit living in Alaska, Canada and Greenland.

LEARNING OBJECTIVES:

- Improve knowledge of the historical context surrounding scientific research with Indigenous people in Canada.
- Improve understanding of the social relations underlying research engagement for Indigenous organizations and communities.
- Improve understanding of the nature and practice of participatory research.
- Develop an understanding of what constitutes a *framework for governance* that is respectful of Indigenous requirements for the ethical conduct of research with Indigenous organizations and communities.

Amish Jain, University of Toronto

Pulmonary Hypertension in Chronic Lung Disease– Can the RV Help us?

Concurrent 3D- Neonatal Physiology

Friday, February 16, 1:30 pm. MB 253

Dr. Amish Jain is a Neonatologist at the Hospital for Sick Children (SickKids), and an Assistant Professor in the Department of Pediatrics at the University of Toronto. After completing a PhD in Neonatal Cardiovascular Physiology from the University of Toronto, he became the founder and Director of Targeted Neonatal Echocardiography and Hemodynamic Program at MSH since 2011. He currently holds Canadian Institute of Health Research and SickKids Foundations New Investigator Research Grant for the study of chronic pulmonary hypertension in preterm neonates.

LEARNING OBJECTIVES:

- Review of physiological concepts that may be at play in chronic pulmonary hypertension in neonates.
- Understand the interaction between high afterload, RV function and symptoms.
- Review a management algorithm for chronic pulmonary hypertension based on symptomatic expectant management.

Lucky Jain, Emory University

Antenatal Corticosteroids in Moderate and Late Preterm Infants

Thursday, February 15, 9:30 am, Husky Great Hall, Kinnear Centre (*Sponsored by: Mallinckrodt)*

Hot Topic Debate: Use of Antenatal Corticosteroids in Late Pregnancy

Thursday, February 15, 11:30 am, Husky Great Hall, Kinnear Centre

Burnout in NICU

Concurrent 1B– Neonatal Epidemiology

Thursday, February 15, 1:00pm, MB 251 *(Sponsored by: Research Manitoba)*

Dr. Lucky Jain is Chair of the Department of Pediatrics at Emory University School of Medicine; Chief Academic Officer of Children's Healthcare of Atlanta; and executive director of Emory and Children's Pediatric Institute. He is a specialist in respiratory disorders of the newborn. His research focuses on the physiology of lung sodium and fluid transport, and on strategies to enhance lung fluid clearance, particularly in late preterm infants and those born by elective Cesarean section. His lab is credited with elucidation of the role steroids play in fetal lung fluid clearance and the resulting multicenter trial of antenatal steroid treatment in late preterm gestations.

LEARNING OBJECTIVES- Antenatal Corticosteroids in Moderate and Late Preterm Infants

- To review the epidemiology, antecedents, and pathogenesis of respiratory morbidity in late preterm infants.
- Understand the role of lung fluid clearance in fetal respiratory transition to air breathing after birth and the potential role for corticosteroids in improving this process.
- Review the results of the ALPS trial and propose guidelines for steroid use in late preterm gestations.

LEARNING OBJECTIVES- Burnout in NICU:

- Create a deeper understanding and appreciation of burnout amongst healthcare professionals and factors that promote it.
- Review opportunities for self-improvement that create resilience and prevent burnout.
- Propose institutional interventions to support professionals with an eye towards increasing engagement and job satisfaction.

Alan Jobe, University of Cincinnati

Lasting Effects of Antenatal Steroids

Saturday, February 17, 11:30 am, Husky Great Hall, Kinnear Centre

Dr. Jobe is a neonatologist and Professor of Pediatrics at Cincinnati Children's Hospital. His research contributions include studies of surfactant metabolism, the hormonal regulation of lung maturation, mechanisms of lung injury with mechanical ventilation, and neonatal resuscitation. He has been Chair of the NICHD Neonatal Research Network Steering Committee and Chair of the NICHD Global Research Network Steering Committee. He has a 26-year collaborative research project on fetal development with Professor John Newnham at the University of Western Australia. He remains actively involved with clinical and translational research to improve outcomes for infants. He was an Associate Editor for Journal of Pediatrics for 18 years. He presently is a consultant for the Bill and Melinda Gates Foundation for infant mortality. Noteworthy recognitions are the E. Mead Johnson Award for Pediatric Research, the Virginia Apgar Award from the AAP, the Mary Ellen Avery Award from the SPR and APS, and election to The US National Institute of Medicine.

LEARNING OBJECTIVES:

- Acknowledge the difficulty in distinguishing a developmentally appropriate stimulus from a stress.
- Appreciate the potential for both short term benefits and long term risks for outcomes from antenatal steroids

Rebecca Jones, University of Manchester

Placental Inflammation: A Cause or a Consequence of Placental Dysfunction

Friday, February 16, 9:30 am, Husky Great Hall, Kinnear Centre

Placental Mechanisms for Susceptibility of Women of Advanced Age to Stillbirth

Concurrent 4C– Placental Physiology

Friday, February 16, 3:30pm, MB 251

Dr Rebecca Jones is a senior lecturer at the University of Manchester, UK. She leads a research group in the Maternal and Fetal Health Research Centre, using a translational medicine approach to understand the causes of placental dysfunction in pregnancies complicated by fetal growth restriction and stillbirth. Her current research focus is the relationship between inflammatory status and placental dysfunction, with the ultimate goal of improving detection of, and treating, placental dysfunction during pregnancy. She also has a major interest in maternal age and has defined placental dysfunction as a contributor to high rates of adverse outcomes in pregnancies of women of advanced maternal age. As well as heading a vibrant research group, Rebecca also has a passion for training the next generation of researchers and is the director for a Masters course in Reproduction and Pregnancy.

LEARNING OBJECTIVES- Placental Inflammation: A Cause or a Consequence of Placental Dysfunction:

- To gain an appreciation of the impact of non-infectious inflammation in high risk pregnancies
- To gain insight into the molecular pathways linking placental inflammation to placental dysfunction

LEARNING OBJECTIVES- Placental Mechanisms for Susceptibility of Women of Advanced Maternal Age to Stillbirth:

- To gain insight into the involvement of placental dysfunction in susceptibility of older women to stillbirth
- To gain appreciation of the potential roles of oxidative stress and inflammation in placental ageing
- To consider the placenta as a potential therapeutic target to reduce stillbirths related to advanced maternal age.

Richard Keijzer, University of Manitoba

Results from the National CNN/CAPS Surveys on the Management of Necrotizing Enterocolitis.

Concurrent Session 4D– Necrotizing Enterocolitis (NEC)

Friday, February 16, 4:00pm, MB Auditorium

Dr. Keijzer received his MD (with honours), PhD (Medicine) and MSc (Molecular Medicine) from ErasmusMC in Rotterdam, The Netherlands. He later moved to Canada to pursue a career as a Pediatric Surgeon-Scientist at the University of Manitoba and the Children's Hospital Research Institute of Manitoba in Winnipeg. His clinical interest concentrates on minimal invasive Pediatric General Surgery and his research focuses on congenital anomalies in general and congenital diaphragmatic hernia (CDH) and abnormal lung development. He has expertise in the mechanisms of normal and abnormal lung development due to congenital diaphragmatic hernia. Currently, his research focuses on delineating the role of microRNAs during normal and abnormal lung development due to CDH. By improving the understanding of the pathogenesis of CDH and its abnormal lung development he aims to develop a prenatal therapeutic intervention to modulate the natural course of the abnormal lung development in these babies before they are born. He is the Thorlakson Chair in Surgical Research and is the Director of Research and Graduate Chair for the Department of Surgery at the University of Manitoba. Dr. Keijzer was the first Pediatric Surgeon-Scientist funded in the Canadian Child Health Clinician Scientist Program.

LEARNING OBJECTIVES:

- To describe the current management practice of medical NEC by Canadian neonatologists
- To describe the current surgical management practice of surgical NEC by Canadian pediatric surgeons

Satyan Lakshminrusimha, UC Davis

Oxygen Saturation Targets– Myth or Reality?

Concurrent Session 3D– Neonatal Physiology

Friday, February 16, 1:00pm, MB 253

Sponsored by: Prolacta Bioscience

Satyan Laksminrusimha is Chair of the Department of Pediatrics at UC Davis where he runs the Centre for Neonatal/Pediatric Resuscitation in conjunction with his colleague Dr. Mark Underwood. The goal of his research is to understand the physiology of transition at birth and to establish evidence-based techniques for neonatal resuscitation. Birth asphyxia currently accounts for about 23% of the approximately 4 million neonatal deaths each year worldwide. The Neonatal Resuscitation Program (and Helping Babies Breathe initiative) has contributed significantly to reduce neonatal mortality and morbidity by educating health care workers all over the world. Using perinatal models of asphyxia, Satyan aims to improve and provide scientific basis for these guidelines. He is currently working on optimizing chest compressions and epinephrine/ vasopressin use during neonatal resuscitation.

LEARNING OBJECTIVES:

- Understand the limitations of oxygen saturation target trials among preterm infants
- Understand the importance of oxygen content and blood flow
- Identify physiologically relevant oxygen saturation targets in preterm and term infants

Piushkumar Mandhane, University of Alberta

Sleep and Neurobehavioral Development in the First Two Years of Life: Results from the CHILD Study

Concurrent Session 3C– DOHaD

Friday, February 16, 1:30pm, MB 252

Sponsored by: The Society of Obstetrics and Gynecology of Canada (SOGC)

Dr. Piush Mandhane graduated with his MD from University of Toronto and completed his PhD in Clinical Epidemiology and Biostatistics from McMaster University. He is currently an Associate Professor and Divisional Director of Pediatric Respiratory Medicine at the University of Alberta. He is one of the CHILD study principal investigators and the CHILD Edmonton site lead. His primary research interest is in understanding how sleep and sleep disruption in early childhood influence behavior and cognitive development. He has published 46 peer-reviewed publications and has been funded by CIHR, The AllerGen NCE, The Lung Association, and Alberta Health Services.

LEARNING OBJECTIVES:

- **Who, What, Where, When, Why of the CHILD study:**

  Recognize how the breadth and depth of the CHILD data can advance your own program of research

- **Present some of the CHILD Edmonton sleep data:**

  Recognize that snoring in childhood as a symptom of multiple overlapping phenotypes

  Identify how the different snoring phenotypes have different behavioural and cognitive outcomes

Nir Melamed, University of Toronto

Twins- What's New in the Prediction and Management of Preterm Birth

Concurrent Session 3B– Maternal Fetal Medicine

Friday, February 16, 1:00pm, MB Auditorium

Dr. Melamed has earned his MD degree and his MSc degree in Biochemistry from the Hebrew University in Jerusalem, Israel. Following completion of residency in Obstetrics and Gynaecology at the Rabin Medical Center, Israel, he completed a fellowship in Maternal Fetal Medicine at the University of Toronto between 2012-2014. In 2014, Dr. Melamed has been appointed as a Clinician Scientist in the Division of Maternal Fetal Medicine, Department of Obstetrics and Gynaecology in Sunnybrook Health and the Sunnybrook Research Institute. Dr. Melamed holds an appointment of an Associate Professor in the University of Toronto. Dr. Melamed has co-authored over 120 original research papers, as well as 10 book chapters and reviews, and his research has been presented in numerous national and international congresses. His main topic of interest include twin pregnancies with focus on sonographic tools for the prediction of preterm birth in twins, growth disorders in twins pregnancies, and the mechanisms of common pregnancy complications such as gestational diabetes and hypertensive complications in twin pregnancies.

LEARNING OBJECTIVES:

- Review the role of cervical length measurement and other cervical characteristics as screening tools for preterm birth in twin pregnancies
- Review the most up-to-date evidence regarding the role of cerclage, progesterone and pessary in the prevention of preterm birth in twin pregnancies

John Newnham, University of Western Australia

Reducing Preterm Birth – the Western Australian Preterm Birth Prevention Initiative
(Sponsored by: CIHR)
Thursday, February 15, 9:00 am, Husky Great Hall, Kinnear Centre
Hot Topic Debate: Use of Antenatal Corticosteroids in Late Pregnancy
Thursday, February 15, 11:30 am, Husky Great Hall, Kinnear Centre

John Newnham is Professor of Obstetrics at The University of Western Australia (UWA) and is a sub-specialist in Maternal Fetal Medicine. He is Head of the UWA Division of Obstetrics and Gynaecology based at King Edward Memorial Hospital and Chief Scientific Director of the Women and Infants Research Foundation. He is also an Adjunct Professor at Peking University, Beijing, and Honorary Director of Obstetrics and Gynaecology at the Drum Tower Hospital, Nanjing, China. His acknowledgments include the Gold Medal of the Royal College of Obstetrics and Gynaecology (London); the Order of Australia in the general division; and an Oration in his name at the annual scientific meetings of the Australian and New Zealand DOHaD Society. His research interests focus on prevention of preterm birth and the early life origins of health and disease. He has initiated many clinical and laboratory research studies, including The Raine Study and the Western Australian Preterm Birth Prevention Initiative.

LEARNING OBJECTIVES:

- Understand the difference between randomized controlled trials and implementation research
- Understand the concept of bundles of care rather than single, discrete interventions
- Know the current level of evidence surrounding the use of progesterone to prevent preterm birth
- Know what proportion of preterm births can be explained with current knowledge

Stephen Pearlman, Thomas Jefferson University

Disruptive Innovation: Are we Ready?
Concurrent Session 3A– Neonatal Epidemiology
Friday, February 16, 1:00pm, MB 251

Dr. Stephen Pearlman has been a neonatologist for the past 22 years after completing his fellowship training at Penn State-Hersey. He is currently the Associate Director of Neonatology and the Director of Pediatric Medical Education at Christiana Care Health Systems in Newark, Delaware. He is the Director of the Neonatal-Perinatal Fellowship program at Thomas Jefferson University where he also is a clinical Professor of Pediatrics. In addition to his interest in pediatric medical education, Dr. Pearlman has been actively involved in neonatal research on a wide array of topics which have resulted in the publication of papers and textbook chapters. He is also a member of the American Academy of Pediatrics Committee on Neonatal Billing Practices.

LEARNING OBJECTIVES:

- To define disruptive innovation and its application to neonatology
- To identify the drivers and barriers to disruptive innovation
- Describe and contrast new models of care delivery

Agostino Pierro, University of Toronto

Necrotizing Entercolitis: Innovative Treatment Strategies

Concurrent Session 4D– Necrotizing Enterocolitis (NEC)

Friday, February 16, 3:30pm, MB Auditorium

Professor Agostino Pierro joined the Hospital for Sick Children and The University of Toronto as Professor of Surgery and Division Chief of Pediatric Surgery and a Senior Associate Scientist in May 2013. His previous position was the Nuffield Professor of Pediatric Surgery and Head of Surgery unit at Great Ormond Street Hospital and University College London (UCL) institute of Child Health, London, UK. Professor Pierro is an internationally recognized pediatric surgeon with expertise and a research interest in Necrotizing Enterocolitis, minimally invasive surgery, regenerative medicine, and metabolic response to Surgery, parental nutrition and randomized controlled trials. His clinical interest is in neonatal, pancreatic, minimally invasive surgery and neuroblastoma surgery. Dr. Pierro's Research Program has continuously been supported by numerous competitive and peer-reviewed grants extending back to 1986, including the most recent Canadian Health Research Institute Foundation Grant. Dr Pierro and his collaborators have obtained research grants totaling more than £6m in the UK and over $5m since his recent move to Toronto. More recently, Dr. Pierro has been privileged to have been appointed an honorary Officer of the Most Excellent Order of the British Empire (OBE). This honour was conferred by Her Majesty Queen Elizabeth II in 2016 in recognition of services to medicine and charity.

LEARNING OBJECTIVES:

- Describe the role of surgery in the treatment of advanced NEC
- Discuss the outcome of traditional treatment
- Report the results of series of experimental investigation on moderate controlled hypothermia, stem cell, remote ischemic conditioning

Brenda Poindexter, University of Cincinnati

The Impact of Nutrition and Growth on Bronchopulmonary Dysplasia

Friday, February 16, 11:30 am, Husky Great Hall, Kinnear Centre (*Sponsored by: Mead Johnson Nutrition)*

Dr. Brenda Poindexter is a board-certified neonatologist with formal training in clinical research and a long track record of conducting both observational and interventional trials in newborn infants. Dr. Poindexter is currently serving as the Director of Clinical and Translational Research for the Perinatal Institute at Cincinnati Children's Hospital. She also served as Principal Investigator for the *Eunice Kennedy Shriver* NICHD Cooperative Multicenter Neonatal Research Network (NRN) for the past 10 years at Indiana University, and will continue to lead the NRN at Cincinnati. Dr. Poindexter has over 15 years of service on the Institutional Review Board (including leadership positions), served on the U.S. National Institute of Health (NIH) review and consensus panels, and represents neonatology on the Council of the Society for Pediatric Research. . She was one of three co-editors for the recently updated, significant text book on recommended nutrient intake levels for stable, fully enterally-fed very low birth weight infants – in "Nutritional Care of Preterm Infants: Scientific Basis and Practical Guidelines". This textbook is a very practical resource for practicing neonatologists, nutritionists, and nurses in neonatal intensive care units all over the world.

LEARNING OBJECTIVES:

- Describe impact of intrauterine and postnatal growth on pulmonary outcomes in extremely premature infants
- Evaluate nutritional interventions to prevent and treat BPD and the impact of interventions for BPD on nutritional status

Wendy Robinson, University of British Columbia

Genetic and Epigenetic Studies of the Placenta

Concurrent Session 1C– Reproductive Science

Thursday, February 15, 1:00 pm, MB 253

Wendy Robinson earned a PhD in Genetics at the University of California, Berkeley CA USA in 1989, specializing in population genetics and genetic epidemiology. Her research as a postdoctoral fellow at the Medical Genetics Institute at the University of Zurich, Switzerland from 1989-1994, focused on the origin and consequences of chromosomal abnormalities in humans. Since 1994, Dr. Robinson has been a faculty member of the Department of Medical Genetics, University of British Columbia in Vancouver, Canada, where she is currently full professor. She is also a senior scientist at the BC Children's Hospital Research Institute and is the Asst. Dean of Graduate and Postdoctoral Education in the UBC Faculty of Medicine. Her research focuses on genetic and epigenetic aspects of placental and fetal development, including confined placental mosaicism, preeclampsia, growth restriction and preterm birth.

LEARNING OBJECTIVES:

- Review our current understanding of genetic abnormalities confined to the placenta and reproductive outcomes.
- Review how epigenetics can add to our understanding of placental pathology.
- How can we use 'omics based tools to improve our diagnosis of placental conditions

Stefania Ronzoni, University of Toronto

The Inverted Pyramid in Maternal Fetal Medicine

Concurrent 2B– Maternal Fetal Medicine

Thursday, February 15, 3:30 pm, MB Auditorium

Sponsored by: Lawson Health Research Institute-Children's Health Research Institute

Dr. Ronzoni is an Associate scientist, Evaluative Clinical Sciences, Women & Babies Research Program, Sunnybrook Research Institute, staff physician in the Division of Maternal Fetal Medicine, Department of Obstetrics and Gynecology, Sunnybrook Health Sciences Centre and Associate Professor, Department of Obstetrics and Gynaecology, Faculty of Medicine, University of Toronto. Stefania is interested in prenatal screening and prevention of obstetrical adverse outcomes such as preeclampsia and preterm birth Her research involves the study of non invasive precocious markers of infection in pregnancy complicated by preterm birth. She is also interested in education in ultrasound and she coordinated a project of innovative learning based on the use of an Ultrasound obstetrical simulator for OBG residents.

LEARNING OBJECTIVES:

- Current role of FTS after the event of NIPT
- Early detection of fetal anomalies
- Prevention of adverse obstetrical outcome: state of the art and future research
- The inverted pyramid

Tessa Roseboom, University of Amsterdam

Early Life Stress and Later Disease: Lessons from the Past- the Dutch Famine (1944-1945)

Saturday, February 17, 11:00 am, Husky Great Hall, Kinnear Centre

Sponsored by: CHRIM

Tessa Roseboom is a Professor of Early Development and Health at the Academic Medical Centre in Amsterdam, the Netherlands. She is fascinated by the concept that an individual's experience in very early life affects his or her health throughout life. Her studies in the Dutch famine birth cohort provided the first direct evidence in humans that maternal nutrition during gestation affected offspring´s (and potentially grand-offspring's) health. Her current research focuses on the fundamental biological processes that underlie 'developmental programming' and on translating the findings of the Dutch famine birth cohort study to current pregnancies, in developed and developing settings. These studies include observational and experimental studies of the long term consequences of lifestyle interventions before and during pregnancy, obstetric interventions, hyperemesis gravidarum, and assisted reproduction techniques. The ultimate aim of her work is to learn more about how to give each child the best possible start in life.

LEARNING OBJECTIVES:

- Get insight into critical periods of development and how stressors during these periods may have different effects in the long run
- Get insight into long term consequences of prenatal undernutrition

Enrique Schisterman, NICHD

The Role of Inflammation on Conception and Pregnancy Outcomes

Concurrent Session 1A– Perinatal Epidemiology

Thursday, February 15, 1:00 pm, MB 252

Sponsored by: McMaster University- Faculty of Health Sciences

As a result of his multidisciplinary training in the complimentary fields of statistics and epidemiology, Dr. Schisterman's work has focused on both etiological and methodological components of exposure assessment, with an emphasis on the use of biomarkers. On the etiological side, Dr. Schisterman has a long-standing interest in evaluating low-cost interventions to improve fecundity and fertility. However, etiological research is not without methodological challenges and Dr. Schisterman has developed new design and analytical tools for addressing complex etiological questions. The design and analysis of the BioCycle Study, a longitudinal study created to assess the relations between endogenous hormones and biomarkers of oxidative stress, exemplified this blend of cutting edge methodology leading to increased etiologic understanding. This was followed by the Effects of Aspirin on Gestation and Reproduction (EAGeR) Trial, a randomized clinical trial designed to investigate the effects of preconception low-dose aspirin and folic acid supplementation on fertility, pregnancy and gestation in women who have had a previous pregnancy loss, and the recently initiated Folic Acid and Zinc Supplementation Trial (FAZST) designed to investigate the effects of folic acid and zinc supplementation on semen quality, pregnancy outcomes and live birth among couples seeking infertility treatment. On the purely methodological side, Dr. Schisterman in actively involved in projects on topics ranging from study design to casual inference.

LEARNING OBJECTIVES:

- Describe the role of systemic, chronic, low grade inflammation in reproductive dysfunction
- Assess the evidence for the efficacy of low-dose aspirin for treating women with previous pregnancy loss and low-grade inflammation

Prakesh Shah, University of Toronto

Perinatal Practices and Outcomes of ELGA Neonates in Canada
Thursday, February 15, 10:00 am, Husky Great Hall, Kinnear Centre
Hot Topic Debate: Use of Antenatal Corticosteroids in Late Pregnancy
Thursday, February 15, 11:30 am, Husky Great Hall, Kinnear Centre
Concurrent Session 4D– NEC
CNN Survey of NEC Management
Friday, February 16, 4:00 pm, MB Auditorium

Dr. Prakesh Shah is Professor at the University of Toronto in Department of Pediatrics and Institute of Health Policy, Management and Evaluation and a neonatologist at Mount Sinai Hospital in Toronto. His major area of research is Maternal and Neonatal Health Services, Patient and Disease oriented research in Neonatology to improve quality of care provision and Knowledge Synthesis. He is the Director of Canadian Neonatal Network and International Network for Evaluation of Outcomes in Neonates. He holds an Applied Research Chair in Maternal and Child Health Services and Policy Research from the Canadian Institutes of Health Research. He has published more than 330 peer reviewed publications and several synopsis documents for provincial ministries on maternal-neonatal health.

LEARNING OBJECTIVES:

- To review perinatal practices in Canada
- To review changes in outcomes of ELGAN in Canada
- To learn about national and international variations in outcomes of ELGAN

Gordon Smith, University of Cambridge, UK

Inflammation, Infection and the Risk of Adverse Pregnancy Outcomes
Friday, February 16, 9:00 am, Husky Great Hall, Kinnear Centre (*Sponsored by: Bles Biochemicals)*
Developing Novel Methods for Screening and Fetal Growth Restriction (FGR)
Concurrent Session 4A– Perinatal Epidemiology
Friday, February 16, 3:30 pm, MB 252 (*Sponsored by: The University of Calgary)*

Gordon Smith is Professor and Head of the Department of Obstetrics and Gynaecology, University of Cambridge, UK. He graduated in Medicine from Glasgow University in 1990 and has subsequently received three doctoral degrees from Glasgow (MD, PhD and DSc). He had Welcome Trust clinical research training fellowships based in Glasgow University (1992-1993) and Cornell University, USA (1996-1999). His clinically orientated research focuses on using maternal, ultrasonic and biochemical data to predict adverse pregnancy outcome. He was elected a Fellow of the Academy of Medical Science in 2010. He is clinically active as a Consultant in Maternal-Fetal Medicine at the Rosie Hospital, Cambridge.

LEARNING OBJECTIVES - Inflammation and Infection and the Risk of Adverse Pregnancy Outcomes:

- To describe the evidence for a role for placental infection and inflammation in the pathogenesis of adverse pregnancy outcomes
- To describe the strengths and weaknesses of sequencing based approaches in the detection of microbiota in human samples

LEARNING OBJECTIVES– Developing Novel Methods for Screening Fetal Growth Restriction:

- To describe the weaknesses in the evidence base around the optimal approach to screening low risk women for FGR
- To describe the capacity of serial ultrasound, with and without placental biomarkers, to identify women at high risk of FGR

CNBP
Canadian Neonatal Brain Platform

The **Canadian Neonatal Brain Platform** brings together a unique, multidisciplinary team of researchers and clinicians to define new strategies to identify causes of brain dysmaturation and to minimize brain injury occurring during the neonatal period.

The mission is to provide breakthroughs in robust imaging biomarkers of brain injury, allow the creation of efficient strategies to promote brain development and plasticity, limit neuronal disruptors and create a framework to support prospective multicenter trials. The platform also enhances partnership with key knowledge users such as families.

Bonnie Stevens, University of Toronto

Immediate and Long-term Impact of Painful Procedures on Hospitalized Neonates

Saturday, February 17, 10:00 am, Husky Great Hall, Kinnear Centre

Bonnie Stevens, RN, PhD is a professor at the Lawrence S. Bloomberg Faculty of Nursing and Faculties of Medicine and Dentistry at the University of Toronto. She is also Associate Chief of Nursing Research and a Senior Scientist in the Child Health Evaluative Sciences program at The Hospital for Sick Children (SickKids). Dr. Stevens is the Director of the University of Toronto Centre for the Study of Pain, Co-Director of the Pain Centre at SickKids and the Chair of the Certification Committee for ChildKind International. Dr. Stevens has held a Career Scientist Award from the Ontario Ministry of Health and Long Term Care and the Premier's Research Excellence Award from the Ontario Ministry of Energy, Science and Technology. She has received the Dr. Mary Ellen Jeans Lectureship Award from the Canadian Pain Society, The Mayday Society and Fellowship Award and the American Pain Society's Jeffrey Lawson Award for Advocacy in Children's Pain Relief. She has over 300 published papers and abstracts and is the co-editor of the "*Oxford Textbook of Pain in Children*" (Oxford University Press) and "*Pain in Neonates and Infants*" (Elsevier).

LEARNING OBJECTIVES:

- To determine the nature and frequency of procedural pain in hospitalized neonates.
- To explore current prevention and treatment strategies for procedural pain in hospitalized neonates.

Moriah Thomason, Wayne State University

Influence of Environmental Stress on the Fetal Brain Connectome

Saturday, February 17, 9:30 am, Husky Great Hall, Kinnear Centre

Dr. Moriah Thomason is an Assistant Professor at the Merrill Palmer Skillman Institute for Child and Family Development and Pediatrics, Wayne State University School of Medicine. She is also the Director of the Perinatal Neural Connectivity Unit, Perinatology Research Branch, NICHD/NIH/DHHS. Abnormal neural connections seen in developmental disorders likely originate *in utero*, but it is difficult to determine what happens in the brain during the prenatal period. The primary objective of our research is to characterize the origins of human brain functional circuitry to provide a basis for comparisons between health and disease. We continue to develop and apply a safe, non-invasive methodology to quantify strength of brain connectivity in human fetuses. We use resting-state functional magnetic resonance imaging (fMRI) to evaluate functional brain circuits in the second and third trimester. We have confirmed the presence of bilateral functional connections in the fetal brain, as well as regional connections within each hemisphere. We have also shown that connection strength increases with fetal gestational age. I will share new data showing that neural development of fetuses that will be born preterm differs from those born at term. I will also present the very first evidence that fetal programming of maternal prenatal stress exerts influence on development of connections in the fetal brain.

LEARNING OBJECTIVES:

- Increase researcher and clinician knowledge about emergent MRI technologies for non-invasive examination of human brain network organization in fetal, neonatal, and early infancy periods;
- Deliver an overview of major initiatives worldwide to map development of brain networks across the antenatal period, both in health and disease;
- Demonstrate one important target area for antenatal MRI research by highlighting new discoveries about connectomics in the preterm brain.

Deanne Thompson, University of Melbourne, Australia

How has Neuroimaging Improved our Understanding of Brain Development in Premature Infants?

Concurrent Session 4B– Neonatal Neurology

Friday, February 16, 3:30 pm, MB 253

Associate Professor Deanne Thompson is a senior neuroscientist whose research focuses on using magnetic resonance imaging (MRI) to investigate the causes and consequences of adverse outcomes following preterm birth. A/Prof Thompson is the co-group leader of the Victorian Infant Brain Studies (VIBeS) group at Murdoch Children's Research Institute in Melbourne, Australia, and leads their neuroimaging team. Her team answers novel research questions for over 10 clinical research studies. She has been awarded multiple prestigious awards for excellence in scientific research, including a Young Tall Poppy science award by the Australian Institute of Policy and Science in 2014. Along with the Australian Academy of Science, she contributed policy recommendations to Australian Parliament which have resulted in new initiatives for Australian brain research. A/Prof Thompson graduated from her PhD from University of Melbourne in 2010 and is a current National Health and Medical Research Council (NHMRC) career development fellow. She has been awarded competitive grants totalling over $8 million, and has 62 publications to date.

LEARNING OBJECTIVES:

To understand:

- How preterm infant's brain development differs from their term-born peers, as determined by magnetic resonance imaging
- What early life factors contribute to brain alterations in preterm infants
- The functional neurodevelopmental consequences of brain abnormalities in preterm infants

Dany Weisz, University of Toronto

Surgical Treatment for Patent Ductus Arteriosus and Clinical Outcomes of Extremely Preterm Infants: Is Ligation Still an Option?

Concurrent Session 2A– Neonatal Physiology

Thursday, February 15, 3:30 pm, MB 251

Sponsored by: Methapharm Curosurf

Dr. Dany Weisz is a neonatal intensivist and director of the targeted neonatal echocardiography program at Sunnybrook Health Sciences Centre in Toronto. He completed his Master of Science in Clinical Epidemiology at the Institute of Health Policy, Research and Evaluation at the University of Toronto. Dr. Weisz's research interests include the epidemiology and management of patent ductus arteriosus, with a focus on surgical ligation, and non-invasive cardiac output monitoring in extremely preterm infants.

LEARNING OBJECTIVES:

- Learn about epidemiological trends in surgical patent ductus arteriosus ligation among preterm infants
- Understand how associations of ligation with adverse neonatal and neurodevelopmental outcomes may be due to residual bias rather than a causal detrimental effect of ligation
- Learn about the up and coming role of catheter based PDA closure in extremely preterm infants

Mark Underwood , UC Davis

Pulmonary Vascular Disease and BPD: Role of Growth, Inflammation, and the Microbiome

Friday, February 16, 11:00 am, Husky Great Hall, Kinnear Centre

Mark Underwood is the Chief of Pediatric Neonatology at the UC Davis Medical Centre and a Professor of Pediatrics. **Dr. Underwood graduated from the University of Texas Southwestern Medical School in 1986 and currently works in Sacramento, CA.** Dr. Underwood's clinical activities are in the care of premature and sick newborn infants. His research interests include necrotizing enterocolitis, development of intestinal innate immunity, and mechanisms of probiotics and prebiotics in pre-term infants. Dr. Underwood's research projects include clinical trials of probiotics and prebiotics in premature infants, assessment of Paneth cell antimicrobial expression in infants with necrotizing enterocolitis and evaluation of Paneth cell expression in newborn rats.

LEARNING OBJECTIVES:

- Understand the independent role of postnatal growth restriction on pulmonary vascular development
- Determine the effect of growth restriction on the intestinal microbiome

UNIVERSITY OF CALGARY

Pathik Wadhwa, University of California, Irvine

Does Aging Begin in Utero? The Fetal Programming of Telomere Biology Hypothesis

Concurrent Session 3C– DOHaD

Friday, February 16, 1:00 pm, MB 252

Sponsored by: The Society of Obstetrics and Gynecology of Canada (SOGC)

Pathik D. Wadhwa is a Professor of Psychiatry & Human Behavior, Obstetrics & Gynecology, Pediatrics, and Epidemiology at the University of California, Irvine, School of Medicine, and the founding director of the UC Irvine Development, Health and Disease Research Program. Dr. Wadhwa received his medical degree from the University of Poona, India, in 1985, and his doctorate in social ecology (behavioral medicine concentration) from the University of California, Irvine, in 1993. His research examines the interface between biological, social and behavioral processes in human pregnancy, with an emphasis on outcomes related to fetal development, birth, and subsequent newborn, infant and child development and health. In particular, this work focuses on maternal-placental-fetal neuroendocrine, immune, metabolic and genetic/epigenetic processes as putative mechanisms that mediate the effects of the maternal environment (and particularly prenatal stress and stress-related processes) on early human development. Dr. Wadhwa has published over 120 peer-reviewed scientific papers and lectured extensively at scientific meetings and universities across North America, Europe and Australia. His program has been continuously supported by several research grants from the U.S. National Institutes of Health and other agencies. Dr. Wadhwa is the recipient of numerous national honors and awards, including recognition for his early- and mid-career contributions from the Academy of Behavioral Medicine, the Perinatal Research Society, the National Institutes of Health, and the World Health Organization.

LEARNING OBJECTIVES:

- What is the role of telomere length and telomerase expression in health and susceptibility for age-related disorders?
- What is the importance of the initial (newborn) setting of telomere length and telomerase expression in health and susceptibility for age-related disorders?
- What is the influence of the intrauterine environment in regulating the initial (newborn) setting of telomere length and telomerase expression capacity?

2018 CNPRM Voyageur Speaker

William D. Fraser, Université de Sherbrooke

DAHOD: An Alternate Hypothesis

Saturday, February 17, 9:00 am, Husky Great Hall, Kinnear Centre

Sponsored By: the DEVOTION Network

William D. Fraser MD holds a Tier 1 Canada Research Chair in Perinatal Medicine at the University of Sherbrooke, where he is Director of the Research Centre of the CHUS. He completed undergrad studies at St. Francis Xavier U., an MD at Dalhousie, speciality training in Obstetrics and Gynecology at McGill, and a Diploma in MFM at the University of Calgary. He pursued research training at the U. Calgary and at U. Laval. Over the last 30 years, his career focused on the evaluation of obstetrical interventions and approaches to care, mainly through clinical trials. He also played a key role in the planning and implementation of pregnancy and birth cohort studies, including MIREC and 3D. He currently co-leads the Sino-Canadian HELTI study, a cluster RCT focusing on the prevention of childhood obesity. He is a Fellow of the Canadian Academy of Health Sciences.

LEARNING OBJECTIVES:

- How did the 19th century British Poor Laws directly impact the progenitors of more than 4 Million present-day Canadians?
- What conditions favoured the emergence of perinatal clinical trials in Canada in the last quarter of the 20th century?
- For young investigators in the first half of the 21st century, what are the requirements for success in perinatal clinical research?

2018 CNPRM Banquet Speaker

Torah Kachur, University of Alberta, CBC Science Reporter

Talk Science to Me

Friday, February 16, 7:00 pm, Husky Great Hall, Kinnear Centre

Sponsored by: Molly Towell

Torah Kachur is a professor, scientist and science communicator. Torah received her PhD in molecular genetics from the University of Alberta and now teaches at the University of Alberta and MacEwan University. While working towards her PhD, she became involved in outreach with the U of A's Women in Scholarship, Engineering, Science and Technology (WISEST) Program, which provides young girls exposure to career options in science and engineering. On a whim, Kachur began to investigate careers in science communication and reached out to Jay Ingram (former host of CBC's *Quirks and Quarks* and Discovery Channel's *Daily Planet*). Ingram became her personal mentor and open the door for opportunities, such as the Banff Science Communications Program.

Since then, Torah has become a syndicated science columnist for more than 20 local afternoon shows on CBC Radio One and is the host of **What a Waste**, a 10 part show all about the science of repurposing waste. She's the co-creator of scienceinseconds.com and has hosted 2 national specials for CBC Radio on "The Food of the Future" and "Kapow! The Science and Technology of Superpowers."

LEARNING OBJECTIVES:

- Finding a narrative
- Getting personal
- Avoid jargon like the plague
- Be concise to have impact

Oral 006

THE IMPACT OF THE HELPING BABIES SURVIVE PROGRAM ON NEONATAL OUTCOMES AND HEALTH PROVIDER SKILLS: A SYSTEMATIC REVIEW & META-ANALYSIS.

Justine Dol, Health, Faculty of Health Professions, Dalhousie University; **Marsha Campbell-Yeo**, School of Nursing, Dalhousie University; Centre for Pediatric Pain Research, IWK Health Centre; **Gail Tomblin Murphy**, School of Nursing, Dalhousie University; **Megan Aston**, School of Nursing, Dalhousie University; **Douglas McMillan**, Department of Pediatrics, IWK Health Centre; **Brianna Richardson**, School of Nursing, Dalhousie University

Background:

Helping Babies Survive (HBS) program, consisting of Helping Babies Breathe (HBB), Essential Care for Every Baby (ECEB), and Essential Care for Small Babies (ECSB), was developed to reduce preventable newborn deaths through training healthcare providers (HCPs) in low-resource countries. Despite the widespread use of HBS, there has been no systematic review to date.

Objective:

To evaluate the impact of HBS on neonatal outcomes and HCP knowledge and skills.

Methods:

We systematically searched PubMed, CINAHL, EMBASE, ProQuest, SCOPUS, and Web of Science from January 2010 December 2016 using HBS program key words. Peer-reviewed published experiential or quasi-experimental English studies on HBS were eligible.

Results:

The search yielded 359 articles and 109 full-texts were screened with 19 articles critically appraised. Two articles were excluded due to poor quality with seventeen studies included - fifteen on HBB (n=172,685 infants and n=2,261 HCPs) and two on ECEB (n=206 HCPs). No studies reported on ECSB. HBS was found to significantly reduce fresh stillbirth rates (OR 0.66, 95% CI, 0.52 to 0.85) and first day mortality rates (OR 0.70, 95% CI 0.51 to 0.98), but was not influential on stillbirth rates or early mortality rate, measured at 7 or 28-days post birth. Short-term improvements in knowledge (RR 1.35, 95% CI, 1.19 to 1.43) and skills (RR 13.88, 95% CI, 2.31 to 82.33) scores were significant but not significant on sustainability and implementation into clinical practice.

Conclusions:

HBS had a significant positive impact on fresh stillbirth and first day mortality but limited conclusions can be drawn about the impact on other neonatal outcomes. While HBS was found to improve immediate knowledge and skill acquisition, there is some evidence that one-time training may not be sufficient for sustained knowledge or the incorporation of key skills related to resuscitation into clinical practice. Continued research is needed to evaluate the long-term impact.

Oral 017

WOMEN WITH PHYSICAL DISABILITY IN PREGNANCY RESIDENT EDUCATION: A NATIONAL SURVEY AS A NEEDS ASSESSMENT FOR CURRICULUM IMPROVEMENT IN OBSTETRICS AND GYNAECOLOGY IN CANADA.

Gharid Nourallah, Mount Sinai Hospital and Institute of Medical Science, University of Toronto; **Berndl Anne**, Sunnybrook Health Sciences Centre

Background:

An increasing number of women with physical disabilities (WWPD) want to become pregnant. However, numerous studies have shown that healthcare professionals are inadequately trained and lack confidence in treating WWPD.

Objective:

The purpose of this study is to explore the current status to which Canadian obstetrics and gynecology programs teach residents about pregnancy and disability, and whether the program would be interested in providing residents with additional educational sessions in this field. Furthermore, the aim is to determine the need for a structured and standardized curriculum for WWPD in pregnancy. To our knowledge, this is the first survey addressing program directors and residents in Canada regarding the needs for a structured and standardized curriculum for WWPD in pregnancy.

Methods:

An online survey was developed and distributed to all Canadian English accredited obstetrics and gynecology residency program directors and residents. Answers were collected over two months period and two email reminders. Questions were in three key areas: Demographic characteristics, knowledge gap, and level of interest in a formal method of education.

Results:

Eighty-four residents and nine program directors participated in the surveys. 89.16 percent of residents responded that they did not have any formal methods of education. Likewise, all program directors agreed that there are no formal scheduled training sessions as part of the residency curriculum. Residents have little background knowledge about the topic, and 67.86 percent reported being uncomfortable with the management issues surrounding a woman with a disability in pregnancy. A vast majority of residents (91.67%) and all program directors are interested in incorporating this topic into the resident curriculum to meet the need of people with severe disabilities in pregnancy.

Conclusions:

Information gathered from this survey guided us in developing a nationwide curriculum initiative to facilitate the provision of education and enhance trainees' skill level and comfort in physical disabilities in pregnancy.

Oral 026

HYPOXIA DIRECTLY INHIBITS ADENYLYL CYCLASE CATALYTIC ACTIVITY IN PERSISTENT PULMONARY HYPERTENSION OF THE NEWBORN

Anurag Singh Sikarwar, University of Manitoba; **Premnath Dhanaraj**, University of Manitoba; **Martha Hinton**, Children's Hospital Research Institute of Manitoba; **Appalaraju Jaggupilli**, University of Manitoba; **Prashen Chelikani**, University of Manitoba; **Shyamala Dakshinamurti**, University of Manitoba

Background:

Persistent pulmonary hypertension of the newborn (PPHN) is marked by hypoxemia, pulmonary vasoconstriction and impaired responses to inotropic drugs. We reported low basal and stimulated cAMP in hypoxic pulmonary artery smooth muscle cells (PASMC), and in PASMC from PPHN animals.

Objective:

To examine pulmonary arterial adenylyl cyclase (AC) activity and regulation in hypoxic PPHN.

Methods:

PPHN was induced in newborn swine by normobaric hypoxia (FiO2 0.10) for 72hr; age-matched normoxic controls. Relaxation of pulmonary arterial rings to AC activator forskolin was studied by isometric myography. We determined AC content, isoform expression and catalytic activity; ATP content; and cAMP degradation due to PDE activity, in human and neonatal porcine PASMC, and HEK293T stably expressing AC6, after 72 hour hypoxia (10% O_2) or normoxia (21% O_2). Using homology modeling, we built a 3D molecular model of human AC6 complexed with Gαs, and sequence prediction software determined amenability to post-translational modifications.

Results:

Relaxation to forskolin was impaired in PPHN pulmonary arteries. AC specific activity was diminished in hypoxia ($p<0.001$). PASMC from PPHN swine had reduced AC activity despite exposure to normoxia in culture; transient hypoxia *in vitro* further decreased AC activity. PASMC expressed AC isoforms 6, 7 and 9; total AC content was unchanged by hypoxia, but AC6 expression and abundance increased in hypoxic cells and PPHN tissues, while activity decreased. Activity of overexpressed AC6 was impaired by hypoxia. Cys1004 in AC6 (subunit C2) and Cys174 in Gαs present at the AC-Gαs interface appear susceptible to reversible nitrosylation.

Conclusions:

PPHN pulmonary artery relaxation is impaired due to decreased AC activity. Hypoxic AC has a decreased maximal catalytic velocity, despite induction of AC isoform 6 expression; inhibition persists after removal from hypoxia. AC nitrosylation may impair coupling with Gαs. Down-regulation of AC-mediated relaxation in hypoxic pulmonary artery has implications for utility of Gαs-coupled receptor agonists in PPHN treatment.

Oral 027

DOES PRESENCE OF DOWN SYNDROME INCREASE RESPIRATORY SYNCYTIAL VIRUS (RSV) RELATED HOSPITALIZATION IN CHILDREN LESS THAN 2 YEARS OF AGE? A SYSTEMATIC REVIEW AND META-ANALYSIS

Souvik Mitra, Dalhousie University & IWK Health Center; **Helen McCord**, Dalhousie University & IWK Health Center; **Mohamed El Azrak**, University of Dublin Trinity College; **Bosco A Paes**, McMaster University

Background:

Down syndrome(DS) is associated with a number of immunologic abnormalities and congenital heart disease(CHD) which increase susceptibility to recurrent respiratory tract infections including respiratory syncytial virus(RSV). However current position statements from the American Academy of Pediatrics and the Canadian Pediatric Society do not recommend routine RSV prophylaxis with palizivumab for all infants with DS.

Objective:

To conduct a systematic review of observational studies to compare RSV-related hospitalization(RSVH) rates, length of hospital stay and need for assisted ventilation in children <2 years of age with DS compared with children without DS.

Methods:

A comprehensive search was conducted of MEDLINE, Embase, CINAHL and conference proceedings.Primary authors of relevant studies were contacted. Studies were included if data was provided on RSVH in children aged <2years with and without DS. Two reviewers independently screened the search results, applied inclusion criteria and assessed methodological quality using the Newcastle-Ottawa Scale. Sensitivity analysis was conducted for the primary outcome(RSVH) comparing DS without CHD versus non-DS children.

Results:

19 cohort studies met the inclusion criteria out of which 10 studies involving 1,390,380 children<2yr of age were included in the meta-analysis. DS-children had significantly higher RSVH compared to non-DS children(RR:6.97;95% CI:6.01 to 8.08;I^2=0%) (Figure1a). Among children hospitalized with RSV, need for assisted ventilation(RR:5.82;95% CI:1.81 to 18.69;I^2=84%) (Figure1b) and length of hospital stay(Mean difference:2.28 days;95% CI:1.61 to 2.96 days;I^2=0%)(Figure1c) were significantly higher in DS-children. On sensitivity analysis, DS- children without CHD also a showed a significantly higher RSVH rate compared to non-DS children(RR:6.31;95% CI:4.83 to 8.23;I^2=0%)(Figure1d).

Conclusions:

Compared to children without DS, RSVH, need for assisted ventilation and length of RSV-related hospital stay is significantly higher in DS children in the first 2 years of life. The results of this systematic review should prompt reconsideration of the need for routine RSV prophylaxis in both healthy and medically compromised DS children up to 2 years of age.

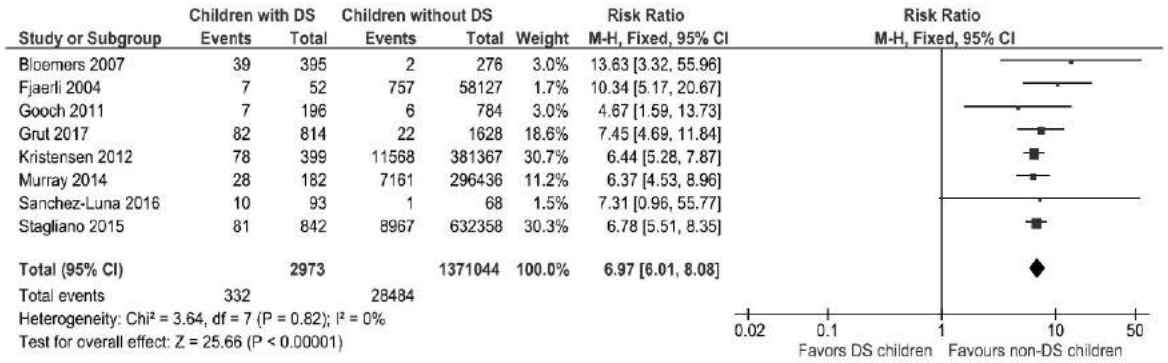

Figure 1a. Forest plot comparing RSVH in children with and without DS <2 years of age

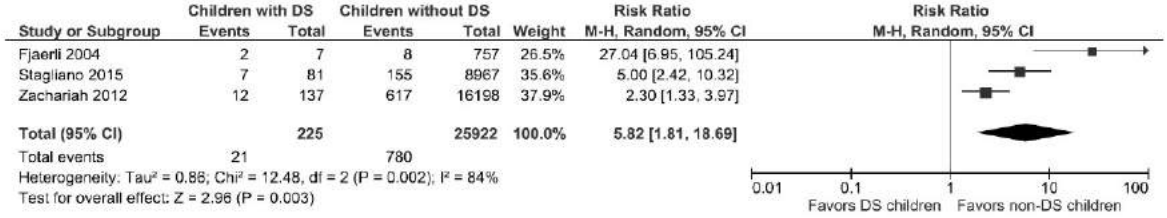

Figure 1b. Forest plot comparing need for assisted ventilation in children with and without DS <2years of age hospitalized with RSV

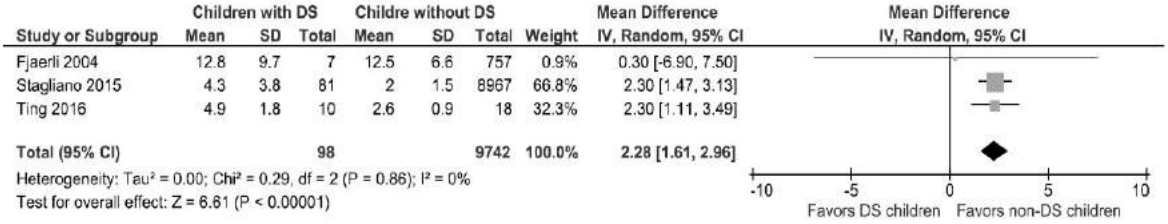

Figure 1c. Forest plot comparing length of hospital stay in children with and without DS <2years of age hospitalized with RSV

Figure 1d. Forest plot comparing RSVH in DS children without congenital heart disease <2 years of age versus those without DS

Oral 033

THE METABOLIC RESPONSE OF HUMAN VILLOUS TROPHOBLASTS TO PROLONGED FATTY ACID EXPOSURE

Zachary JW Easton, The University of Western Ontario; **Christina MG Vanderboor**, The University of Western Ontario; **Timothy RH Regnault**, The University of Western Ontario

Background:

An increasing number of women of reproductive age consume a diet overabundant in saturated fatty acids (FA) and processed sugar. While this diet is linked to the development of mitochondrial dysfunction within placental tissue, the underlying causal mechanisms remain unknown.

Objective:

We aimed to develop a cell model to characterize mitochondrial function of term human placentae in response to elevated fat and sugar. It is postulated that the BeWo choriocarcinoma cell line—a well-established human immortalized cell line representative of term villous trophoblasts—can be utilized to model this dietary-mediated mitochondrial dysfunction.

Methods:

BeWo cells were cultured with 0–1000 µM palmitate (PA), oleate (OA) or a 1:1 molar ratio of PA:OA (P/O) conjugated 2:1 to Bovine Serum Albumin for up to 72H. Cell viability and human chorionic gonadotropin (hCG) transcript abundance (marker of differentiation) were then measured for FA-treated undifferentiated (cytotrophoblast (CT)-like) cells and differentiated (syncytiotrophoblast (SCT)-like) BeWo cells. In addition, the Seahorse XF^{e}24 Extracellular Flux Analyzer (Seahorse) was optimized to quantify BeWo cell metabolism.

Results:

BeWo CT and SCT cell viability count, and hCG mRNA abundance were not significantly affected with 100 µM (equivalent to physiological third trimester fasting serum FA level) treatments of FA at T72H ($p>0.05$). The optimal Seahorse cell plating density for BeWo cells was found to be $1x10^4$ cells/well. In addition, oligomycin (1.5 µg/mL) and the mitochondrial uncoupler DNP (50 µM) were determined to be effective to measure BeWo glycolytic and oxidative metabolic function.

Conclusions:

BeWo cells can be cultured for up to 72H in the presence of 100 µM FA with no negative influence on cell viability or differentiation. We have also demonstrated that the Seahorse can be utilized with the BeWo cell line and in turn can be utilized in future studies to quantify and modulate the metabolic-specific consequences of increased FA exposure on the placenta.

Oral 034

INTERVENTIONS TO TRY TO PREVENT PRETERM BIRTH IN WOMEN WITH A HISTORY OF CONIZATION: A SYSTEMATIC REVIEW AND META-ANALYSES

Marinela Grabovac, McMaster University; **Anne Mary Lewis Mikhael**, McMaster University; **Sarah Diana McDonald**, McMaster University

Background:

Women with a history of conization (removal of a portion of the cervix) are at increased risk of preterm birth. The most effective prevention for this population remains unknown.

Objective:

The objective of this systematic review was to determine if progesterone, cerclage, or pessary decrease the risk of preterm birth compared to no treatment in women with a history of conization and a singleton pregnancy.

Methods:

Our protocol was registered on PROSPERO. We searched Cochrane Central, MEDLINE, EMBASE, CINAHL and ClinicalTrials.gov (January 1994-May 2017). Two reviewers independently assessed titles, abstracts, full texts, extracted data and assessed quality. We included randomized controlled trials (RCT) and observational studies that provided data for preterm birth <34 weeks, preterm birth <37 weeks and neonatal mortality, which were our primary outcomes. We generated odds ratios with 95% confidence intervals using random effects meta-analyses.

Results:

We reviewed 762 unique titles and abstracts, and assessed 91 full text articles. We included nine studied after contacting authors (three RCTs and six cohort studies). We observed that women in the cerclage group were more likely to have a short cervix or another risk factor for preterm birth compared to women with no intervention, hence the results were likely biased due to confounding by indication. In women with history of conization, who received a cerclage, the odds ratio of preterm birth <34 weeks was 3.99 (95% CI 0.67-23.62, three studies, I^2=65%), of preterm birth <37 weeks was 2.10 (95% CI 0.87-5.05, four studies, I^2=0%), and of neonatal mortality was 8.33 (95% CI 0.22-320.38, two studies, I^2=N/A). We did not find any studies comparing either progesterone or pessary to no treatment.

Conclusions:

The existing evidence, which is likely limited due to confounding by indication, does not support cerclage or other interventions for preterm birth prevention after conization. Randomized studies are necessary.

Table 1 - Summary of primary outcomes in systematic review/meta-analyses of preterm birth prevention after conization

Outcome	Number of studies	Cerclage group (Events/Total)	No intervention group (Events/Total)	Absolute Risk (Cerclage vs. No Intervention)	OR (95% CI)	I^2 (%)	Quality of evidence
PTB < 34 weeks	3	15/50	11/120	30% vs. 9%	3.99 (0.67-23.62)	65	Very low
PTB < 37 weeks	4	14/35	38/161	40% vs. 24%	2.10 (0.87-5.05)	0	Very low
Neonatal mortality	2	2/28	0/33	7% vs. 0%	8.33 (0.22-320.38)	N/A	Very low

Oral 037

CLINICAL AND ECHOCARDIOGRAPHIC PREDICTORS OF RESPONSE TO INHALED NITRIC OXIDE THERAPY IN PRETERM NEONATES LESS THAN 32 WEEKS WITH HYPOXIC RESPIRATORY FAILURE.

Mohamed Shalabi Ahmed, University of Toronto; **Mohamed Ibrahim**, University of Toronto; **Michelle Baczynski**, Mount Sinai Hospital; **Deepak Louis**, University of Toronto; **Karl McNamara**, University of Toronto; **Amish Jain**, Mount Sinai Hospital; **Regan Giesinger**, University of Toronto; **Danny Weisz**, University of Toronto; **Patrick McNamara**, University of Toronto

Background:

Inhaled nitric oxide is a selective pulmonary vasodilator and is the standard of care for term neonates with hypoxemic respiratory failure. The use of inhaled nitric oxide in preterm infants still an area of controversy. The response to inhaled nitric oxide in premature infants is variable, although little is known regarding the factors influencing response to treatment.

Objective:

To identify clinical and echocardiography predictors of positive response to iNO treatment in neonates between 24 0/7 and 31 6/7 weeks gestational age with hypoxic respiratory failure.

Methods:

This a multicenter retrospective study, we retrospectively identified preterm infants treated with inhaled Nitric oxide at The Hospital for Sick Children, Mount Sinai Hospital and Sunnybrook Health Science Center. Preterm infants with Hypoxic respiratory failure who received iNO therapy were enrolled in the study, with comparison of clinical and Echocardiographic data before and after starting iNO.

Results:

281 infants enrolled in the study, 232 with complete clinical data, and 76 with both clinical and Echo data. The analysis was done for the last group with both clinical and Echo data available. Patents demographic are shown in Table 1, clinical data before and after iNO therapy shown in Table 2, and Echo data are shown in Table 3. The overall response rate to iNO therapy in preterm infants is 60%. The cohort with good iNO response has a statistically significant difference in the signs of pulmonary hypertension with a p-value of 0.01.

Conclusions:

Preterm infants with hypoxic respiratory failure do respond to inhaled nitric oxide at the same reported literature response rate of the full-term infants. Pulmonary hypertension is a good predictor of the positive response.

Table 1; ***Clinical Characteristics: Perinatal***

Characteristic		iNO Responders (n=50)	iNO Non-Responders (n=26)	p-value
GA (weeks)		28 [25.8, 32]	26.2 [24.9, 29.6]	0.09
Birthweight (grams)		1128 [775, 1672]	830 [725, 1277]	0.15
Maternal Diabetes Mellitus		3 (6%)	2 (8%)	1.0
Small for gestational age, n(%)		6 (11%)	2 (10%)	0.7
Oligohydramnios, n(%)		17 (34%)	7 (27%)	0.7
Anhydramnios, n(%)		6 (12%)	1 (4%)	0.17
Pulmonary hypoplasia, n(%)		4(8%)	4 (15%)	0.43
PROM, n(%)		15 (30%)	6 (22%)	0.71
Antenatal steroids		What is item 4?		
Need for resuscitation		48 (96%)	25 (96.1%)	1
Congenital Anomaly		8 (16%)	2 (8%)	.48
5 min Apgar		6[4, 8]	5 [2, 7.5]	0.17
Highest form of delivery room resuscitation, n(%)	Mask CPAP	3 (6%)	4 (15%)	0.68
	Intubation	37 (74%)	18 (69%)	
	Chest compr-essions	7 (14%)	3 (12%)	
	Epi-nephrine	2 (4%)	1 (4%)	
Surfactant, n(%)		44 (88%)	22 (85%)	0.73

Table 2; clinical data before and after iNO.

Characteristics	iNO Responders (n=50)	iNO Non-Responders (n=26)	p-value
Respiratory support *CMV* *HFOV* *HFJV*	 *8* *20* *22*	 *8* *12* *12*	 0.59
Day of Life of iNO initiation	2 [1, 3]	12 [1, 30]	0.001
Dose of iNO (ppm)	20, (20, 20)	20, (20, 20)	1.0
Corrected GA at iNO initiation	28.7 [26.9, 32.1]	29.3 [27.2, 33]	0.5
Mean airway pressure (cmH_2O)	14 ± 3.5	15.6 ± 3.9	0.08
FiO_2	100 [96, 100]	100 [92, 100]	0.87
[MAP x FiO_2] / 100	13.4 ± 3.9	14.8 ± 4.7	0.17
Serum lactate	2.3 [1.6, 5.2]	2.5 [1.9, 4.1]	0.83
pH	7.2 ± 0.1	7.2 ± 0.1	0.99
Oxygen index	29 [23, 42]	30 [26, 43]	0.7
SAP (mmHg)	37 [31, 45]	43 [36, 51]	0.07
DAP (mmHg)	21 [17, 27]	22 [17, 28]	0.7
MAP (mmHg)	28 ± 7	31 ± 9	0.19
Hypotension (BP < 3rd percentile for GA)	26 (52%)	12 (46%)	0.47
Inotropic support before iNO (n)	19 (38%)	12 (46%)	0.66
Urinary output (mls/kg/min)	0.6 [0, 1.6]	0.9 [0.1, 2.6]	0.17
Total fluid intake	80 (80, 132)	140 (80, 160)	0.06

Clinical Characteristics: 2 hours after iNO initiation			
Respiratory support *CMV* *HFOV* *HFJV*	 *5* *22* *23*	 *4* *10* *12*	0.76
Mean airway pressure (cmH_2O)	13 [11, 15]	14 [13, 18]	0.02
FiO_2	43 [28, 60]	100 [96, 100]	<.001
[MAP x FiO_2] / 100	5.8 [3.8, 60]	14 [11.7, 17.8]	<.001
Serum lactate	3 [1.4, 6.5]	2.6 [1.9, 7.1]	0.7
pH	7.29 [7.19, 7.34]	7.19 [7.03, 7.33]	0.06
Oxygen index	11.2 [5.4, 19.2]	29.8 [25.2, 38]	<.001
SAP (mmHg)	41 [34, 52]	46 [33, 55]	0.6
DAP (mmHg)	27 [22, 31]	29 [21, 32]	0.43
MAP (mmHg)	34 ± 9	34 ± 8	0.74
Hypotension (BP < 3rd percentile for GA)	13 (26%)	9 (35%)	0.25
Inotropic support after iNO (n)	21 (42%)	13 (50%)	0.67
Urinary output (mls/kg/min)	1.5 [0.3, 3.0]	0.9 [0.1, 2.6]	0.17
Total fluid intake	100 (80, 122)	135 (80, 160)	0.03

Table 3: Echo data.

Characteristics	iNO Responders (n=50)	iNO Non-Responders (n=26)	p-value
Pulmonary Hypertension, n (%)	44 (88)	16 (61.0)	0.01
PDA open	32/40 (80%)	13/16 (81%)	1.0
PDA diameter (mm)	2 [1.5, 3]	1.8 [1.6, 2.5]	0.56
PDA (R to L or bidirectional), n(%)	29/44 (66%)	14/21 (67%)	0.83
PDA (R to L shunt), n(%)	14/34 (41%)	8/21 (38%)	0.95
ASD open	34/40 (85%)	11/15 (73%)	0.43
PFO (R to L or bidirectional shunt), n(%)	32/42 (76%)	10/18 (56%)	0.2
PFO (R to L shunt), n(%)	9/42 (21%)	3/18 (17%)	1.0
ASD diameter (mm)	1.9 [1, 3.1]	1.9 [0.1, 3.3]	0.18
No PDA AND No ASD	0/40	4/16 (25%)	0.005
RVSp (mmHg)	47 ± 17	41 ± 18	0.37
Septum – paradoxical motion, n(%)	12/43 (28%)	6/26 (23%)	0.83
Septum – flat or paradoxical, n(%)	41/45 (91%)	16/23 (69%)	0.04
RVET (msec)	154 [142, 166]	164 [145, 175]	0.25
PAAT (msec)	31 [28, 41]	35 [32, 47]	0.23
PAAT:RVET ratio	4.8 ± 1.4	4 ± 1.2	0.1
Abnormal RV function, n(%)	17/45 (38%)	7/25 (28%)	0.57
RVO < 170, n(%)	20/30 (67%)	5/16 (31%)	0.04

RVO < 100, n(%)	5/30 (17%)	3/16 (19%)	1.0
RVO (ml/kg/min)	150 [105, 167]	178 [122, 251]	0.2
RV FAC < 25%, n(%)	15/41 (37%)	3/17 (18%)	0.34
FAC 4 Chamber (%)	35 ± 16	40 ± 19	0.24
FAC 3 Chamber	36 ± 17	41 ± 16	0.42
TAPSE (mm)	5.5 ± 1.8	5.8 ± 1.6	0.73
Abnormal LV function, n(%)	3/43 (7%)	6/22 (24%)	0.05
LVO (ml/kg/min)	145 [106, 214]	176 [116, 255]	0.41
LVO < 170, n(%)	17/29 (59%)	7/17 (41%)	0.4
LVO < 100, n(%)	4/29 (14%)	3/17 (18%)	1.0
LVED (cm)	1.2 [1.1, 1.4]	1.3 [1, 1.5]	0.54
FS < 25% (n)	4/43	4/19	
EF < 30% (n)	0/38	2/16	
Fractional shortening (%)	35 ± 9	36 ± 9	0.63
Ejection fraction (%)	60 (54, 68)	59 (51, 66)	0.65
LA:Ao ratio	1.3 [1.1, 1.6]	1.2 [1, 1.8]	0.86
Outcomes			
Length of stay	21 (9, 56)	29 (13, 128)	0.24
Pulmonary hemorrhage	7 (14%)	2 (8%)	0.71
Duration of invasive ventilation (d)	8 (5, 28)	18 (6, 44)	0.14
Duration of non-invasive ventilation (d)	3 (0, 22)	5 (0, 33)	0.34
Oxygen treatment (d)	11 (4, 56)	29 (12, 94)	0.04

Chronic lung disease (n)	13 (26%)	9 (35%)	0.6
Home oxygen (n)	8 (16%)	5 (19%)	0.75
NEC (n)	7	8	
ROP (n)	13	9	
IVH (n)	24 (48%)	14 (53%)	0.8
Severe IVH (n)	12 (25%)	3 (11%)	0.3
PVL (n)	2	3	0.33

Table: Association of pulmonary hypertension and covariates with complete or partial response to inhaled nitric oxide

Variable	iNO Responders (n=50)	iNO Non-Responders (n=26)	Crude OR (95% CI)	Adjusted OR (95% CI)
Pulmonary hypertension on echocardiography	44 (88)	16 (61.0)	4.58 (1.43, 14.66)	5.51 (1.26, 24.12)
Gestational age (weeks)	28 [25.8, 32]	26.2 [24.9, 29.6]	1.11 (0.96, 1.28)	0.96 (0.79, 1.17)
Day of life of iNO initiation	2 [1, 3]	12 [1, 30]	0.92 (0.87, 0.97)	0.92 (0.86, 0.99)
Mean airway pressure (cm H_2O)	14 (3.5)	15.6 (3.9)	0.89 (0.78, 1.01)	0.86 (0.72, 1.02)
Systolic arterial pressure prior to iNO (mmHg)	37 [31, 45]	43 [36, 51]	0.97 (0.93, 1.01)	0.99 (0.94, 1.04)

Data presented as median [IQR] or mean (SD).

Oral 038

CO-CULTURE OF HUMAN FETAL MEMBRANES AND UTERINE MYOCYTES INDUCE SYNERGISTIC RELEASE OF A SERIES OF PRO-INFLAMMATORY CYTOKINES AND CHEMOKINES PROMOTING UTERINE TRANSITION.

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Background:

Transitioning of the pregnant uterus into the uterus of delivery is essential for parturition and is marked by increases in uterine activation proteins (UAPs: FP, OTR, COX-2) and pro-inflammatory mediators (IL-1β, IL-6).

Objective:

We developed a co-culture method to explore maternal myometrial and fetal membrane tissue interactions, involving term non-labouring human myometrial smooth muscle cells (HMSMC) and fetal membrane explants (FME). We hypothesize that cross-talk between tissues promotes pro-inflammatory expression and therefore uterine transitioning for parturition.

Methods:

HMSMC are plated in 12-well plates alone or with 6mm FME in transwell inserts. Via shared culture medium, tissues are simultaneously stimulated with IL-1β (1 ng/mL), followed by collection of supernatant for multiplex assay and RNA extraction of FME/HMSMC for RT-PCR. Relative mRNA expression of UAPs and IL-6 are measured per tissue, and cytokines/chemokines released by HMSMC alone, FME alone and HMSMC/FME co-cultures. N=5-7 subjects, two-way ANOVA, $p<0.05$.

Results:

After 24h in co-culture, HMSMC increased *COX-2* and *IL-6* mRNA 34x and 523x, respectively, compared to HMSMC alone. Co-incubated FME had 13x higher *IL-6* and 17x higher *COX-2* than FME alone (all $p<0.001$). IL-1β incubation up-regulates *IL-6* and *COX-2* in monocultures, but only induces a minimal additional effect in co-cultures. Co-culture resulted in 3.2x and 2.2x increased FME *FP* and *OTR*, and 3x increased HMSMC *OTR* ($p>0.05$). Co-culture induced the synergistic release of 18 different cytokines/chemokines (including IL-6, IL-8, CCL2, CXCL1 and TNFα) ($p<0.001$).

Conclusions:

Our model studies *in vitro* interactions between gestational layers using myometrium and fetal membranes at term. Indirect contact via shared medium results in the synergistic release of 18 pro-inflammatory cytokines/chemokines. Co-culture significantly increased *IL-6* and *COX-2* (and increasing trends in *FP* and *OTR*) in both HMSMC and FME. These data suggest that 'crosstalk' between the tissues initiate a 'cytokine chain reaction' that results in up-regulation of *IL-6* and *COX-2*, promoting uterine transitions.

Oral 039

VALIDATION OF A CLINICAL AND SONOGRAPHIC BASED SCORING SYSTEM FOR PRENATAL PREDICTION OF MORBIDLY ADHERENT PLACENTA IN HIGH RISK POPULATION

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Background:

Morbidly adherent placenta (MAP) defines a spectrum of conditions including accreta, increta and percreta. It is a significant obstetric challenge with increased risk of perinatal morbidity and mortality. MAP has been rising incidence worldwide as a result of the notably increased rate of Cesarean deliveries. The reported incidence of MAP has increased from approximately 0.8 per 1000 deliveries in the 1980s to 3 per 1000 deliveries in the past decade. The incidence of placenta accreta in Canada was 1 in 695 deliveries in 2009 to 2010. Accurate Antenatal diagnosis will improve both maternal & neonatal outcomes.It allows appropriate risk assessment of complications and organizing delivery plans by a multidisciplinary medical team.

Objective:

To validate sonographic based scoring system for the prediction of MAP in high risk population.

Methods:

A retrospective review included pregnant women referred to our ultrasound unit during 2010-2016 with a previous uterine scar (Cesarean section, D&C, etc.) and Anterior or low lying placenta. Ultrasound images & cine clips were reviewed by a junior level MFM specialist investigator blinded to pregnancy outcome, ultrasound and pathology reports, using three previously proposed sonographic based scoring systems for risk assessment and prediction of of MAP. Parameters assessed are Lacunae number, grade and size, blood flow in lacunae, placenta location, myometrial thickness, loss of hypoechoic placental-uterine demarcation line, hypervascularity of placenta-bladder and/or uteroplacental interface and number of cesarean scars. Confirmation of the diagnosis of MAP was based on operative and pathology reports of the included cases.

Results:

56 cases analyzed by applying the three scoring systems of whom 12 were diagnosed with MAP. See attached tables.

Conclusions:

Assigning a clinical and ultrasound based scoring system may be effective for antenatal risk assessment and prediction of morbidly adherent placenta in high risk group.Early detection allows arranging a multidisciplinary approach which can improve patient outcome.

Comparisons of 3 scoring systems in detecting true cases by junior / senior

Table 1: Accuracy, PPV and NPV.

	Tovbin	Rac	Gilboa
Accuracy (95%CL)	0.96 (0.92, 1)	0.95 (0.89, 1)	0.91 (0.84, 0.99)
Positive predictive value (95%CL)	0.92 (0.76, 1)	0.91 (0.74, 1)	0.89 (0.68, 1)
Negative predictive value (95%CL)	0.98 (0.93, 1)	0.96 (0.90, 1)	0.92 (0.84, 0.99)

Figure 1: Sensitivity and 95% CL

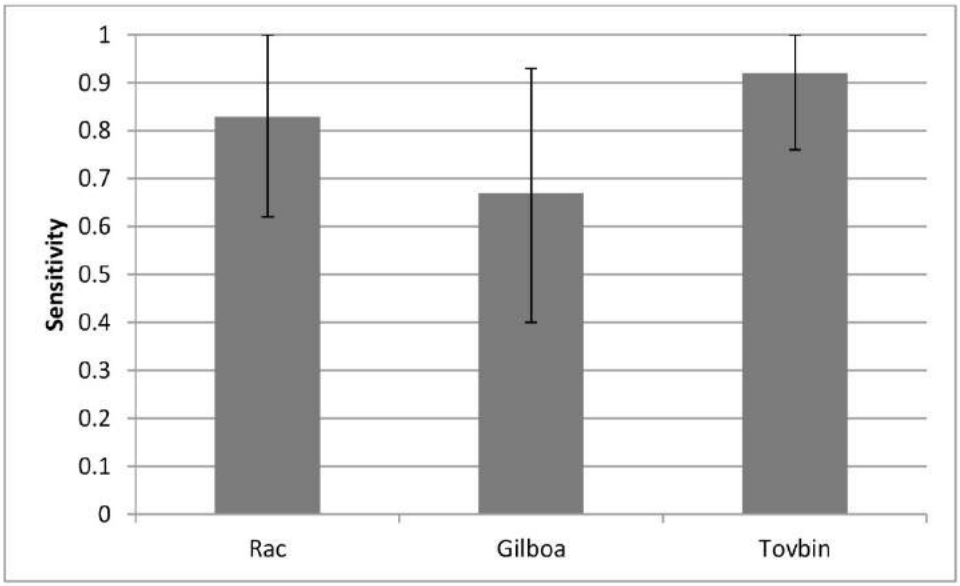
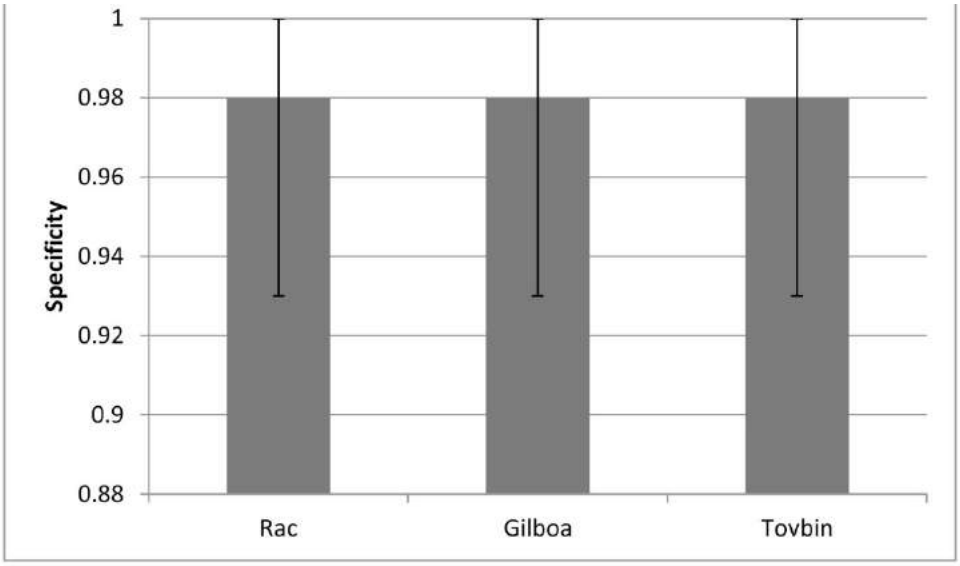


Figure 2: Specificity and 95%CL



Oral 040

EFFECTS OF MATERNAL STRESS ON OFFSPRING DEVELOPMENT AND ADULT BEHAVIOUR IN A RAT TWO-HIT STRESS MODEL ARE GENDER-SPECIFIC.

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Background:

Maternal stress and inflammation affect pregnancy, parturition and long-term outcomes, including for offspring. Inflammation, particularly Interleukin (IL)-1, was shown to play a key role in progeny neonatal and developmental outcomes.

Objective:

We hypothesized that distinct stress hits influence pregnant rats and their offspring differently when combined than either alone, affecting pregnancy evolution, outcome, progeny development and adult behaviour.

Methods:

Parental F0 generation dams received psychological Stress and/or immune stress: restraint/forced swimming on gestational days (GD)12-18 and/or IL-1β (5µg/day i.p.; saline as sham) on GD17-delivery respectively. Pregnancy outcomes, maternal weight gain, F1 offspring weight, eye opening. Development was tested on postnatal day (P)7 by evaluating negative geotaxis. Adult behavioural testing included: Open Field Test, Elevated Plus Maze, Novel Emergence. Two/three-way ANOVA, $P \leq 0.05$.

Results:

Stress/IL-1β interaction increased gestational length variation, decreased maternal weight gain (GD11-18; $P<0.05$) and female offspring P1 weight ($P<0.05$). Daughters of Stress/IL-1β exposed dams had a developmental delay ($P<0.05$) while Stress only exposed daughters had both eyes open earlier on P15. Addition of IL-1β mitigated this effect, normalizing timing ($P=0.001$). In males, stress and IL-1β separately decreased birth weight and increased eye opening speed (both $P<0.05$ and <0.01). Behavioural testing showed gender-specific differences: males were affected by Stress, females also by IL-1β. A single stressor increased anxiety-like behaviour and hyperactivity, whereas multi-hit stress mediated the individual effects ($P<0.001$-0.05 depending on measure analyzed).

Conclusions:

Prenatal exposure to stress negatively affects maternal and pregnancy outcomes, offspring development and lifelong health. The effects depend on the number of stressors individuals are exposed to, strengthening our hypothesis. Outcomes also differ depending on generation and gender, suggestive of epigenetic transmission of environmental stressors. Increased anxiety and hyperactivity in F1 females could alter maternal behaviour in their own gestations, potentially adding another stress hit and worsening outcomes. Evidence of the latter may direct interventions towards decreasing maternal stress load.

Oral 044

EVALUATION OF SMART-DEVICE APPLICATIONS TARGETED TO PARENTS OF INFANTS IN THE NEONATAL INTENSIVE CARE UNIT (NICU): A SYSTEMATIC REVIEW IN PROGRESS

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Background:

Parents of preterm infants use their smartphone on average 20 hours per week to search for health information. In a recent review, websites targeted towards NICU parents were found to have poor to moderate quality educational material; however, there is a dearth of literature on smart-device mobile applications (apps) for NICU parents.

Objective:

To evaluate apps available to parents of infants in the NICU for quality of information, usability, and credibility.

Methods:

We systematically searched Apple App Store and Google Play Store using 49 key terms (i.e. "preterm infant"). English apps targeting NICU parents less than $20 were included. Apps for healthcare professionals, e-books/magazines, or non-relevant results were excluded. Three tools were used for evaluation: Mobile Application Rating Scale (MARS) to measure quality; Patient Education Materials Assessment Tool for Audiovisual Materials (PEMAT-AV) to measure the app's content understandability and actionability; and Trust it or Trash It to measure credibility.

Results:

Initial search yielded 6579 apps, with 49 apps eligible. After full review, 32 apps were included for analysis. Using MARS, most apps (n= 25, 78.1%) received an acceptable score on overall quality (i.e. >3.0 out of 5.0), with six (18.8%) receiving greater than 4.0. Twelve apps (37.5%) received a PEMAT-AV score between 76%-100% on both understandability and actionability. Trust It or Trash It deemed 22 apps (68.8%) as 'trash' for reasons including no identification of sources or lack of current information, with only 10 (31.3%) deemed trustworthy.

Conclusions:

This evaluation revealed that out of the small number of available apps targeted towards NICU parents, just over one third were considered good educational material, yet over two-thirds of the apps were found to have issues regarding credibility and less than one quarter were considered high quality. The apps currently available for NICU parents remains lacking and of concern.

Oral 046

IMPACT OF MATERNAL BODY MASS INDEX (BMI) AND GESTATIONAL WEIGHT GAIN ON OBSTETRICAL AND PERINATAL OUTCOME

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Background:

High BMI in pregnancy is a risk factor for maternal complications like gestational diabetes, gestational hypertension, higher rate of caesarean section while neonatal complications include large or small for gestational age neonates, birth asphyxia and congenital anomalies. Pregnant women with low BMI are at an increased risk of premature rupture of membranes and low birth weight neonates.

Objective:

To determine the fetal and maternal outcome in various groups of BMI and its association with gestational weight gain in antenatal women.

Methods:

A prospective study conducted to observe the correlation of maternal BMI and gestational weight gain with fetal and maternal outcome in 250 antenatal cases. BMI was classified using International WHO criteria. Total weight gain was assessed prior to delivery. Maternal and fetal complications and outcome were compared in different BMI groups. Results were statistically evaluated using SPSS version 21.

Results:

Incidence of hypothyroidism was higher in the overweight (44.21%) and obese (13.68%) pregnant women. Women with high BMI are more prone to develop gestational hypertension (p-value 0.001) and failed induction (p-value 0.031). Adverse outcomes were less common in the underweight group. Neonates born to women with high gestational weight gain are more likely to have meconium aspiration syndrome (p- value 0.055), birth asphyxia (p-value 0.046), and sepsis (p-value 0.015).

Conclusions:

The health of women throughout their childbearing age should be addressed to improve obstetrical and perinatal outcome. Screening antenatal women at the time of their booking for BMI in the first trimester and following up with gestational weight gain helps to anticipate untoward complications rendering better pregnancy outcome.

Oral 058

REIGNING IN WILD EFFECT ESTIMATES: USING BAYESIAN MODELS FOR EXPLORATORY ANALYSES IN THE NICU

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Background:

Exploratory analyses are valuable for hypothesis generation, but, are at high risk for spurious and inflated associations. Bayesian methods allow researchers to formalize a skeptical stance towards large effects, protecting against false positives by shrinkage of estimates.

Objective:

To compare Bayesian and Frequentist methods for estimation in the context of PTSD symptoms experienced by mothers at NICU discharge.

Methods:

Forty-one mothers of preterm infants recruited as part of a larger randomized trial completed the PCL-5, a validated measure of post-traumatic stress disorder (PTSD), and a pain memory questionnaire. PTSD symptoms were regressed on neonatal pain, and mother's memory, adjusting for maternal and neonatal characteristics. Five outcomes were assessed: PCL-5 overall score, and four subscale scores (B-E). Three models were fit for each analysis: One with a prior on R^2 of 0.5, one with a prior 0.3 (skeptical), and one using traditional methods. Models were compared using k-fold information criteria (KIC).

Results:

Bayesian methods with skeptical priors provided modest (KIC difference = 4.06 to 8.12) improvements in predictive performance. For PCL-5 overall, Bayesian models identified number of painful procedures as a significant predictor ($\beta = 0.4$ (0.003 to 0.801)). Traditional models identified painful procedures ($\beta = 0.62$ (0.13 to 1.10)), gestational age ($\beta = 0.46$ (0.04 to 0.88)), skin-to-skin contact ($\beta = 0.34$ (0.05 to 0.63)), years of education ($\beta = -0.42$ (-0.71 to -0.13)), and pain anxiety ($\beta = 0.32$ (0.04 to 0.61)) as statistically significant. Across all analyses, Bayesian models identified five statistically significant coefficients while Frequentist models found 13.

Conclusions:

Bayesian models identified fewer statistically significant associations, and made more conservative estimates of the coefficients in analyses of small samples. Superior predictive performance suggests that these findings may be more robust.

Oral 067

TRENDS IN THE PRENATAL DIAGNOSIS OF VASCULAR RINGS IN ALBERTA AND RATE AND TIMING OF POSTNATAL INTERVENTION

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Background:

Vascular rings encircle the trachea and esophagus and are a rare diagnosis with heterogeneous underlying anatomy and unpredictable clinical course. The three-vessel-view and three-vessel-tracheal-sweep-view (3VV) have been increasingly integrated into routine obstetrical screening and fetal echocardiography over the past 5-7 years and facilitate prenatal detection of vascular rings.

Objective:

The primary objective was to examine how rates of prenatal detection of vascular rings have evolved with increased use of 3VVs since 2003. Our secondary objective was to examine associated lesions and clinical outcomes of prenatally versus postnatally diagnosed patients.

Methods:

This is a retrospective, descriptive, cohort study of fetal and pediatric patients diagnosed with a vascular ring in our tertiary referral center from 2003-2017. Patients were identified through institutional databases.

Results:

Eighty-two patients with vascular rings were encountered pre and postnatally from 2003-2017, with prenatal diagnoses in 22 (27%). No prenatal diagnoses were made prior to 2010. Prenatal detection rates have dramatically increased subsequently (Table 1). The distribution of vascular rings (specifically double aortic arch or right aortic arch left ductus arteriosus and left aberrant subclavian artery) did not differ between pre (14% (3/22) and 86% (19/22), respectively) and postnatally (23% (14/60) and 77% (46/60), respectively) diagnosed groups (p=0.57). Of prenatally diagnosed cases, 68% (15/22) had additional cardiac lesions in contrast to 47% (28/60) in the postnatally diagnosed cohort (p=0.08). Of those diagnosed prenatally and delivered, 95% (18/19) have undergone vascular ring surgery versus 73% (44/60) of those diagnosed postnatally (p=0.048).

Conclusions:

The prenatal detection rate of vascular rings has improved substantially since 2010 in Alberta. Although the types of vascular rings and additional cardiac pathology are similarly distributed among pre versus postnatally diagnosed patients, prenatally diagnosed vascular rings were more likely to require early intervention which could be due to an increased incidence of associated cardiac defects or earlier recognition of associated symptoms

Year of prenatal diagnosis	Total Number	Number with a Prenatal Diagnosis
2003-2009	28	0 (0%)
2010-2012	22	5 (23%)
2013-2015	24	11 (45%)
2016-2017	8	6 (75%)

Table 1. Prenatally diagnosed vascular rings at the University of Alberta from 2003-2017.

Oral 069

INCIDENCE OF SURGICAL ERRORS DURING AND COMPLICATIONS AFTER CAESAREAN SECTION IN THE UNITED STATES

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Background:

Caesarean Section (CS) is the most common inpatient surgery performed internationally. Although CS is typically performed to prevent adverse maternal and fetal outcomes, there is still a risk of surgical complications or errors, however, the magnitude of the incidence remains unclear.

Objective:

This study aims to examine the incidence of surgical errors during and complications following CS in the United States.

Methods:

Data were obtained from the 2014 Nationwide/National Inpatient Sample, which is a de-identified database containing a random sample of 20% of hospital discharges in the United States. Descriptive statistics were calculated to characterize the obstetric population. The overall rate of surgical errors during and complications after CS were also calculated.

Results:

Amongst 237,269 CS, 1.97% (95% CI:1.91%-2.02%) had at least one surgical error. Errors involving blood vessels were the most common surgical error encountered during CS at 1.12% (95%CI:1.08%-1.17%), followed by errors involving the bladder at 0.31% (95%CI:0.28%-0.33%), and errors involving the ureter at 0.21% (95%CI:0.20%-0.23%). Additionally, 10.15% (95% CI:10.03%-10.27%) of the sample had at least one surgical complication after CS. Cardiac complications were the most common complication post-CS at 3.21% (95%CI:3.14%-3.28%), followed by respiratory complications and infectious complications at 2.43% (95%CI:2.37%-2.49%) and 2.36% (95%CI:2.30%-2.42%), respectively. Moreover, 0.71% (95%CI:0.68%-0.74%) of CS cases in the sample had both an error and complication. The prevalence of developing a complication after CS was 3.77 (95% CI:3.63%-3.93%) times higher for those that also had an error during CS compared to those without an error.

Conclusions:

The incidence of surgical errors during and complications following CS in this study was higher than reported previously. As patient safety is paramount in healthcare, this study has the potential to identify specific quality improvement initiatives to reduce the incidence of adverse maternal events following CS.

Table 1: NIS HCUP 2014 Incidence of Composite Surgical Errors and Complications		
Surgical Errors	**Composite Description**	**Database N(%)**
	Any surgical error affecting the uterus	484 (0.20)
	Any surgical error affecting the ureter	506 (0.21)
	Any surgical error affecting blood vessels	2,666 (1.12)
	Any surgical error affecting the bladder	727 (0.31)
	Any surgical error affecting the bowel	0
	Any surgical error due to dehiscence	332 (0.14)
	Any surgical error due to foreign body or substance	27 (0.01)
ALL SURGICAL ERRORS		**4,666 (1.97)**
Surgical Complications	**Composite Description**	**Database N(%)**
	Maternal death in hospital	753 (0.32)
	Any infectious surgical complication	5,590 (2.36)
	Any cardiac surgical complication	7,608 (3.21)
	Any bowel -elated surgical complication	2,138 (0.90)
	Any fistula-related surgical complication	305 (0.13)
	Any shock-related surgical complication	373 (0.16)
	Any respiratory surgical complication	5,757 (2.43)
	Any postpartum hemorrhage complication	4,497 (1.90)
	Any embolism surgical complication	202 (0.09)
	Any miscellaneous surgical complication	1,556 (0.66)
	Any hysterectomy	6,566 (2.77)
	Any anesthesia-related surgical complication	1,209 (0.51)
ALL SURGICAL COMPLICATIONS (WITH HYSTERECTOMIES)		**29,482 (12.43)**
ALL SURGICAL COMPLICATIONS (*WITHOUT* HYSTERECTOMIES)		**24,077 (10.15)**

Oral 084

SMALL FOR GESTATIONAL AGE IN THE ABSENCE OF HYPERTENSIVE DISORDERS IN SINGLETONS - CAN PATHOLOGY DEFINE WHAT IS EARLY ONSET?

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Background:

Small for gestational age newborns (SGA, <10th percentile for gestational age) may be associated with placental abnormalities, and may occur early or late in pregnancy. The gestational age threshold to define early- versus late-onset is yet to be established. It has been suggested that the optimal cut-off, based on clinical outcome, is 32-33 weeks. Nonetheless, a similar threshold based on etiopathology was not defined.

Objective:

To evaluate placental findings at different gestational ages in order to determine the threshold which differentiate early- from late -onset SGA.

Methods:

This was a retrospective analysis of women with singleton gestations and SGA newborns, who delivered at a tertiary, university-affiliated medical center (2001-2015). Women with hypertensive disorders were excluded. Placental pathology was classified to maternal vascular malperfusion, umbilical cord anomalies, fetal vascular malperfusion, and other lesions. Findings were compared according to gestational age at delivery, between each week of gestation for the period between 28 and 38 weeks of gestation.

Results:

A total of 430 women with singleton gestation and SGA were eligible for analysis. The overall rate of placental maternal malperfusion lesions was over 70% (Table). When the rate of placental maternal malperfusion lesions were analyzed, there was significant decrease in the presence of 2 or more different types of maternal malperfusion lesions between gestations ending at or prior to 32 weeks of gestation (mean 65%), and those ending after that period (mean 25%). The same held true for the presence of 3 or more different maternal malperfusion findings (33% vs 2%, Table and Figure).

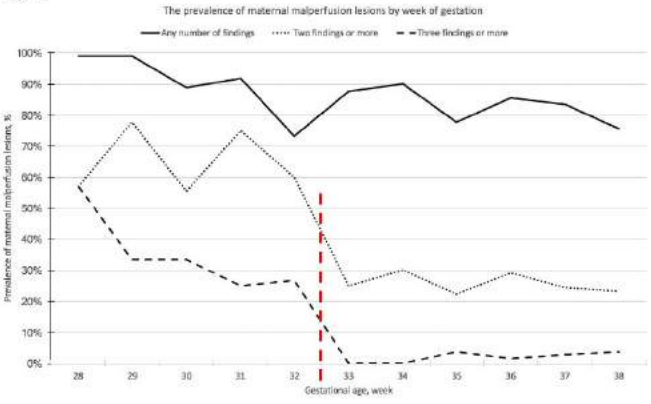
Conclusions:

The difference in prevalence of multiple types of placental maternal malperfusion lesions before and after 32 weeks of gestation supports the notion that 32 weeks of gestation should serve as the cut-off between early onset and late onset SGA.

Table

Variable	28 weeks	29 weeks	30 weeks	31 weeks	32 weeks	33 weeks	34 weeks	35 weeks	36 weeks	37 weeks	38 weeks	p value
Sample	7	9	9	12	15	8	10	27	62	103	168	
Placental findings												
Maternal malperfusion, n(%)	7 (100)	9 (100)	8 (88.9)	11 (91.7)	11 (73.3)	7 (87.5)	9 (90.0)	21 (77.8)	53 (85.5)	86 (83.5)	127 (75.6)	0.36
Maternal malperfusion - any 2 findings, n(%)	4 (51.7)	7 (77.8)	5 (55.6)	9 (75.0)	9 (60.0)	2 (25.0)	3 (30.0)	6 (22.2)	19 (29.0)	25 (24.3)	39 (23.2)	<0.001
Maternal malperfusion - any 3 findings, n(%)	4 (51.7)	3 (33.3)	3 (33.3)	3 (25.0)	4 (26.7)	0 (0)	0 (0)	1 (3.7)	1 (1.6)	3 (2.9)	3 (3.6)	<0.001

Figure



Oral 091

OBESITY ALTERS MONOCYTE PROFILES IN REPRODUCTIVELY CYCLING NON-PREGNANT AND PREGNANT MICE AT MID-GESTATION

Jessica A Breznik, McMaster University; **Kevin P Foley**, McMaster University; **Christian Schulz**, McMaster University; **Dessi Loukov**, McMaster University; **Jonathan D Schertzer**, McMaster University; **Deborah M Sloboda**, McMaster University; **Dawn ME Bowdish**, McMaster University

Background:

Obesity is characterized by low-grade chronic inflammation, accompanied by recruitment of monocytes (macrophage precursors) into metabolic tissues. Increased macrophage accumulation within the placenta is associated with inflammation and adverse pregnancy outcomes.

Objective:

We hypothesized that a specific subset of monocytes (inflammatory Ly6C^{+high}), which migrates to sites of infection, also contributes to obesity-associated tissue inflammation. We examined circulating monocyte frequency and inflammatory phenotype with a diet-induced obesity (DIO) model in non-pregnant and pregnant female mice.

Methods:

Female C57BL/6 mice were fed either standard chow (Con, 17% kcal fat) or high fat (HF, 60% kcal fat) diet for 6 weeks prior to sacrifice (non-pregnant NP cohort; n=8/diet) or mating with C57BL/6 males fed standard diet (pregnant cohort; n=9/diet). Pregnant mice were maintained on their respective diets until embryonic day (E)14.5. At endpoint, fasting blood glucose (FBG) and insulin were measured, and blood and bone marrow immune cell populations were analyzed by flow cytometry.

Results:

Diet-induced obesity significantly increased body weight and elevated fasting blood glucose in both non-pregnant and pregnant mice cohorts ($p<0.001$). Total bone marrow monocytes increased in NP and pregnant mice fed HF diet ($p<0.01$), whereas inflammatory monocytes decreased ($p<0.01$). To contrast, the prevalence of both total and inflammatory monocytes was increased in the circulation of NP and pregnant mice fed HF diet ($p<0.01$). In NP mice fed HF diet, inflammatory monocytes had decreased surface expression of maturity marker F4/80 ($p<0.05$) but DIO did not significantly alter their chemotactic CCR2 marker expression.

Conclusions:

HF diet intake in NP female mice was associated with increased weight gain, hyperglycemia, bone marrow monopoiesis, and an increase in circulating immature inflammatory monocytes. Similar effects were also observed in DIO females at E14.5, suggesting that Ly6C^{+high} monocytes may contribute to obesity-associated inflammation at the maternal-fetal interface.

Oral 093

MATERNAL DIET-INDUCED OBESITY (MDIO) ALTERS MATERNAL AND FETAL HEPATIC GLUCONEOGENESIS AT EMBRYONIC DAY 14.5

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Background:

Maternal obesity is associated with an increased risk of offspring metabolic dysfunction and fatty liver in adulthood, likely due to changes in fetal hepatic development during intrauterine nutritional stress.

Objective:

Since hepatic lipotoxicity has been linked to gluconeogenic changes in clinical and animal studies, we hypothesized that mDIO would impose significant changes in fetal hepatic gluconeogenic signalling that could be associated with a postnatal fatty liver phenotype.

Methods:

Female C57BL/6 mice were fed a standard control diet (CON; 17% kcal fat; n=10) or a high fat diet (mDIO,60% kcal from fat; n=10) for 6 weeks prior to and throughout gestation. Maternal and fetal hepatic tissue was collected on embryonic day (E)14.5 and transcript levels of key liver gluconeogenic enzymes were investigated by RT-qPCR. Fixed maternal hepatic sections were also investigated for evidence of steatosis.

Results:

mDIO increased maternal blood glucose and serum insulin and leptin levels compared to CON mothers at E14.5. mDIO reduced maternal hepatic cytosolic phosphoenolpyruvate carboxykinase (PEPCK) mRNA levels ($p<0.0001$), hepatic nuclear factor 4 alpha (HNF4α) mRNA, a known transcription activator of PEPCK ($p=0.0004$), and upstream insulin receptor substrate 2 (IRS2) ($p=0.0018$) compared to CON mothers. mDIO also decreased mRNA levels of fetal PEPCK ($p=0.0068$) and pyruvate carboxylase (PCx) ($p=0.0003$). Preliminary histological analyses suggest that maternal liver shows evidence of lipid deposition after mDIO.

Conclusions:

mDIO is associated with a downregulation of mRNA transcript levels of key gluconeogenic enzymes in the maternal and fetal liver at E14.5. We speculate that this is likely due to an overabundance of triglycerides and altered maternal-fetal glucose gradient. These measures are the subject of ongoing experiments. Lipid metabolism and protein quantification of gluconeogenic factors are currently being investigated.

Oral 096

NON-INVASIVE ASSESSMENT OF HIPPOCAMPAL METABOLISM DURING THE ACUTE PERIOD OF INFLAMMATION IN AN ANIMAL MODEL OF PERIVENTRICULAR LEUKOMALACIA

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Background:

Inflammation-induced white matter injury (WMI) is associated with late hippocampal atrophy and, learning and memory impairments in preterm infants. Proton magnetic resonance spectroscopy (MRS) allows *in vivo* assessment of brain metabolism in humans and animals. Using MRS, it has been shown that animals subjected to early-life inflammation had decreased expression of N-acetylaspartate (marker of neuronal integrity) and increased concentration of lactate and free lipids in the corpus callosum (Lodygensky et al., 2014).

Objective:

Using MRS, we evaluated hippocampal metabolism during the acute period of inflammation. Furthermore, we characterized the immediate effect of the neuroprotective therapy Anakinra, an antagonist of interleukin-1 receptor (IL-1Ra), on hippocampal metabolism.

Methods:

P3 Sprague-Dawley rats received LPS (1mg/kg) or sterile saline injections in the left corpus callosum. A subset of rats receiving LPS were treated with three intraperitoneal injections of IL-1Ra (10 mg/kg). 24h post-injection, MRS of the ipsilateral hippocampus was acquired on a 7 Tesla preclinical scanner with a very short echo time (2.7ms) SPECIAL sequence combined with water suppression pulses and outer volume saturation sequence on 22 animals (8 sham, 8 LPS, 6 LPS+IL-1Ra). Metabolites concentrations (µmol/g) were quantified using the LCModel. Quantifiable metabolites were identified using a Cramér-Rao Lower bound threshold of ≤20%. Kruskal-Wallis test was used for statistical comparisons.

Results:

Eighteen metabolites concentration were measured by MRS in the hippocampus. Among them, five showed significant difference between groups). LPS injection decreased the concentration of metabolites related to neuronal integrity (NAA and NAA+NAAG), glutamatergic neurotransmission (Glu) and membrane integrity (PE). The effect of LPS on these metabolites was partially restored by IL-Ra treatment. IL-1Ra treatment limited the WMI-induced increase of Lip20+MM20 concentration.

Conclusions:

MRS detected the early (24h post-injury) changes in hippocampal metabolism following injury and the neuroprotective effect of IL-1Ra. Metabolites of neuronal integrity, neurotransmitters and membrane health were altered by inflammatory WMI.

Table 1. Concentrations (µmol/g) of metabolites showing significant difference between the groups

Metabolites	Sham	LPS	LPS+IL-1Ra
Glu	8.09±0.22	**6.69±0.25****	7.08±0.37
NAA	2.84±0.16	**2.31±0.06****	2.67±0.15
NAA+NAAG	3.96±0.16	**3.11±0.11*****	3.51±0.19
Lip20+MM20	9.07±0.65	**13.19±0.72****	12.38±0.92
PE	6.71±0.18	**5.71±0.21***	6.11±0.45

** : p< 0.05 ; ** : p<0.01; *** : p<0.001; compared to sham.* Glu=Glutamate; NAA=N-acetylaspartate; NAAG=N-acetylaspartylglutamate; Lip20=lipid 20; MM20=macromolecule 20; PE=Phosphorylethanolamine

Oral 100

GESTATIONAL WEIGHT GAIN IN TWIN PREGNANCIES MODELED AS A FUNCTION OF GESTATIONAL AGE AND PRE-PREGNANCY BODY MASS INDEX

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Background:

Inadequate gestational weight gain (GWG) is associated with maternal and neonatal outcomes. While standards for GWG exist for singleton gestation, there are only provisional guidelines for twins.

Objective:

To estimate the distribution of GWG as a function of gestational age (GA) and pre-pregnancy BMI (ppBMI) in a large cohort of twin pregnancies, and determine the association between GWG and preterm birth (PTB).

Methods:

Longitudinal quantile regression models were developed to estimate the inter-quartile ranges of GWG as a function of GA from 12-38 weeks among women with uncomplicated twin term birth. GWG was defined as low or high by $<25^{th}$ or $>75^{th}$ centiles, repectively (Figure and Table). Cox proportional hazards regression models were used to examine associations between GWG and outcomes.

Results:

1) The association between PTB<37 weeks and GWG group differed as a function of ppBMI ($p < 0.001$): For obese women, low GWG was associated with higher PTB<37 risk (HR 3; 95%CI 2-5). For underweight women with average GWG, the risk of PTB<37 was higher than obese women with high GWG (HR 1.4; 95%CI 1.01-2).
2) The association between GWG and PTB<37 weeks differed as a function of GA at the time of examination ($p<0.001$). Low GWG diagnosed before, but not after, 22 weeks was associated with increased risks of PTB. 3) Restricting analysis to women with GWG according to 2009 IOM guidelines, the same association between GWG and PTB persisted. 4) For PTB<32 weeks, the same association of GWG as a function of ppBMI ($p< 0.001$), and GA ($p<0.001$) was observed. Low GWG diagnosed after, but not before, 28 weeks was associated with increased risk of PTB<32 (HR 1.3; 95%CI 1.1-1.6).

Conclusions:

The association between GWG and PTB differed significantly as a function of ppBMI and GA at examination. Further investigation of optimal GWG is warranted.

Figure - Estimated Quantile of Gestational Weight Gain as a function of Gestational Age from 12-38 weeks

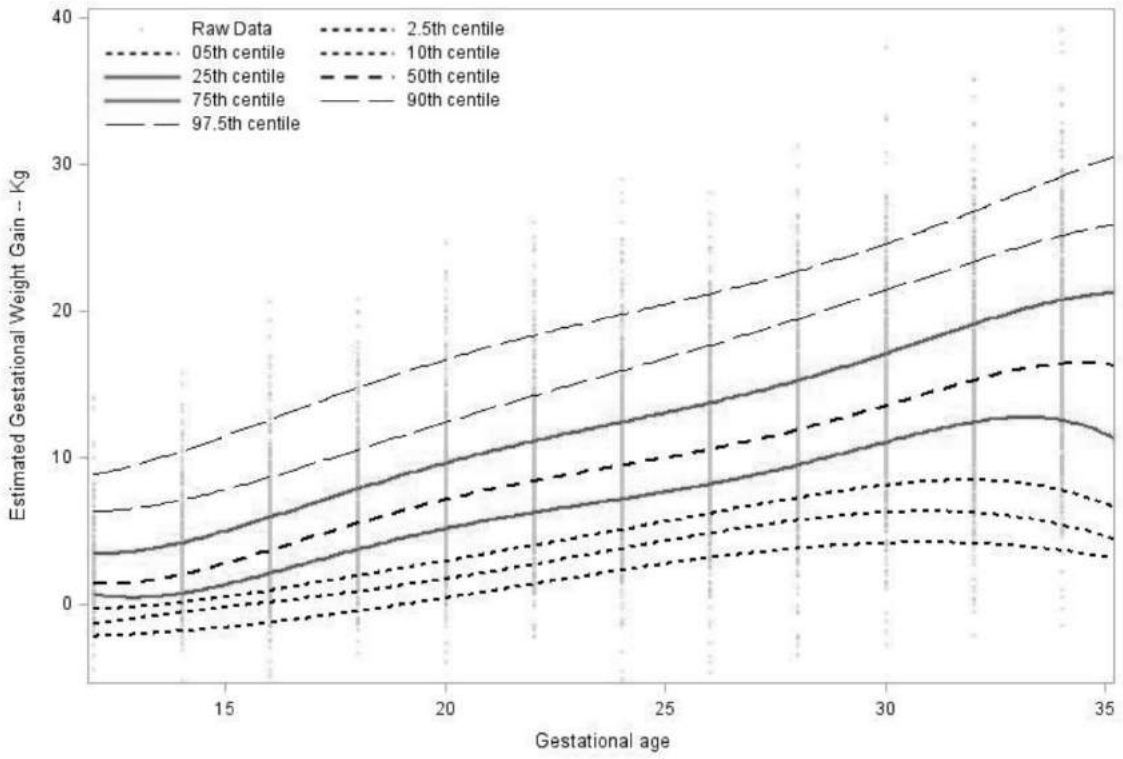

Table - Estimated Quantile of Gestational Weight Gain as a function of Gestational Age from 12-38 weeks

GA	kq_025	kq_05	kq_1	kq_25	kq_5	kq_75	kq_9	kq_95	kq_975
12	-2.21	-1.38	-0.35	0.64	1.35	3.39	6.30	7.21	8.83
14	-1.87	-0.58	0.09	0.70	1.98	4.16	7.08	8.49	10.41
16	-1.29	0.11	0.91	2.06	3.64	5.89	8.63	10.28	12.54
18	-0.52	0.84	1.90	3.69	5.49	7.83	10.49	12.22	14.71
20	0.38	1.70	2.93	5.11	7.10	9.59	12.37	14.12	16.65
22	1.34	2.69	3.98	6.21	8.37	11.08	14.17	15.90	18.30
24	2.29	3.75	5.06	7.13	9.43	12.38	15.89	17.61	19.74
26	3.13	4.81	6.16	8.15	10.52	13.69	17.61	19.33	21.13
28	3.78	5.70	7.22	9.45	11.86	15.21	19.42	21.14	22.68
32	4.12	6.21	8.44	12.38	15.24	19.05	23.34	25.11	26.74
34	3.64	5.40	7.76	12.52	16.37	20.72	25.11	27.01	29.14
36	2.62	3.60	5.33	9.67	15.63	21.08	26.14	28.31	31.28
38	1.01	0.64	0.30	1.56	11.14	18.58	25.60	28.31	32.33

Oral 107

OPERATIVE VAGINAL DELIVERY, OBSTETRIC TRAUMA, AND BIRTH TRAUMA

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Background:

The inverse relationship between rates of operative vaginal delivery (OVD) and cesarean delivery (CD) has led to recommendations for increasing OVD rates as a strategy to reduce the CD rate. These recommendations assume that OVD has greater relative safety compared with CD; however, recent studies have shown high rates of trauma following OVD.

Objective:

To quantify the associations between population rates of operative vaginal delivery and obstetric trauma and birth trauma.

Methods:

OVD, obstetric trauma and birth trauma frequencies among live born, term, singletons in four Canadian provinces were obtained using information from the Canadian Institute for Health Information between 2004 and 2014 (n=1,938,913). The primary outcomes were obstetric trauma (e.g., severe perineal lacerations) and severe birth trauma (e.g., intracranial hemorrhage). Adjusted rate ratios (ARR) and 95% confidence intervals (CI) were estimated using ecological Poisson regression. In addition, absolute percent rate increases and excess cases of trauma were calculated.

Results:

Among nulliparous women, OVD rates were positively associated with obstetric trauma (ARR 1.06, 95% CI 1.05-1.06; i.e., 1% absolute increase in OVD was associated with a 6% relative increase in obstetric trauma; approximately 708 excess cases of obstetric trauma per year; Table 1). This association was stronger in parous women. ARRs were lower following vacuum compared with forceps delivery (ARR 1.09, 95% CI 1.08-1.10 vs 1.06, 95% CI 1.05-1.07 in nulliparous women). OVD rates were also associated with severe birth trauma in nulliparous women (ARR 1.05, 95% CI 1.03-1.07; approximately 18 excess cases of birth trauma per year) but not in parous women (Table 1).

Conclusions:

Increased rates of OVD are associated with higher rates of obstetric trauma, as well as severe birth trauma in nulliparous women. Recommendations to reduce CD rates by increasing rates of OVD should be tempered by the understanding that such actions will result in higher rates of obstetric trauma.

Table 1. Crude and adjusted rate ratios (ARR) and 95% confidence intervals (CI) expressing the change in obstetric trauma and severe birth trauma rates per 1% absolute increase in operative vaginal delivery rates and associated number of excess cases per year, term singleton deliveries, Canada*, 2004-2014

	Nulliparous			Parous					
				No previous cesarean			With a previous cesarean		
	ARR	95% CI	No. of excess cases/yr	ARR	95% CI	No. of excess cases/yr	ARR	95% CI	No. of excess cases/yr
Obstetric trauma									
Delivery rate									
All OVD	1.06	1.05-1.06	708	1.10	1.08-1.13	360	1.11	1.07-1.16	158
Forceps	1.09	1.08-1.10	1 061	1.26	1.10-1.43	937	1.11	1.00-1.25	158
Vacuum	1.06	1.05-1.07	708	1.05	1.03-1.08	180	1.16	1.11-1.22	230
Sequential instruments	1.44	1.35-1.55	5 189	1.19	0.84-1.67	-	0.95	0.83-1.09	-
Severe birth trauma									
Delivery rate									
All OVD	1.05	1.03-1.07	18	0.98	0.94-1.04	-	1.02	0.85-1.22	-
Forceps	1.01	0.95-1.08	-	1.09	0.68-1.76	-	0.86	0.37-2.00	-
Vacuum	0.97	0.90-1.04	-	0.96	0.89-1.04	-	1.25	0.91-1.72	-
Sequential instruments	1.53	1.03-2.27	191	2.00	0.58-6.86	-	0.47	0.17-1.27	-

*Includes data from Alberta, Manitoba, Ontario, and Saskatchewan.
OVD, operative vaginal delivery
Crude and adjusted rate ratios were obtained from ecological random-intercept Poisson regression models.
Adjusted for rates of older maternal age (≥35 years of age), hypertension, diabetes, labour induction and macrosomia.

Oral 113

STEM CELLS ISOLATED FROM AMNIOTIC FLUID RESCUE NECROTIZING ENTEROCOLITIS BY RESTORING INTESTINAL EPITHELIAL HOMEOSTASIS

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Background:

Necrotizing enterocolitis (NEC) is a neonatal intestinal disease associated with impairment of intestinal epithelial homeostasis. Intestinal stem cells (ISCs), through the Wnt/β-catenin pathway, can be involved in this homeostasis. Amniotic fluid stem (AFS) cells are able to attenuate the intestinal injury observed in experimental NEC. The cross talk between exogenous AFS cells and endogenous ISCs remain unclear.

Objective:

Our aim is to investigate the effect of AFS cells on intestinal homeostasis during NEC.

Methods:

Amniotic fluid was harvested from a 14-day pregnant rat and AFS cells were isolated using c-Kit positive selection by flow-cytometry, and characterized using stem cell positive markers Nanog, Sox2 and Ki67. NEC was induced in 5-day old C57BL/6 mice with gavage feeding of hyperosmolar formula, hypoxia and oral lipopolysaccharide for four days. On days 6 and 7, pups received intraperitoneal injections of AFS cells ($2x10^4$, n=10) or PBS (n=10). Breastfed pups served as control (n=10). The distal ileum was harvested and assessed for NEC severity. Intestinal epithelial homeostasis was assessed by examining activation of Wnt (β-catenin), ISCs (Lgr5), and proliferation (Ki67), using immunostaining and RT-qPCR. Data is presented as mean±SD and compared using one-way ANOVA.

Results:

AFS cells were isolated from amniotic fluid and confirmed though positive staining for stem cell markers c-Kit, Nanog, Sox2, and Ki67. Impairment of intestinal homeostasis was confirmed with less β-catenin, Lgr5, and Ki67 staining and decreased gene expression in NEC (β-catenin $p<0.05$; Lgr5 $p<0.01$) compared to control. AFS cell treatment reduced intestinal injury in NEC ($p<0.01$). This was associated with increased staining and gene expression of homeostasis markers β-catenin ($p<0.05$), Lgr5 ($p<0.05$) and Ki67 ($p<0.01$) compared to untreated NEC.

Conclusions:

Stem cells isolated from amniotic fluid restore intestinal homeostasis by activating Wnt signaling and ISCs, and restore epithelial proliferation in NEC. These findings elucidate the mechanism of action of AFS cell treatment in NEC.

Oral 117

PERINATAL IRON-DEFICIENCY AND A SECONDARY HIGH-SALT DIET STRESSOR CAUSE SEX-DEPENDENT CARDIOVASCULAR DYSFUNCTION AND VASOCONSTRICTOR HYPERSENSITIVITY IN ADULT OFFSPRING

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Background:

Iron-deficiency (ID) afflicts an estimated 23% and 50-80% of pregnant women in developed and developing nations, respectively, and has been shown to cause long-term programming of hypertension and impaired renal sodium handling. Here, we sought to determine whether reductions in endogenous vasodilator nitric oxide (NO) are implicated.

Objective:

We hypothesized perinatal ID results in hypertension, reduced NO bioavailability, and vasoconstrictor hypersensitivity; all of which would be exacerbated by a high-salt diet – a common cardiovascular stressor.

Methods:

Sprague Dawley rats were fed either an iron-replete (controls) or low-iron diet (ID group) throughout pregnancy. Upon giving birth, all dams were fed an iron-replete diet. Six-month old offspring were anesthetized and instrumented with indwelling catheters and vascular function was assessed with adrenergic agonist phenylephrine (in the presence or absence of nitric oxide synthase inhibitor L-NAME). Six weeks prior to experimentation, both ID and control offspring were either fed a normal-salt (NS) or high-salt diet (HS; 5% w/w NaCl).

Results:

At the time of birth, iron-restriction resulted in a 34% decrease in maternal hemoglobin (Hb) and a 52% decrease in offspring Hb compared to controls (both $P<0.001$). Mean arterial pressure (MAP) was increased by 15% relative to controls in male ID offspring ($P=0.03$), but not in females. The HS diet had no impact on baseline MAP in either sex. L-NAME mediated changes in MAP were not altered in males, but were greater in female ID offspring ($P=0.03$), although this effect was blunted by HS treatment ($P<0.01$). ID offspring of both sexes exhibited hypersensitivity to phenylephrine in the presence and absence of L-NAME (both $P<0.01$), albeit only females exhibited a further heightened response during HS treatment ($P=0.04$).

Conclusions:

Perinatal ID causes sex-specific programming effects on hemodynamics and vascular reactivity in adult offspring which may contribute to the sex-based imbalance of the burden of cardiovascular disease.

Oral 118

SILDENAFIL AS A POSSIBLE TREATMENT FOR RETINOPATHY OF PREMATURITY

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Background:

Retinopathy of prematurity (ROP) is a disease of the retina affecting premature neonates, and causes long-term visual impairments such as blindness. Current treatments for ROP are invasive and aim at preventing further progression of retinal damage, but do not repair these damages.

Objective:

Our goal is to investigate the therapeutic effect of sildenafil on retinal structure in a rat model of ROP.

Methods:

Sprague-Dawley rats were exposed to hyperoxia (80% oxygen) interrupted by three 0.5-hour periods of normoxia (21% oxygen) per day, or exposed to room air only (21% oxygen), from post-natal day 4 to 14 (P4-P14). All pups were then housed in room air. Sildenafil (50mg/kg) or vehicle was given per os twice daily after oxygen exposure (from P15-P21). At P30, retinas were extracted, and sectioned. They were then stained to measure the thicknesses of the different retinal layers. Immunohistochemistry was also performed to count the number bipolar cells (Chx10) in the inner retina, as well as the number of microglia (Iba1) within different retinal layers.

Results:

Hyperoxia caused a reduction in thickness of the outer plexiform layer (OPL) (3.48±1.14 µm), containing the connections between photoreceptors and bipolar cells, and a decrease in the number of bipolar cells in some parts of the retina (0.25±0.05 cells/µm), compared to controls (9.16±2.08 µm and 0.35±0.08 cells/µm, respectively) ($p<0.05$). In addition, the number of microglia cells was significantly increased in the rats exposed to hyperoxia (0.012±0.004 cells/µm), compared to controls (0.007±0.003 cells/µm) ($p<0.05$). Sildenafil improved OPL thickness in ROP animals, but did not change the number of bipolar cells. In hyperoxic rats treated with sildenafil, the number of microglia was decreased back to control levels.

Conclusions:

Treatment with sildenafil following oxygen exposure provided some recovery of the structure of the retina. This beneficial effect may be modulated by a decrease of inflammation within the retina.

Oral 119

BARRIERS TO ADDRESSING PERINATAL MENTAL HEALTH ISSUES IN MIDWIFERY SETTINGS

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Background:

Poor perinatal mental health is linked to various adverse pregnancy and child outcomes. Despite having a holistic philosophy of care, similar to other maternity care settings, perinatal mental health issues often remain under-diagnosed and untreated in midwifery settings.

Objective:

The aim of this integrative review was to determine midwives' perceived barriers to the screening, referral, and management of perinatal mental health issues

Methods:

The following databases were searched: MEDLINE, CINAHL, EMBASE, and PsycINFO. We included qualitative, quantitative, and mixed methods studies published in a peer-reviewed journal in English. Two reviewers independently extracted data and subsequently integrated the extracted data into a single data matrix. The data matrix was compared iteratively across primary data sources to identify themes and sub-themes. The identified barriers to screening, management and referrals were subsequently categorized into provider-level and system-level barriers. The relevance and methodological quality of the included studies were evaluated using appropriate checklists.

Results:

Twenty studies met the inclusion criteria and were included. Insufficient/lack of training, lack of clarity regarding the scope of practice and time constraints were common provider level barriers across various stages of addressing mental health issues from identification to management. The system-level barriers were more complex and diverse and included unclear pathways and unlinked services, lack of local guidelines or policies, continuity of care, structured office procedures, clinical support and supervision and accessible educational resources, scarcity of available referral resources, complex bureaucratic processes and challenges related to expansion of the scope of practice.

Conclusions:

Training, expansion of the scope of practice and collaborative care are central for successful screening, management and appropriate and timely referrals of perinatal mental health issues. An integrative model of care may address fragmentation in perinatal mental health services and enable a holistic midwifery care.

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PRETERM BIRTH AND NEONATAL HEALTH OUTCOMES: CANADIAN TRENDS IN 2004-2015

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Background:

Gestational age is a strong predictor of adverse neonatal outcomes. In Canada, the rate of preterm birth (<37 weeks gestation) remained stable between 2000 and 2013 around 6.0-6.4% among singleton infants.

Objective:

To examine concomitant temporal trends in neonatal mortality and severe morbidity by preterm gestational age categories.

Methods:

Information on all singleton live births at 24-45 weeks in Canada (excl. Quebec) between 2004 and 2015 was obtained from the Canadian Institute for Health Information (N=3,124,725). Neonatal mortality was defined as death before discharge; severe neonatal morbidity included intraventricular haemorrhage, periventricular leukomalacia, retinopathy of prematurity, necrotizing enterocolitis, sepsis, convulsions, bronchopulmonary dysplasia, and respiratory distress syndrome (ICD-10-CA codes). Logistic regression was used to obtain odd ratios adjusted (AOR) for temporal changes in maternal age, gestational age, rural/urban residence, infant sex, and socio-economic status.

Results:

The rate of preterm birth at 24-36 weeks was unchanged between 2004 and 2015 (6.3%, n=195,751). Neonatal mortality in preterm infants declined from 1.3% in 2004-06 to 1.0% in 2013-2015 (AOR=0.97, 95% CI: 0.96-0.98), while composite mortality/severe morbidity increased from 15.8% to 16.8% (AOR=1.01, 95% CI: 1.01-1.02). Both mortality and mortality/severe morbidity declined among infants born at 24-27 weeks (AOR=0.95, 95% CI: 0.93-0.97; and AOR=0.97, 95% CI: 0.96-0.99, respectively). Mortality declined among infants born at 28-33 weeks (AOR=0.97, 95% CI: 0.95-0.99). Mortality/severe morbidity increased among infants born at 28-33 and 34-36 weeks (AOR=1.02, 95% CI: 1.01-1.03; and AOR=1.02, 95% CI: 1.01-1.02, respectively).

Conclusions:

In Canada, neonatal outcomes improved significantly among extremely low gestational age neonates (<28 weeks) with declines in mortality and in mortality/severe morbidity among infants born at 24-27 weeks. Mortality also declined among infants born at 28-33 weeks. In contrast, increases in mortality/severe morbidity among moderate and late preterm infants (28-33 and 34-36 weeks) highlight the need for focused care in this population.

Table 1. Temporal changes in gestational age-specific neonatal outcomes among singleton preterm live births in Canada (excl. Quebec), 2004-2015. Adjusted odds ratios express the average annual change in the risk of neonatal mortality and/or morbidity.

Gestational age-specific outcomes	Outcome by Period n (%)		p-value*	Adjusted Odds Ratio† (95% CI)
	2004-2006	2013-2015		
Neonatal mortality				
24-27 weeks	329 (18.9)	269 (14.0)	**<0.001**	**0.95 (0.93-0.97)**
28-33	170 (1.9)	135 (1.4)	**0.004**	**0.97 (0.95-0.99)**
34-36	101 (0.3)	110 (0.3)	0.980	1.00 (0.97-1.03)
All (24-36)	600 (1.3)	514 (1.0)	**<0.001**	**0.97 (0.96-0.98)**
Neonatal mortality/severe morbidity				
24-27 weeks	1 506 (86.7)	1 610 (83.6)	**0.008**	**0.97 (0.96-0.99)**
28-33	3 432 (38.5)	4 131 (42.0)	**<0.001**	**1.02 (1.01-1.03)**
34-36	2 234 (6.4)	2 737 (7.1)	**<0.001**	**1.02 (1.01-1.02)**
All (24-36)	7 172 (15.8)	8 478 (16.8)	**<0.001**	**1.01 (1.01-1.02)**

CI, confidence interval
Bolded value indicates statistical significance at $p<0.05$
*p-value for temporal trend, Cochran-Armitage test
†Adjusted for temporal changes in maternal age, gestational age, rural/urban residence, infant sex, and socio-economic status

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CHRONIC MEDICAL CONDITIONS AND PERINATAL MENTAL ILLNESS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background:

One in five women suffer from a mood, anxiety, or psychotic disorder in pregnancy or within 12 months of delivery. Women at high risk for perinatal mental illness need to be identified early to avoid negative outcomes.

Objective:

The objective of this systematic review and meta-analysis was to determine whether women with chronic medical conditions (CMC) are at increased risk for perinatal mental illness.

Methods:

Medline, EMBASE, CINAHL, and PsycINFO were searched using terms for CMC and prenatal or postnatal mood, anxiety, and psychotic disorders. Data were extracted and quality was assessed by two reviewers using standardized instruments. We used random effects models to generate unadjusted and adjusted pooled odds ratios (aPOR) and 95% confidence intervals (CI) for the association between CMC overall and perinatal mental illness overall; CMC overall and prenatal and postnatal mental illness; CMC overall and mood, anxiety, and psychotic disorders; and specific CMC and perinatal mental illness overall.

Results:

The review included 17 papers representing 13 studies and 1,634,665 women. CMC overall was associated with perinatal mental illness overall (aPOR 1.31, 95% CI 1.07-1.60; Table 1) and prenatal (aPOR 1.41, 95% CI 1.10-1.81) but not postnatal mental illness, with the latter analysis explained by one protective study that carried disproportionate weight. CMC overall was associated with perinatal depression (aPOR 1.31, 95% CI 1.05-1.64) and anxiety (aPOR 1.63, 95% CI 1.35-1.95); no studies examined bipolar or psychotic disorders. Diabetes (aPOR 1.34, 95% CI 1.07-1.69), hypertension/heart disease (aPOR 1.60, 95% CI 1.05-2.45), migraine (aPOR 1.75, 95% CI 1.20-2.54), and other neurological disorders (aPOR 1.45, 95% CI 1.19-1.77), but not asthma, were associated with perinatal mental illness.

Conclusions:

Women with CMC are at increased risk for perinatal mental illness, suggesting the need to integrate mental health resources for prevention, screening, and intervention in medical settings where perinatal women with CMC are treated.

Table 1. Unadjusted and adjusted association between chronic medical conditions (CMC) overall and perinatal mental illness overall.

Study	Sample size	Odds ratio (95% confidence interval)
	Unadjusted association	
Burgut et al., 2013 (Qatari)	837	1.36 (0.85 to 2.17)
Burgut et al., 2013 (Other)	542	1.77 (1.02 to 3.09)
Katon et al., 2011	2,398	1.54 (1.08 to 2.21)
Kozhimannil et al., 2009	11,024	2.06 (1.46 to 2.90)
Raisanen et al., 2014	511,938	1.56 (1.42 to 1.71)
Reiter et al., 2013	106,935	1.60 (1.30 to 2.00)
Pooled result	**633,674**	**1.59 (1.47 to 1.72)**
	Adjusted association	
Bjork et al., 2014	102,716	1.50 (1.20 to 1.80)
Burgut et al., 2013 (Qatari)	837	0.96 (0.45 to 1.89)
Burgut et al., 2013 (Other)	542	1.94 (1.01 to 3.79)
Chaaya et al., 2002	396	0.94 (0.40 to 2.19)
Cripe et al., 2010	1,774	2.06 (1.54 to 2.76)
Farr et al., 2014	4,451	1.00 (0.20 to 4.30)
Feldman et al., 2017	8,405	0.52 (0.79 to 1.71)
Katon et al., 2011	2,398	1.16 (1.31 to 2.63)
Kozhimannil et al., 2009	11,024	1.86 (1.05 to 9.79)
Miller et al., 2016	305	3.21 (0.93 to 1.31)
Raisanen et al., 2014	511,938	1.10 (0.99 to 1.65)
Razaz et al., 2016	1,159	1.28 (0.99 to 1.65)
Silverman et al., 2017	707,701	1.32 (0.98 to 1.78)
Tata et al., 2007	281,019	1.52 (1.36 to 1.69)
Pooled result	**1,513,146**	**1.31 (1.07 to 1.60)**

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META-ANALYSIS OF NEURODEVELOPMENTAL OUTCOMES AT 4-10 YEARS OF AGE IN CHILDREN BORN AT 22-25 WEEKS GESTATIONAL AGE: AN UPDATE

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Background:

Published data on long-term outcomes are an important resource for clinicians to support expectant parents making perinatal care decisions.

Objective:

To update our 2013 meta-analysis with data from recently published, high quality cohorts of 22-25 wk GA infants using relevant definitions of neurodevelopmental disability (NDD).

Methods:

We used a peer-reviewed electronic search and grey search. Two authors independently reviewed cohorts published after May 2012 with the following inclusion criteria: born ≥1995 in a developed nation, assessed for NDD at 4-10 yrs; prospective data collection, <30% loss to follow-up, consistent definitions for moderate-to-severe (M-S) NDD as per those from EPICure; and results reported by GA. We contacted authors for clarification. Random-effects meta-analysis was used to provide pooled proportions at each GA. Weighted regression was used to examine the relationship between GA and NDD within each study. I^2 was used to assess heterogeneity.

Results:

From 2481 titles, 20 full-text articles were reviewed and six (added to the nine from 2013) met inclusion criteria. High heterogeneity at higher GA and wide CIs at lower GA persisted. Results showed rates of M-S NDD in school-age survivors were: 42% (95%CI 23,64%; I^2 0%) at 22 wks; 41% (95%CI 31,52%; I^2 30%) at 23 wks; 32% (95%CI 25,39%; I^2 44%) at 24 wks; and 23% (95%CI 18,29%; I^2 60%) at 25 wks GA. The new analysis continued to show a significant decrease in likelihood of M-S NDI between each GA wk (8.1% decrease per wk (95%CI -11.8, -4.5%, $p<0.001$) but not for likelihood of severe NDD (2.7% decrease per wk (95%CI -6.6, 1.3%), I^2 45%, $p=0.18$).

Conclusions:

This high quality data can be used by physicians to support parents during the decision-making process for their infant. Heterogeneity and a small sample size at 22 wk GA remains a concern in the interpretation of the data.

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GESTATIONAL DIABETES ALTERS MITOCHONDRIAL BIOENERGETICS IN EARLY-LIFE AND IMPAIRS CARDIAC FUNCTION IN THE RAT OFFSPRING

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Background:

Gestational diabetes mellitus (GDM) is the most common complication of pregnancy. Children of mothers with GDM are at higher risk for developing cardiometabolic diseases.

Objective:

We hypothesize that GDM induces fetal cardiomyocyte mitochondrial dysfunction, conditioning the offspring for heart disease later in life.

Methods:

To induce GDM, female rats were fed a high fat (45% kcal) and sucrose diet prior to mating, throughout pregnancy and lactation. Lean control females received a low fat (10% kcal) diet. Fetal rat ventricular cardiomyocytes (FRVCs) were isolated from e20.5 offspring for analysis of mitochondrial respiration. To assess cardiac function over the entire life course of the offspring, serial echocardiography was performed at e18.5 and at 3, 6, 9 and 12-months of age using a Vevo 2100 ultrasound. Metabolites from the serum of 3-month old offspring were measured using UPLC-MS/MS interfaced with a HESI-II source and mass analyzer.

Results:

In the absence of elevated blood pressure, offspring exposed to GDM exhibit increased left ventricle posterior wall thickness, a marker of cardiac hypertrophy across their life course (fetal to 12-months; $p<0.05$). Beginning at 6-months of age, offspring exposed to GDM exhibit increased isovolumetric relaxation time ($p<0.05$), indicating impaired diastolic heart function. Basal and maximal mitochondrial oxygen consumption was reduced for glucose (35% & 68%) and fatty acid (49% & 52%) substrates in FRVCs isolated from GDM offspring ($p<0.05$). β-hydroxybutyrate levels are elevated and citric acid cycle intermediates are reduced in the serum of 3-month old GDM offspring, indicative of altered mitochondrial metabolism.

Conclusions:

Impaired early-life cardiomyocyte mitochondrial substrate oxidation and ATP production elicits a compensatory cardiomyocyte hypertrophy in the young offspring of GDM dams, which contributes to the development of diastolic dysfunction in older offspring. These findings outline potential mechanisms that link early-life GDM exposure to the development of heart disease later in life in the offspring.

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PREDICTION OF SPONTANEOUS PRETERM BIRTH AMONG TWIN GESTATIONS USING MACHINE LEARNING AND TEXTURE ANALYSIS OF CERVICAL ULTRASOUND IMAGES

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Background:

Preterm birth (PTB) is the main cause of neonatal mortality and morbidity in twin pregnancies. Cervical length is an important predictor of PTB in both singleton and twin gestations, but its predictive value is limited. Thus, there is an urgent need for new biomarkers to improve the predictive accuracy for PTB. We hypothesized that texture analysis of ultrasound images of the cervix may detect microstructural changes that reflect premature cervical ripening.

Objective:

Our aim was to use quantitative texture analysis of ultrasound images of the cervix combined with machine learning algorithm to detect patterns that are predictive of PTB in twins.

Methods:

Retrospective study of women with twin gestation who underwent serial monitoring of cervical length in a single referral center between 2016-2017. Ultrasound images of the cervix at 22^{+0}-26^{+6} weeks of gestation were extracted and analyzed. An automated software module was developed to extract texture features from four regions-of-interest. Texture features were then used in a Random Forest Classifier machine learning algorithm to predict PTB.

Results:

A total of 164 images from 98 women with twins were analyzed. The rate of PTB was 62.2% (61/98). 119 texture features were analyzed from each region. The predictive value for PTB, expressed as the area under the ROC curve (AUC) was higher for samples obtained from the external os vs. internal os, and was highest for the anterior aspect of the external os (0.75, 95%CI 0.61 – 0.78) (Table 1). The sensitivity and specificity for PTB for samples at the anterior external os were 69% and 70%, respectively.

Conclusions:

In this preliminary analysis we have found a novel biomarker that may detect premature cervical ripening and predict PTB. The observation that changes in the external os were most predictive of PTB may provide to the hypothesis that ascending bacterial infection contributes to cervical ripening and PTB.

Table 1: AUC's and standard deviation (SD) of the random forest classifier for the four regions-of-interest

Region of interest	AUC (95% CI)
Posterior lip, External Os	0.70 (0.61 – 0.78)
Posterior lip, Internal Os	0.68 (0.59 – 0.77)
Anterior lip, External Os	0.75 (0.67 - 0.82)
Anterior lip, Internal Os	0.59 (0.49 – 0.67)

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NONPRESENTING DICHORIONIC TWINS AND PLACENTAL VASCULAR MALPERFUSION

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Background:

Twin pregnancies are associated with an increased risk of perinatal mortality and morbidity compared with singletons. Interestingly, within twin pregnancies, the non-presenting twin has been shown to be on average smaller and at greater risk of perinatal mortality and morbidity compared with its presenting co-twin. However, the mechanisms underlying this observation remain unclear.

Objective:

We aimed o explore the hypothesis that selective placental pathology affecting the nonpresenting twin is a significant contributory factor mediating the smaller size at birth of nonpresenting dichorionic twins.

Methods:

Retrospective cohort study of all dichorionic twin deliveries in a single tertiary center between 2002 and 2015 where by departmental policy, all placentas from multifetal gestations are routinely sent for pathological examination. Maternal charts, neonatal charts, and pathology reports were reviewed. Placental abnormalities were classified into lesions associated with maternal vascular malperfusion, fetal vascular malperfusion, placental hemorrhage, and chronic villitis. Comparison of neonatal outcomes and placental abnormalities was made between all nonpresenting and all presenting twins as well as within twin pairs.

Results:

A total of 1,322 women with dichorionic twins were studied. Nonpresenting twins were smaller at birth compared with the presenting co-twin starting at 32 weeks (birth weight 2224±666 gr vs. 2278±675 gr, p=0.036). Nonpresenting twins had smaller placentas (361±108 gr vs. 492±129 gr, p<0.001) as early as 24 weeks. Nonpresenting twins had higher odds for any placental abnormality (aOR 1.91, 95%-CI 1.63-2.23), small placenta (aOR 4.69, 95%-CI 3.75-5.88) and maternal vascular malperfusion (OR 2.75, 95%-CI 2.32-3.27) compared with their presenting co-twins. In nonpresenting twins, the presence of maternal vascular malperfusion pathology was associated with lower birth weight compared with their presenting co-twin during the third trimester.

Conclusions:

The lower birth weight of non-presenting fetuses in dichorionic twin pregnancies is correlated with a higher rate of placental maternal vascular malperfusion pathology.

Placental findings in the presenting and non-presenting twins

Placental findings	Presenting twin N = 1322	Non-presenting twin N = 1322	p-value
Placental weight			
Placental weight (g)	492±129	361±108	**<0.001**
Placental weight <10th centile *	114 (8.6)	404 (30.6)	**<0.001**
Fetal-placental ratio	5.2±1.4	6.4±2.2	**<0.001**
Cord abnormalities			
Single umbilical artery	16 (1.5)	15 (1.4)	0.9
Marginal or velamentous cord insertion	849 (64.2)	833 (63.0)	0.5
Hypercoiled cord	101 (7.6)	126 (9.5)	0.1
Placental abnormalities			
Any placental abnormality	526 (39.8)	735 (55.6)	**<0.001**
Any maternal vascular malperfusion lesions †	278 (21.0)	556 (42.1)	**<0.001**
Two or more maternal vascular malperfusion lesions †	29 (2.2)	78 (5.9)	**<0.001**
Fetal vascular malperfusion †	238 (18.0)	211 (16.0)	0.16
Hemorrhage †	43 (3.3)	44 (3.3)	0.91
Chronic villitis	73 (5.5)	83 (6.3)	0.41

* Based on the nomograms of Pinar et al.

† As defined in the methods section.

Significant p-values are emphasized by bold font

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EXPOSURE TO VIOLENCE DURING PREGNANCY AND ITS ASSOCIATION WITH MATERNAL PRENATAL CARE UTILIZATION – META-ANALYTIC REVIEW

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Background:

Women experience violence during pregnancy at alarming rates worldwide, with estimates ranging from 1-32% depending on location and survey methodology. Violence during pregnancy increases risk of adverse maternal and fetal outcomes, though the mechanisms linking these experiences are poorly understood. One proposed pathway is the impact of violence on maternal use of prenatal care, yet this relationship has not been systematically or qualitatively synthesized.

Objective:

The present meta-analyses investigate the relationship between violence during pregnancy and inadequate prenatal care utilization across two dimensions: 1) no prenatal care during gestation, and 2) delayed entry into care.

Methods:

Articles were identified via systematic search of 10 health and social-science databases using broad search terms (e.g., “intimate partner violence”, “pregnan*). Following removal of duplicates, 3915 abstracts and full texts were assessed to determine final studies for inclusion. This study followed the Meta-Analysis of Observational Studies in Epidemiology (MOOSE) guidelines. Analyses were conducted using Comprehensive Meta-Analytic Software 2.0.

Results:

A total of 9 independent studies representing 5212878 women were included in the no prenatal care analyses, and 19 independent studies with 5212878 women were included in the delayed entry to care analyses. Random-effects models found significant associations between pregnancy-related violence and inadequate prenatal care, such that abused women were more likely to completely abstain from care (OR = 2.86, 95% CI: 1.58-5.19) or to delay care (OR = 1.88, 95% CI: 1.48-2.40). These results were moderated significantly by sociodemographic, abuse-related, and methodological factors. Continuous participant characteristic Moderators are presented in Table 1.

Conclusions:

These findings are important because prenatal care targets and protects against adverse outcomes and represents an unparalleled window of opportunity for supporting women experiencing violence. These results highlight the vulnerability of this population and emphasize the need for creative multi-sector practice and policy solutions to better reach and support these women.

Table 1

Meta-regression results of continuous participant characteristic moderators for the association between abuse during pregnancy and inadequate prenatal care utilization

Participant Characteristics (%)	*k*	Slope	95% CI	*z*
No Prenatal Care During Gestation				
Teen Mothers - Control	8	.103	[-.010, .213]	1.82
Teen Mothers – Exposed	8	.047	[.010, .090]	2.21*
Primiparous – Control	5	.147	[.049, .246]	2.92**
Primiparous – Exposed	5	-.166	[-.584, .252]	-0.78
<High School – Control	6	-.003	[-.033, .030]	-0.12
<High School – Exposed	6	.075	[.037, .114]	3.85***
White – Control	7	.026	[.016, .035]	5.31***
White – Exposed	7	.025	[.013, .037]	4.10***
Delayed Prenatal Care				
Teen Mothers - Control	14	-.012	[-.04, -.02]	-.89
Teen Mothers – Exposed	14	.004	[-.01, .02]	0.45
Married – Control	16	.010	[.001, .02]	2.12*
Married – Abused	16	.010	[-.001, .02]	1.81
Employed – Control	8	.019	[.001, .04]	2.11*
Employed - Abused	8	.014	[-.02, 05]	0.89
Primiparous – Control	5	.003	[-.01, .02]	0.36
Primiparous – Abused	5	-.005	[-.01, .002]	-1.42
<High School – Control	6	.001	[-.01, .01]	0.21
<High School – Abused	6	.009	[.001, .02]	2.31*
White – Control	7	-.001	[-.01, .01]	-0.28
White – Abused	7	-.001	[-.01, .01]	-0.35

Note. This table includes moderators containing sufficient data available from five or more studies. *k* = number of studies; *z* = z-score; . * p <.05, ** p < .01, *** p < .001

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ENERGY INTAKE FOR PRETERM INFANTS FED DONOR MILK IS SIGNIFICANTLY IMPACTED BY FEEDING TECHNIQUE.

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Background:

Fortified mother's milk is the optimal nutrition for preterm infants. However, when mother's milk volumes are insufficient, pasteurized donor milk is used as the preferred alternative. Compared to mother's milk, donor milk is thought to be lower in macronutrient and energy content due to its pasteurization and container changes during processing.

Objective:

To determine the effect of pasteurization and feeding method on the macronutrient composition of donor milk.

Methods:

Ten donor milk pools were created from eight donors and analyzed for macronutrient and energy content before and after pasteurization. After 7-60 days of freezing following pasteurization, the samples were prepared according to NICU practices and four feeding methods were simulated: gavage, 30-minute slow feed, 60-minute slow feed, and continuous feed over 4-hours. Macronutrients were assessed after each feeding method using a mid-infrared human milk analyzer (MIRIS, Sweden). Generalized estimating equations models were utilized to compare individual macronutrient composition at each processing stage and through each feeding technique.

Results:

There were no statistically significant decreases in energy, fat, protein, or carbohydrate content following pasteurization or when milk was fed via gavage. Statistically significant decreases were observed in energy and fat content as the time within the nasogastric tubing increased. The total fat and energy content(mean ± SE), respectively, after each processing and feeding method was as follow: post-pasteurization 3.11(± 0.12)g/dL, 61.5(± 1.16)kcal/dL; milk preparation container 2.76(± 0.11)g/dL,58.40(± 1.10)kcal/dL; gavage 2.83(± 0.12)g/dL, 60.00(±1.14)kcal/dL; 30-minute feed 2.16(±0.12)g/dL, 53.50(± 1.14)kcal/dL; 60-minute feed 1.93(± 0.12)g/dL, 51.60(± 1.18)kcal/dL; continuous feed 0.68(± 0.06)g/dL,41.1(±0.66)kcal/dL. No statistically significant decreases were seen in protein or carbohydrate when feeding over longer periods of time.

Conclusions:

Pasteurization on its own did not reduce the energy, fat, protein, or carbohydrate content in donor milk; however, the feeding technique significantly impacted the final delivery of energy and fat.

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DISPARITIES IN CAESAREAN SECTION RATES BY MATERNAL SOCIOECONOMIC STATUS ACROSS DIVERSE OBSTETRIC INDICATIONS

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Background:

Previous literature reports an inconsistent association between caesarean section (c-section) rate and maternal socioeconomic status (SES); however, this inconsistency may be the result of a failure to examine the association across indications for c-section.

Objective:

This study examined the variation in c-section rates by maternal SES across diverse-obstetric indications for c-section.

Methods:

This cross-sectional study used data from the 2015 US Birth Certificate (n=3,850,114). Data on demographics, SES (education and insurance status), medical conditions (e.g., diabetes, hypertension, and eclampsia), and obstetric characteristics (e.g., parity and fetal presentation) were extracted. Multivariable log-binomial regression models were used to examine the association between the c-section rate and SES across the Robson's 10-groups (10 clinically relevant obstetric groups for c-section) after adjustment for confounding variables, such as maternal age and medical conditions.

Results:

The overall c-section rate was 32.0%. No statistically significant differences were observed by either measure of SES (maternal education (p=0.12) and insurance status (p=0.09)). However, a statistically significant disparity in the use of c-section across SES was observed for particular obstetric indications, even after adjustment for confounders. For example, women with graduate education compared to those who did not complete high school were more likely to have a c-section (adjusted RR: 2.4, 95% CI: 2.3-2.4) for low-risk conditions (group 1: nulliparous women with singleton fetus, cephalic presentation, ≥37 gestational weeks, and spontaneous labor). Whereas, they were less likely to have c-section (adjusted RR: 0.7, 95% CI: 0.6-0.9) for a strongly-medically-indicated condition (group 9: abnormal fetal lies). Women without private insurance or Medicaid coverage were less likely to have c-section in almost all obstetric groups, compared to those with private insurance.

Conclusions:

Examining the overall c-section rate obscures the relationship between SES and use of c-section for particular indications. The unequal utilization of c-sections across maternal SES highlights inequities in obstetric care received by American women.

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NEURODEVELOPMENT IN 3 YEAR-OLDS FOLLOWING PRENATAL EXPOSURE TO MATERNAL GESTATIONAL HYPERGLYCEMIA OR PRE-PREGNANCY ADIPOSITY

John E Krzeczkowski, McMaster University; **Khrista Boylan**, McMaster University; **Tye E Arbuckle**, Environmental Health Science Research Bureau; **Linda Dodds**, Dalhousie University; **Gina Muckle**, Laval University; **Lindsay A Favotto**, McMaster University; **William Fraser**, Universitaire de Sherbrooke; **Ryan J Van Lieshout**, McMaster University

Background:

Prenatal exposure to maternal adiposity and/or hyperglycemia has been linked to neurodevelopmental problems in offspring. However, despite its preventive potential, no studies have examined the role that prenatal diet plays in these links.

Objective:

We examined associations between maternal adiposity or hyperglycemia and cognitive and/or behavioral problems in 3-year old children, and if these persisted following adjustment for modifiable confounders including prenatal diet.

Methods:

Data from 808 children born to women participating in the Canadian Mother Infant Research on Environmental Chemicals (MIREC) cohort were used to examine associations between maternal body mass index (BMI), pregnancy hyperglycemia, and verbal, performance and full-scale IQ scores on the Wechsler Preschool and Primary Scale of Intelligence, and externalizing and internalizing problems on the Behavior Assessment Scale for Children in 3-year-old offspring. Linear regression models were used to examine associations before and after adjustment for prenatal diet quality, smoking, maternal depression, education, and quality of home environment.

Results:

Mean maternal pre-pregnancy BMI was 25.10 (*SD*=5.63) and 7.9% were hyperglycemic. Body mass index and hyperglycemia predicted lower verbal and full-scale IQ scores in unadjusted models. BMI was also linked to more externalizing problems. However, these associations were not significant after adjustment. Verbal and full-scale IQ scores were confounded by the quality of home environment and prenatal diet quality (Verbal IQ semi-partial correlations: r_{HOME}=0.34, p<0.01; r_{diet}=0.17, p<0.01; Full-scale IQ r_{HOME}=0.38, p<0.01; r_{Diet}=0.11, p<0.05). Externalizing problems were also accounted for by quality of home environment (r_{HOME}=-0.23, p<0.01) and maternal depression (r_{PPD}=0.17, p<0.01).

Conclusions:

Associations between maternal metabolic complications during pregnancy and offspring neurodevelopment may be due to postnatal confounding variables. However, even after adjustment for traditional risk factors for child cognitive functioning (quality of home environment, depression), we show for the first time that maternal pregnancy diet may be an important factor linking maternal metabolic complications and offspring neurodevelopment.

Oral 176

SOCIAL SUPPORT AND MATERNAL MENTAL HEALTH AT 4 MONTHS AND 1 YEAR POSTPARTUM: ANALYSIS FROM THE ALL OUR FAMILIES COHORT

Erin Hetherington, University of Calgary; **Sheila McDonald**, University of Calgary; **Suzanne Tough**, University of Calgary

Background:

Low social support is consistently associated with postpartum depression. However, previous studies do not do not consistently control for previous mental health and do not consider type of support.

Objective:

This study has two objectives: to examine if low social support contributes to subsequent risk of depressive and anxiety symptoms, and to determine which type of support (if any) is most important for later mental health problems.

Methods:

Data from the All Our Families longitudinal pregnancy cohort was used (n=3057). Outcomes were depressive or anxiety symptoms at 4 months and 1 year postpartum. The primary exposures were social support during pregnancy and at 4 months postpartum. Controlling for past mental health, relative risks and risk differences were calculated using log binomial models. The risk of low total support and the relative importance of 3 types of support were examined.

Results:

Low social support during pregnancy was associated with an increased risk of depressive symptoms (RR 1.50, 95% CI 1.24 to 1.82) and anxiety symptoms (RR 1.63, 95% CI 1.38 to 1.93) at 4 months postpartum. Low social support at 4 months was associated with an increased risk of anxiety symptoms (RR 1.65, 95% CI 1.31 to 2.09), but not with depressive symptoms at 1 year. The risk difference for low social support during pregnancy was 0.06 (95% CI 0.30 to 0.9) for postpartum depressive symptoms. This suggests that improving support during pregnancy for 17 women could prevent 1 case of depression at 4 months. Similar risk differences were found for anxiety outcomes. Emotional/informational support was the most important type of support for postpartum anxiety.

Conclusions:

Low social support increases the risk of postpartum mental health problems both at 4 months and 1 year regardless of previous mental health. Women with low social support may benefit from strategies to improve support in the prenatal period.

Oral 181

SPLIT-WEEK GESTATIONAL AGE BETTER PREDICTS OUTCOMES IN PRETERM INFANTS AT THE EXTREMES OF VIABILITY

Jessie van Dyk, Sunnybrook Health Sciences Centre; **Sumesh Thomas**, University of Calgary; **Paige Church**, Sunnybrook Health Sciences Centre; **Hussein Zein**, Foothills Medical Centre; **Leonora Hendson**, Foothills Medical Centre; **Elizabeth Asztalos**, Sunnybrook Health Sciences Centre; **Alberto NettelAguirre**, University of Calgary; **Selphee Tang**, Alberta Health Service; **Rudaina Banihani**, Sunnybrook Health Sciences Centre

Background:

Current use of completed weeks of gestation for antenatal counselling around the limits of viability does not take into account the impact of fewer than 7 days maturity on neonatal outcome. We hypothesized that using a split-week gestational age (GA) outcome model would be more informative.

Objective:

To compare differences in composite outcomes of neonatal mortality and or morbidity between a split-week GA and full week GA for infants born between 23 to 26 weeks GA.

Methods:

We conducted a retrospective cohort study between 2005 and 2014 of preterm infants born between $23^{0/7}$ to $26^{6/7}$ weeks GA at two high-risk perinatal centers in Canada. The primary outcome was neonatal mortality and or morbidity defined as the presence of severe intraventricular hemorrhage or periventricular leukomalacia, severe retinopathy of prematurity and or bronchopulmonary dysplasia. Differences in outcome were compared using a split-week GA defined as early (X^{0-3}) and late (X^{4-6}) with X between 23-26 weeks GA. Outcome comparisons were also made between the late split of a preceding week (X^{4-6}) and the early split of the subsequent week (X^{0-3}).

Results:

Statistically significant differences were demonstrated in composite outcomes of neonatal mortality and or morbidity between the early and late split of a gestational week at 24, 25 and 26 but not at 23 weeks GA. There were no statistically significant differences in composite outcomes between infants born at the late versus early part of a subsequent split-week between 23^{4-6} versus 24^{0-3} weeks ($p = 0.14$), and 24^{4-6} versus 25^{0-3} weeks GA ($p = 0.6$).

Conclusions:

The early or late part of GA week maturity should be considered in antenatal counselling of pregnancies at 24, 25 and 26 weeks gestation. Using outcomes derived for completed gestational weeks may not provide adequate information when counselling at the limits of viability.

Table 1: Split week gestational age comparisons for composite outcome and neonatal mortality only

Outcome	GA (weeks)	Full week n (%)	Early split-week n (%)	Late split-week n (%)	95% CI	P-value
Composite outcome (neonatal mortality and morbidity)	23	92 (94.8)	40 (95.2)	52 (94.5)	(-8.8, 10.2)	1
	24	272 (80.5)	172 (85.6)	100 (73)	(3.1, 22.1)	0.0064
	25	277 (64.1)	174 (69.6)	103 (56.6)	(3.3, 22.7)	0.0073
	26	222 (48.8)	157 (55.9)	65 (37.4)	(8.8, 28.2)	0.0002
Neonatal mortality only	23	49 (50.5)	25 (59.5)	24 (43.6)	(-6, 37.8)	0.1784
	24	92 (27.0)	62 (30.7)	30 (21.6)	(-0.8, 19.1)	0.0821
	25	52 (11.9)	33 (13.2)	19 (10.1)	(-3.4, 9.6)	0.4001
	26	35 (7.5)	25 (8.7)	10 (5.5)	(-1.9, 8.3)	0.2777

Oral 184

IS EARLY EXTUBATION ASSOCIATED WITH INCREASING RISK OF SHORT TERM NEUROLOGICAL OUTCOME IN VERY PRETERM INFANTS?

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Background:

Reduce duration of mechanical ventilation in very preterm babies is one of daily challenge for the neonatologists to avoid severe bronchopulmonary dysplasia. Lack of prospective and wide data existed about this practice and their risks on severe neurologic morbidities in the literature.

Objective:

The objective of this study was also to evaluate the association between severe IVH in preterm babies, intubated at birth and with attempt of extubation within 48h of life.

Methods:

The EPIPAGE-2 study is a national, prospective, population-based cohort study conducted in France during the year 2011. All infants admitted in neonatal intensive care units and intubated were included in this study. Early extubation (EE) was defined as extubation attempt within 48h of life. Severe IVH were considered as grade III or IV according to Papile classification. The two groups, exposed to early extubation (EE group) and non-exposed ((No EE)) were built with the method of a propensity score

Results:

1509 intubated preterm infants born under 29 weeks of gestational age were initially studied. After PS and GA matching, there was 409 patients in each group. IVH was not associated with EE in the main analysis (OR 0.8, IC95% 0.6-1.3). In addition subgroup with infants who were not reintubated further, they had a lower risk of IVH (2.0 %) in the EE group than those in the non EE group (6.8 %).

Conclusions:

Early extubation should not afraid clinicians concerning IVH in very preterm infants with stable medical situation, but they have to be caution when the extubation failure is high.

Oral 190

A PARENT–TARGETED AND MEDIATED VIDEO INTERVENTION TO IMPROVE UPTAKE OF PAIN TREATMENT FOR BABIES DURING NEWBORN SCREENING: A PILOT RANDOMIZED CONTROLLED TRIAL.

Carolina Lavin Venegas, University of Ottawa; **Denise Harrison**, Children's Hospital of Eastern Ontario (CHEO); **Monica Taljaard**, Ottawa Hospital Research Institute (OHRI); **Jessica Reszel**, Children's Hospital of Eastern Ontario Research Institute (CHEO RI); **Sandra Dunn**, Better Outcomes Registry & Network (BORN) Ontario; **Ian D Graham**, Ottawa Hospital Research Institute (OHRI); **JoAnn Harrold**, Children's Hospital of Eastern Ontario (CHEO); **Catherine Larocque**, Children's Hospital of Eastern Ontario Research Institute (CHEO RI); **Becky Nicholls**, Prefers not to be disclosed; **Stuart Nicholls**, Ottawa Hospital Research Institute (OHRI), **Pat O'Flaherty**, Champlain Maternal Newborn Regional Program (CMNRP), **Janet Squires**, Ottawa Hospital Research Institute (OHRI), **Bonnie Stevens**, The Hospital for Sick Children, **Marie-Josée Trépanier**, Champlain Maternal Newborn Regional Program (CMNRP)

Background:

Most newborns undergo painful newborn screening blood tests (NBS). Breastfeeding, skin-to-skin care and sweet solutions effectively reduce pain during blood tests; however, these strategies are inconsistently used.

Objective:

To inform a full-scale trial, we evaluated the feasibility and acceptability of a knowledge translation study using a parent-targeted/mediated video; and obtained preliminary data regarding effect on uptake of pain treatment.

Methods:

Pilot randomized controlled trial involving 100 parent-newborn dyads in a mother-baby-unit. Fifty-one were randomized to view the video portraying use of pain treatment during NBS; 49 received usual care. Primary outcomes (feasibility, acceptability) included parents' perceptions of the video, parents' intention to use/request pain treatment and to recommend the video to others, as measured by questionnaires in the intervention group (IG); and recruitment processes, rates of consent, and attrition. Descriptive statistics were used. Secondary outcomes (preliminary effectiveness) included use of pain treatment during NBS, obtained from medical charts in both arms and compared using absolute difference in proportions and 95% confidence intervals. Multivariable logistic regression analysis was used to conduct subgroup analyses based on previous knowledge of pain treatment.

Results:

Between May-August 2016, 100 parents were recruited. All participants in the IG received the intervention as planned. All parents in the IG reported an intention to recommend the video, and to use at least one pain treatment, with a greater preference for breastfeeding or skin-to-skin care over sucrose (Table 1). There was no difference in use of pain treatment during NBS between groups. Overall, 63% of newborns received at least one strategy – mainly, sucrose (59%), despite parents preferring breastfeeding or skin-to-skin care.

Conclusions:

This study was feasible and acceptable to conduct. Our results highlighted that informing parents only was not sufficient to change practice. Future work is planned to explore effective means to translate evidence-based pain knowledge to both parents and healthcare providers.

Table 1: Feasibility, acceptability and preliminary effectiveness of the knowledge translation study using a parent-targeted/mediated video.

FEASIBILITY AND ACCEPTABILITY			
Consent rate		70% (100/142)	
Attrition rate		1% (1/100)	
Parents' perception that the video was the right length		96% (49/51)	
Parents' intention to recommend the video to other parents		100% (51/51)	
	Breastfeeding % (95% CI)	**Skin-to-skin care % (95% CI)**	**Sucrose % (95% CI)**
Parents' intention to use/request pain treatment after viewing the video (n= 51)	90% (82 to 98)	92% (85 to 99)	67% (54 to 80)

EFFECTIVENESS					
				Subgroup Analyses	
	Intervention Group	**Control Group**	**Risk Difference**	**Previous knowledge of pain treatment**	**No previous knowledge of pain treatment**
	n=50*	**n=49**		**n=37**	**n=62**
	% (95% CI)	**% (95% CI)**	**% (95% CI)**	**Odds ratio (95% CI)**	**Odds ratio (95% CI)**
Use of pain treatment during newborn screening (n=99)	60% (46 to 74)	67% (54 to 80)	-7% (-26 to 12)	0.705 (0.141, 3.517) p-value: 0.6696	0.584 (0.184, 1.8656) p-value: 0.3621

Abbreviation: CI, confidence interval.
* One infant in the intervention group was excluded from analyses due to missing outcome data.

Oral 193

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

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Background:

Pregnancy complications leading to fetal hypoxia are linked to the development of adult cardiovascular disease in offspring. A prenatal hypoxic insult reduces placental perfusion and increases oxidative stress in the placenta. Factors released from a stressed placenta affect the development of fetal organs (e.g. heart). MitoQ is an antioxidant which, when attached to nanoparticles (nMitoQ), can be used to target maternal and placental oxidative stress without crossing the placenta.

Objective:

We hypothesized that nMitoQ treatment will improve oxygenation and reduce oxidative stress in both placental and fetal cardiac tissues, ultimately leading to better pregnancy outcomes.

Methods:

Pregnant rats were exposed to hypoxia (11% O_2) or normoxia (21% O_2) from gestational day (GD)15-21; term=22 days. On GD15, rats were intravenously injected with saline or nMitoQ. Placentae and fetal tissues were collected from both sexes on GD21. Tissue hypoxia was assessed by hypoxyprobe-1 staining, which binds at PO_2<10mmHg. Reactive oxygen species (ROS) were assessed by dihydroethidium and MitoSOX staining in placenta and fetal cardiac tissues.

Results:

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

Conclusions:

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

Oral 200

REDUCING NEONATAL ABSTINENCE SYNDROME IN BABIES BORN TO MOTHERS ENROLLED IN OPIOID REPLACEMENT THERAPY PROGRAMS

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Background:

The number of hospitalizations of babies with Neonatal Abstinence Syndrome (NAS) in Canada has increased over 20% increase from 2012 to 2016 and this continues to rise. NAS affects approximately 80% of infants born to opioid dependent women.

Objective:

The primary purpose of this pilot project was to develop a framework for creating a comprehensive strategy aimed at reducing the degree of NAS in the baby.

Methods:

A pilot quality project has occurred over a two-year period involving a convenience sample of babies from pregnant women in Opioid Replacement Therapy (ORT) programs delivering at a Level 2 hospital in Edmonton. Only babies of pregnant women in ORT program were included in this pilot project. Seventeen babies participated in the PostPartum Rooming-In Approach (PPRIA). Retrospective chart review was performed to compare these babies with a historical cohort of babies from mothers in ORT program. The use of morphine treatment, length of NICU stay, hospital stay, breast feeding, use of support and hospitalization cost were compared between groups (Student *t* and z tests).

Results:

In the historical cohort, among 29 babies with NAS, we identified 9 babies were born to women in ORT programs. Comparison of the baby cohorts demonstrated positive infant outcomes supporting PPRIA. More specifically, there was a decrease in morphine treatment (12% versus 67%, $p<0.005$) and length of NICU stay (0.82 days versus 10.33 days, $p<0.001$), while there was an increase in breastfeeding (71% versus 22%, $p<0.01$) and babies being discharged in the care of their mothers (100% versus 66%, $p=0.01$) in PPRIA babies compared to historical ORT babies, respectively. The healthcare cost reduction per baby was $15,279 (based on average length of stay of 14 days).

Conclusions:

In this pilot study, the PPRIA model resulted in reduced severity of NAS, with improved breastfeeding rate and decreased hospital cost.

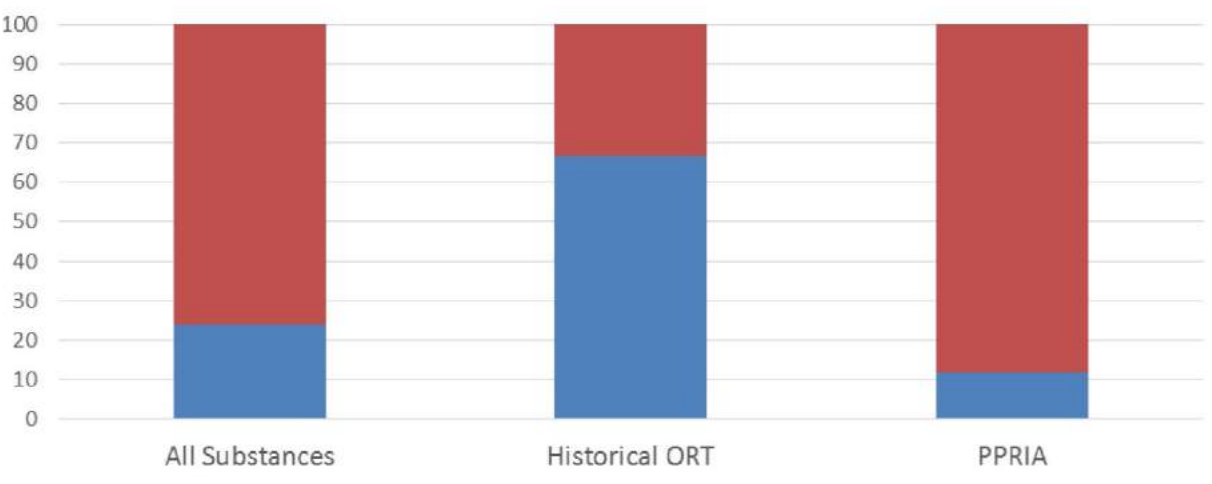

Figure 1. Morphine Treatment (%)

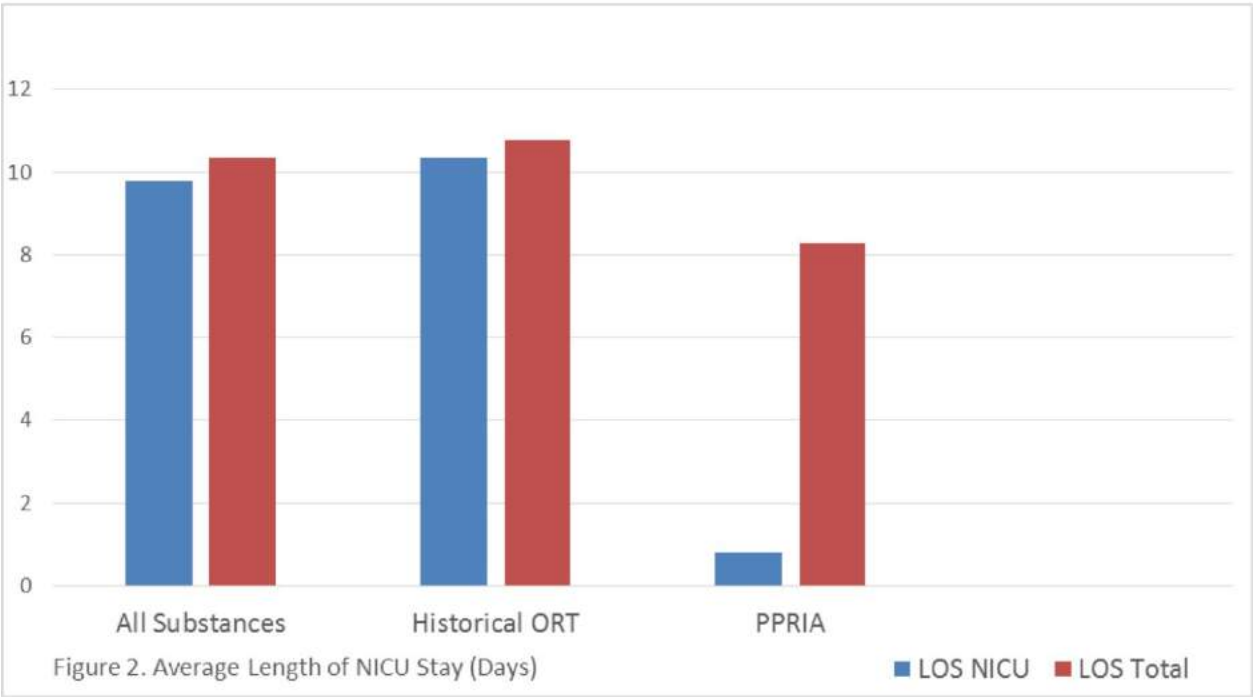

Figure 2. Average Length of NICU Stay (Days)

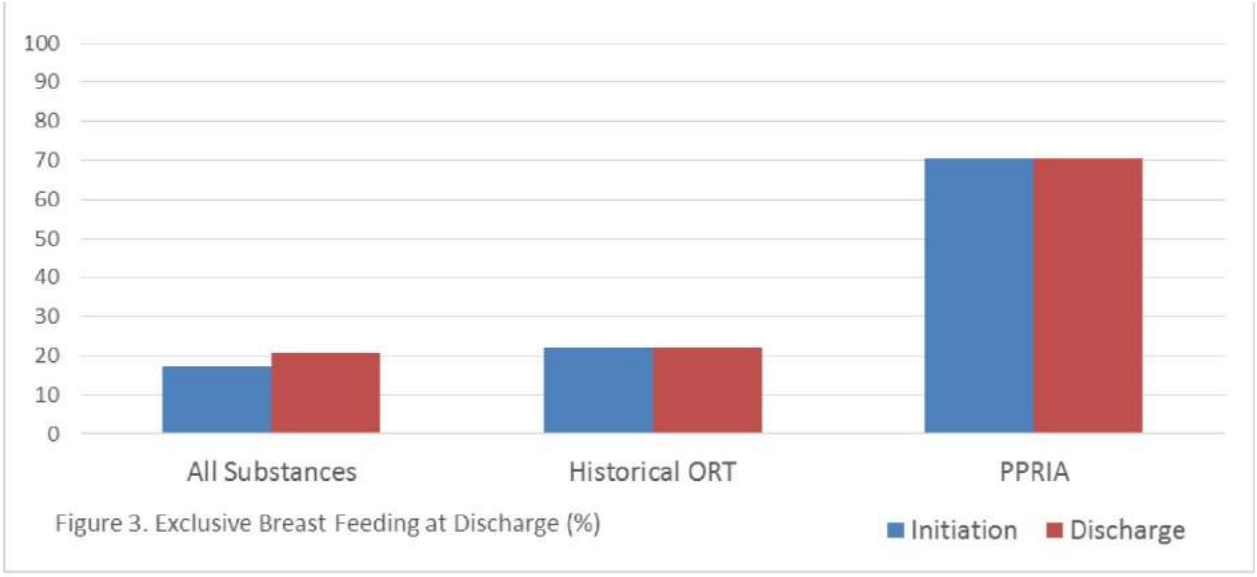

Figure 3. Exclusive Breast Feeding at Discharge (%)

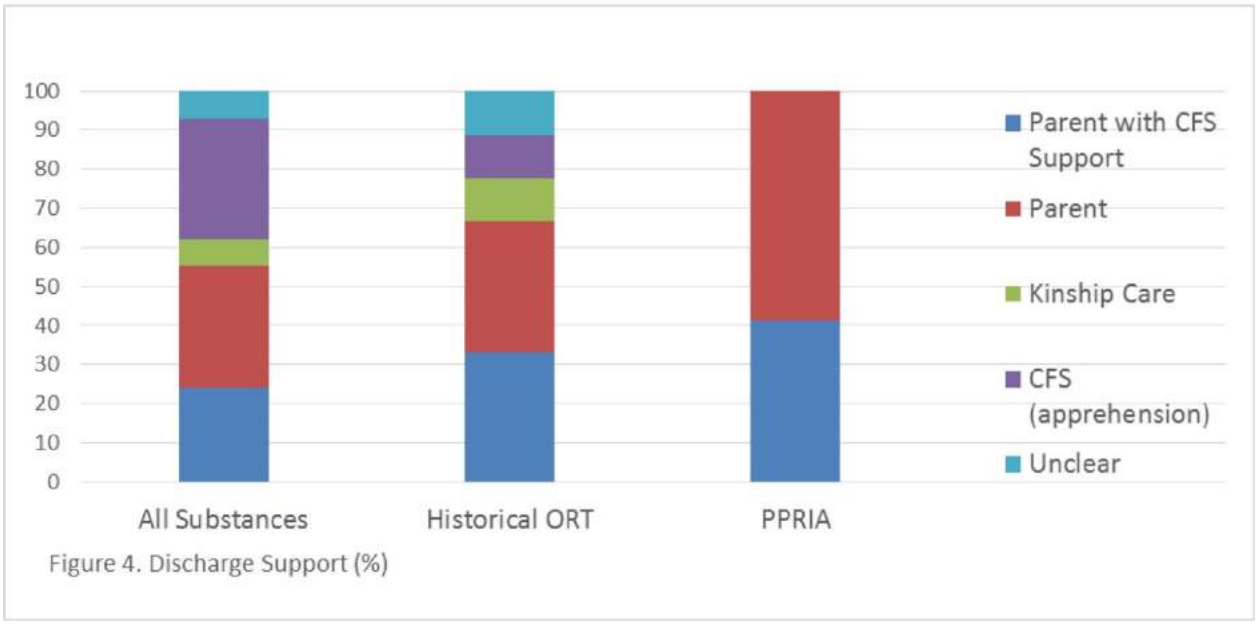

Figure 4. Discharge Support (%)

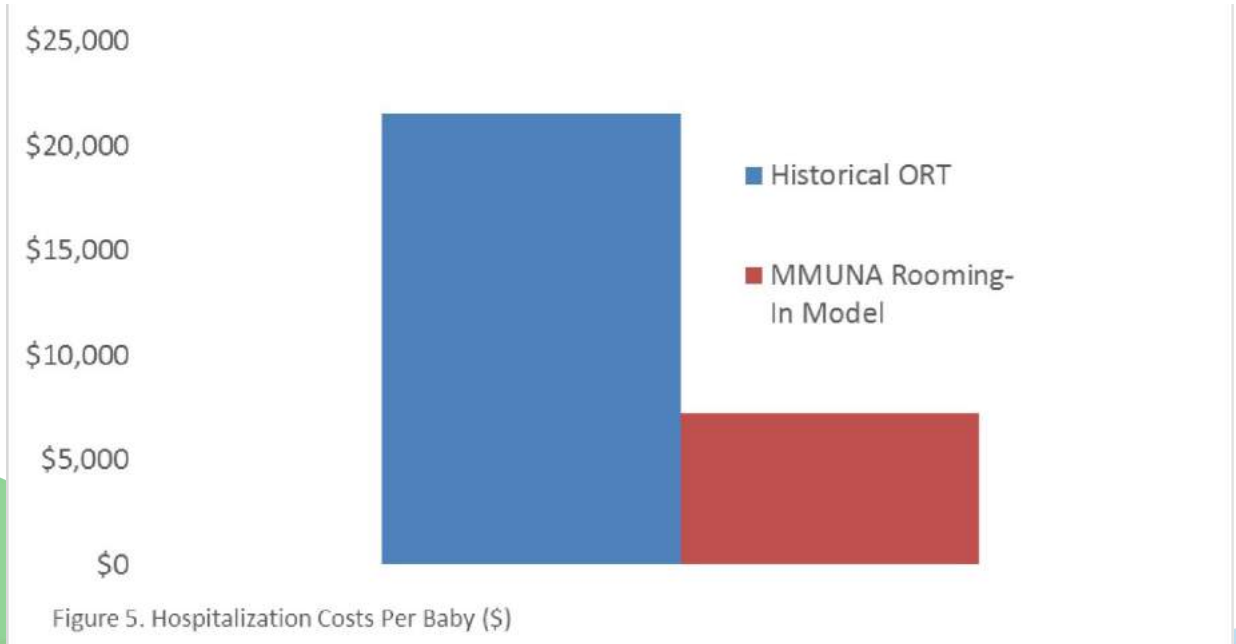

Figure 5. Hospitalization Costs Per Baby ($)

Oral 204

DOES THE TIMING OF INITIATION OF THERAPEUTIC HYPOTHERMIA INFLUENCE MRI FINDINGS AND OUTCOMES IN ENCEPHALOPATHIC BABIES?

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Background:

Therapeutic hypothermia (TH), initiated < 6h of life, is the standard treatment for infants with moderate to severe hypoxic ischemic encephalopathy (HIE). While preclinical studies show that TH is more effective when started early, little clinical data exists.

Objective:

The objectives of our study are to examine the effect of early vs. late TH on the severity and pattern of brain injury on MRI and on the neurodevelopmental outcomes.

Methods:

This retrospective cohort included infants with HIE treated with TH at a level three neonatal intensive care unit between 2009 and 2016. Babies were grouped into: early cooling (TH started ≤ 180 minutes of life) or late cooling (TH started > 180 minutes of life). Two radiologists evaluated the severity and pattern of brain injury on MRI using both NICHD and Barkovich scoring system. Neurodevelopmental outcomes were evaluated at 4, 10, 18 and 48 months.

Results:

Ninety-four patients (median gestational age 39 weeks; median birth weight 3.3 kg) were included in the study, 55 in the early cooling and 39 in the late cooling group. The early cooling group included more patients with severe HIE (32.7% vs 10.3%, p=0.01). No difference was observed between the 2 groups in regard to the pattern and severity of brain injury. In the late cooling group, there was a trend toward more severe watershed (WS) injury (WS score ≥3) (30.6% vs 17%, p=0.19) and more moderate to severe brain injury (33.3% vs 23.4%, p=0.33). There was no difference in the neurodevelopmental outcomes between the 2 groups.

Conclusions:

TH initiated early (before 180 minutes of life) was neither associated with a difference in brain injury on MRI nor better neurodevelopmental outcomes. Despite having more infants with severe HIE in the early cooling group, there was a trend toward less significant brain injury in this group.

Oral 208

TO HAVE A C-SECTION OR NOT? UNDERSTANDING PLANNED C-SECTION EXPERIENCES OF MIGRANT AND CANADIAN-BORN WOMEN IN EDMONTON, ALBERTA

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Background:

Globally caesarean section (C-section) rates are exceeding recommended ranges, placing women at higher risk for immediate complications. Evidence suggests migrant women to have higher C-section rates compared to Canadian-born highlighting an area of concern. Contrastingly the literature indicates women prefer to deliver vaginally leading us to question the degree to which women, especially migrants participate in decision-making.

Objective:

Given this, our study explored how decisions to have planned C-sections are made, including the roles of women and obstetricians, the factors considered and whether migrant women's experiences differ from Canadian-born women.

Methods:

A qualitative study using a focused ethnographic approach was conducted at a teaching hospital in Edmonton over a ten-month period. Migrant (N=64) and Canadian-born women (N=27) who had a higher risk of undergoing a C-section were included. Data were collected through observation of prenatal appointments, and postpartum in-depth interviews. Written informed consent was obtained from all participants and ethics approval was received from the University of Alberta.

Results:

Our findings reveal the decision-making process was similar between both groups. Migrant and Canadian-born women were the primary decisions-makers for most planned C-sections. While both groups' decisions were based on medical factors, socio-cultural factors such as length of recovery and lack of social support had a larger effect on migrant women's decisions. A group of migrant women chose to have planned C-sections in order to plan and arrange time off work and childcare, in order to overcome their lack of social support.

Conclusions:

While both groups shared similar experiences, our findings suggest migrant women are making decisions based on socio-cultural factors in order to fill in gaps in social support. Further research is necessary to explore how these factors may inadvertently be contributing to the higher C-section rates experienced by migrant women in Canada.

Oral 209

A RANDOMIZED CONTROLLED TRIAL ON THE EFFECT OF INTRODUCING A DAILY SMARTPHONE-BASED FEEDBACK SYSTEM BETWEEN GDM PATIENTS AND PHYSICIANS ON PATIENT COMPLIANCE, GLYCEMIC CONTROL, PATIENT SATISFACTION, AND PREGNANCY OUTCOME

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Background:

Patient compliance is an important factor in pregnancy outcome in pregnancies complicated by gestational diabetes mellitus (GDM).

Objective:

To study the impact of introducing a smartphone-based daily communication platform between GDM patients and their physicians, on patients compliance, glycemic control, satisfaction, and pregnancy outcome.

Methods:

This is s prospective, single-center, randomized controlled trial. Newly diagnosed GDM patients presenting to our multidisciplinary diabetes-in-pregnancy clinic were randomized to: (1) routine bi-weekly prenatal clinic care (control group) or (2) an additional daily detailed feedback on their compliance and glycemic control from the clinic team via an application installed on their smartphone (smartphone group). The primary outcome was patient compliance defined as the actual blood glucose measurements/instructed measurements X100. The secondary outcomes included diabetes-control parameters, pregnancy, and neonatal outcomes. The study was adequately powered to detect a 20% difference in patient compliance, based on a preliminary phase that demonstrated 70% baseline compliance to glucose measurements.

Results:

A total of 120 newly diagnosed GDM patients were randomized. The two groups did not differ in terms of age, parity, education, BMI, family history, maternal diseases, OGTT values, and HbA1C at randomization. The smartphone group demonstrated higher level of compliance (83.1% vs. 66.3%,$p<0.001$), lower mean blood glucose (104.7±9.1 mg/dl vs. 112.6 ± 8.6 mg/dl,$p<0.001$), lower rates of off-target measurements both fasting (7.6% vs. 14.3%, $p<0.001$) and post-prandial (4.7% vs. 8.3%,$p<0.001$), and a lower rate of pregnancies requiring insulin treatment (13.2% vs. 29.3%, $p=0.034$). The rates of macrosomia, neonatal-hypoglycemia, shoulder-dystocia and other delivery and neonatal complications did not differ between the groups. Patients in the smartphone group reported excellent satisfaction from the use of the application and from their overall prenatal care.

Conclusions:

Introduction of a smartphone-based daily feedback and communication platform between GDM patients and the multidisciplinary diabetes-in-pregnancy clinic team, improved patient compliance, glycemic control, and the rate of insulin treatment.

	Smart-phone group n=60	Control group n=60	*p*-value
Glycemic control			
Compliance (%)	82 ± 0.16	67 ± 0.27	**<0.001**
Mean blood glucose (mg/dl)	104.7±9.1	112.6 ± 8.6	**<0.001**
Off-target post prandial glucose measurements (%)	7.6 ± 0.8	14.3 ± 0.9	**<0.001**
Off target fasting glucose measurements (%)	4.7 ± 0.4	8.3 ± 0.5	**<0.001**
Patients requiring insulin treatment (%)	7 (13.2%)	17 (29.3%)	**0.034**
Pregnancy and delivery outcomes			
Gestational age at delivery (weeks)	38.11±1.76	38.45±1.45	0.292
Cesarean delivery (%)	9 (16.9)	17 (30.9)	0.116
Polyhydramnios (%)	0	4 (6.9%)	0.120
Neonatal outcome			
Birth weight (grams)	3074±550	3188.3±420	0.226
LGA (%)	6 (11.3)	6 (11.1%)	1.000
NICU admission (%)	4 (7.5%)	7 (13.2%)	0.526
Composite adverse neonatal outcome (%)	7 (13.2%)	11 (20.4%)	0.439

LGA – large for gestational age (birthweight > 90th percentile), NICU – neonatal intensive care unit. Values in bold are statistically significant

Oral 216

CARDIOVASCULAR-RELATED MORBIDITY AND MORTALITY IN WOMEN WITH A HISTORY OF PREGNANCY COMPLICATIONS: A SYSTEMATIC REVIEW

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Background:

Studies have found that women with a history of pregnancy complications are identified, at or shortly after delivery, with risk factors for cardiovascular (CVD) disease and that these effects may persist long-term. However, clinical guidelines recommend post-partum follow-up only in women with a history of preeclampsia or preterm birth.

Objective:

We therefore performed a systematic review of observational studies to examine the association between pregnancy complications and the risk of subsequent CVD.

Methods:

We systematically searched PubMed, MEDLINE (via Ovid), EMBASE (via Ovid), CINAHL, and the Cochrane Library for observational studies investigating the association between pregnancy complications, including hypertensive disorders in pregnancy, gestational diabetes, low birth weight, placental abruption, preterm birth, small-for-gestational-age at birth, stillbirth, and pregnancy loss, and subsequent CVD. Studies were grouped by pregnancy complication and design in order to facilitate between study comparisons. Quality assessment was performed in duplicate using the ROBINS-I tool.

Results:

Our literature search identified 13,969 publications, of which 84 were included in our review. The majority of included studies were cohort studies examining hypertensive disorders in pregnancy (n=46), preterm birth (n=15), and gestational diabetes (n=11). Follow-up ranged from 0 to 55 years, and the sample sizes varied from 250 to 2,000,000 women (Table). The overall evidence suggests that all pregnancy complications except pregnancy loss are associated with an increased risk of subsequent CVD in women (range: HR 1.1 to 14.5). The findings for pregnancy loss were heterogeneous across studies with a suggestion of no increased risk of CVD. The studies included in the review were found to be of varying quality largely due to insufficient adjustment for known confounders.

Conclusions:

Women with a history of the included pregnancy complications are at increased risk of subsequent CVD. The findings support the importance of continuous follow-up and risk-factor management in these women beyond the post-partum period.

Pregnancy Complication	Cohort				Case-Control			
	No. Studies	Sample Size (range)	Follow-up (range, years)	Effect Estimates (range)	No. Studies	Sample Size (range)	Follow-up (range, years)	Effect Estimates (range)
Hypertensive disorders in pregnancy	41	252 - 1,132,019	0 - 55	HR 1.0 – 14.5	5	217 - 690	0 – 43.5	OR 1.2 – 16.9
Gestational diabetes	9	917 - 1,515,387	2.2 – 11.5	HR 1.0 – 4.5	2	6,880 – 15,969	2.2 - 11.5	OR 1.5 – 2.8
Low birth weight	4	129,920 – 1,400,083	7.6 – 23.9	HR 0.9 – 1.9	1	690	3.2 - 320	OR 6.5
Placental abruption	7	3,977 - 2,117,797	7.6 – 21.8	HR 1.0 – 5.8	0	n/a	n/a	n/a
Pregnancy loss	6	11,518 – 1,031,279	0.2 – 16.8	HR 0.8 – 2.7	1	803	NR	OR 1.2
Preterm birth	13	14,062 – 902,008	0 – 50	HR 1.0 – 5.8	2	504 – 609	2 - 50	OR 1.1 – 2.1
Small-for-gestational-age	9	3,977 – 1,400,083	0.1 – 21.8	HR 0.9 – 3.5	0	n/a	n/a	n/a
Stillbirth	7	3,977 – 923,686	5.5 – 21.8	HR 1.0 – 2.7	0	n/a	n/a	n/a

Abbreviations: HR: hazard ratio; OR: odds ratio; n/a: not applicable; NR: not reported.

Oral 219

HUMAN MILK FATTY ACIDS: ASSOCIATIONS WITH MATERNAL CHARACTERISTICS AND INFANT BODY COMPOSITION

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Background:

Nutritional exposures during early infancy, such as human milk fatty acids (FA), may have long-lasting consequences for infant development.

Objective:

We aimed to identify maternal factors that influence human milk FA composition and examine the cross-sectional association of human milk FA with infant body composition.

Methods:

In a representative subset of 425 mother-infant dyads from the Canadian Healthy Infant Longitudinal Development (CHILD) study, we collected milk samples at 3-4 months postpartum and measured FA by high-resolution capillary gas-liquid chromatography. The relative levels (% total fatty acids) of specific FA and total saturated (SFA), monounsaturated (MUFA), n-3 and n-6 polyunsaturated FA (n-3 PUFA and n-6 PUFA) were analyzed as standard deviation scores (SDS). Various fixed and modifiable maternal factors were self-reported. Infant weight for length (WFL) SDS at 4 months was calculated according to the WHO reference.

Results:

Maternal pre-pregnancy BMI was correlated positively with SFA and negatively with MUFA, n-3 and n-6 PUFA (all p-values<0.05). Individual and total SFA, n-3 and n-6 PUFA were associated with ethnicity, lactation stage, study site, and fish oil supplement use. In addition the n-3 PUFAs, eicosapentaenoic and docosahexaenoic acid, were positively associated with maternal education. Age, parity and smoking were not associated with human milk FA. Among mothers who did not consume fish oil supplements during pregnancy, each SDS increase of arachidonic acid was associated with 0.15 SDS (95%CI (-0.28; -0.01)) lower infant WFL. This association was independent of maternal BMI, ethnicity, lactation stage and infant sex. Other FA measures, including the n-6/n-3 PUFA ratio, were not associated with WFL at 4 months.

Conclusions:

Human milk FA were associated with several fixed and modifiable maternal characteristics. Higher levels of arachidonic acid in human milk were associated with lower infant WFL. Further research is needed to determine the implications of these findings for infant health.

Oral 222

EFFECT OF CIGARETTE SMOKING ON INSULIN LIKE GROWTH FACTOR-1 LEVELS IN PREGNANT WOMAN

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Background:

Maternal smoking during pregnancy is associated with reduced birth weight. The mechanism by which this occurs is unclear. Insulin like growth factor-1 (IGF-1) is a major regulator fetal growth.

Objective:

To assess the effect of tobacco smoking on levels of IGF-1 in pregnant women.

Methods:

Levels of IGF-1 were measured during the second and third trimester of pregnancy in women who smoked and compared to levels in non-smoking pregnant women. Exclusion criteria included diabetes mellitus, preeclampsia, hypertension, any inflammatory condition and any renal, cardiovascular or liver disease. IGF-1 levels and cotinine levels were estimated using by quantitative sandwich enzyme linked immunoassay. Mann-Whitney test was used for continuous variables and the χ^2 or Fisher's exact test for dichotomous data. A $p < 0.05$ was statistically significant.

Results:

Data presented as median and interquartile range. In mothers who smoked, median cotinine levels were 123 ng/mL (55-264). There was no correlation between cotinine and IGF-1 levels.

Conclusions:

Lower IGF-1 may be involved in the reduced birthweight of infants whose mothers smoke.

Our study suggests that the lower IGF- 1 level in pregnant smokers is not mediated by cotinine.

	Smoker (n=115)	Non-smoker (n=109)	P-value
Maternal age (yrs)	27 (23-32)	30 (27-34)	.00
Body Mass Index	24 (20-27)	23 (21-26)	.52
Gestation (wks)	30 (26-33)	29 (25-32)	.11
Primigravida n (%)	26 (24)	37 (34)	.09
Caucasian n (%)	104 (90)	90 (83)	.10
IGF-1 (ng/ml)	167 (116-252)	207 (149-270)	.02

Oral 224

IMPACT OF PUBLICLY-FUNDED NON-INVASIVE PRENATAL TESTING ON THE UTILIZATION OF INVASIVE DIAGNOSTIC TESTING IN BRITISH COLUMBIA

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Background:

Non-invasive prenatal testing (NIPT) is a relatively new test for Down syndrome and other chromosomal abnormalities based on analysis of cell-free fetal DNA circulating in maternal blood. In British Columbia (BC), NIPT was first introduced as a privately-paid test in February 2013, and became provincially-funded for high-risk women in November 2015.

Objective:

The objective of this project was to evaluate the impact of introducing public funding for NIPT on utilization of invasive diagnostic testing including amniocentesis and chorionic villus sampling (CVS). The primary hypothesis was that the rate of invasive diagnostic testing would be significantly reduced after the introduction of publicly-funded NIPT.

Methods:

All known singleton and twin pregnancies in BC that met the eligibility criteria for publicly-funded NIPT due to having a positive prenatal genetic screening result between February 1, 2013 and April 30, 2016 were included. These pregnancies were identified by linking population-based administrative and clinical datasets from the BC Prenatal Genetic Screening Program. An interrupted time series analysis using log-binomial regression was performed to estimate the effect of implementing publicly-funded NIPT on the rate of amniocentesis and CVS, controlling for underlying time trends.

Results:

There were 4,837 pregnancies in BC with a positive prenatal genetic screening result between February 1, 2013 and April 30, 2016. 31.8% (1,283/4,038) and 11.6% (93/799) of these high-risk pregnancies had invasive diagnostic testing before and after the introduction of publicly-funded NIPT, respectively. Interrupted time series analysis estimated that the rate of invasive diagnostic testing decreased by 48% (95% CI: 33.4% to 80.7%) after the introduction of publicly-funded NIPT compared with the period when there was only self-pay NIPT.

Conclusions:

The introduction of publicly-funded NIPT in November 2015 significantly reduced the use of invasive diagnostic testing in BC. Our findings are important for informing future decisions on publicly-funded NIPT in BC and other provinces in Canada.

Oral 227

RISK OF ANOREXIA NERVOSA WITH OVERWEIGHT AND OBESITY SEVERITY: A POPULATION BASED COHORT STUDY IN SWEDEN

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Background:

Anorexia nervosa is most common among adolescent and young adults between 12 and 25 years of age and it has the highest mortality rate among all psychiatric disorders. The etiology of anorexia nervosa is poorly understood, while genetic factors play a major role, maternal and obstetric complications during pregnancy are possible environmental causes.

Objective:

We investigated the association between maternal overweight and obesity and risk of anorexia nervosa.

Methods:

A retrospective cohort study including all live singleton females born in Sweden from 1992 through 2002. Individuals with anorexia nervosa diagnosis were identified using the Swedish national inpatient, outpatient, or death registers. Diagnosis of anorexia nervosa in children was restricted to the period after the child's 10th birthday. Multivariable Cox proportional hazards regression was used to estimate adjusted hazard ratios (aHRs) and 95% confidence intervals (CIs) adjusting for, maternal age, country of origin, education level, cohabitation with partner, height, smoking, and year of delivery.

Results:

Among 486688 live singleton females, 85.3% had data on early pregnancy BMI. The overall incidence of anorexia nervosa in females aged 10 years to 21 years was 8.54 per 10,000 person-years. The rates and HRs of anorexia nervosa in offspring increased with increasing maternal age and education level in a dose-response pattern (p-value for trend <0.0001). The adjusted rates of anorexia nervosa decreased linearly by maternal BMI (p-value for trend <0.0001). Compared with offspring of normal weight mothers, rates of anorexia nervosa decreased by 26% (aHR 0.74, 95%CI 0.65-0.84) in overweight mothers and obesity grade I was associated with 39% (aHR 0.61, 95%CI 0.47-0.78) decreased rate.

Conclusions:

Overall, the rate of anorexia nervosa decreased with maternal overweight and obesity severity in a dose-response manner. Genetic and environmental factors such as socioeconomic and family level factors play an important role in development of anorexia nervosa in offspring.

Oral 228

THE OUTCOMES OF PRENATALLY DIAGNOSED HEMOGLOBIN BARTS DISEASE WITH OR WITHOUT INTRA-UTERINE TRANSFUSION IN ONTARIO, CANADA

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Background:

With the advances in fetal medicine and improved access to intrauterine transfusion (IUT), more patients diagnosed with homozygous α^0-thalassemia prenatally will survive this previously fatal condition.

Objective:

This study aims at evaluating the outcomes of affected pregnancies with or without IUT and the long-term outcomes of the survivors.

Methods:

We retrospectively collected data on genotype, intrauterine interventions and pregnancy outcomes in all cases of homozygous α^0-thalassemia in Ontario, Canada, from 1989 to 2014. Clinical data on postnatal development and neurocognitive profiles of all long-term survivors was also collected. This was compared with the longitudinal data of 24 patients with transfusion-dependent β-thalassemia (TDT-β).

Results:

99 affected pregnancies were identified. 74 (75%) of them resulted in miscarriage or chose termination of pregnancy. 12 couples (12%) decided to continue pregnancy without transfusion and none of the newborns survived the first week of life. 13 pregnancies that underwent IUT(s) all resulted in live birth. Four of them (31%) did not survive beyond two months of age. The nine survivors had earlier iron overload requiring iron chelation therapy in comparison to TDT-β patients but had comparable liver iron concentration with iron chelation therapy. Endocrinopathies were more frequent in these patients and they were shorter in stature. Neurocognitive outcome was not significantly affected in five patients who were assessed and none showed intellectual impairment. In three patients, MRI studies demonstrated brain changes in keeping with silent ischemic infarct.

Conclusions:

In patients with homozygous α^0-thalassemia, IUT is associated with improved survival. However, it does not change the burden of the disease where all survivors are transfusion dependent. While acceptable neurocognitive outcome can be expected, these patients have more clinical complications compared to their TDT-β counterparts. Outcomes of all aspects of homozygous α^0-thalassemia with or without IUT should be taken into consideration when counseling patients.

Oral 229

DEFENDING THE NEONATAL HEART: MISOPROSTOL PREVENTS BNIP3-INDUCED CARDIOMETABOLIC DYSFUNCTION DURING HYPOXIA

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Background:

Systemic hypoxia affects more than 60% of preterm infants and is associated with both impaired cardiac metabolism and the development of persistent pulmonary hypertension. While the mechanism for injury remains unclear, it appears that the genetically conserved, pro-death Bnip3 pathway may play a central role.

Objective:

We hypothesize that misoprostol, an FDA-approved prostaglandin receptor agonist, inhibits Bnip3 through PKA-induced phosphorylation, thereby protecting infants from hypoxia-induced cardiometabolic dysfunction.

Methods:

Both environmental hypoxia (10% oxygen) and misoprostol were applied to primary neonatal cardiomyocytes to assess their effects on cardiometabolic dysfunction. Mitochondrial membrane potential and superoxide production were measured via fluorescence microscopy (n>80 cells). Concurrently, a metabolic flux analyzer (Seahorse XF-24) was used to assess mitochondrial respiration, which was compared to control treatments (normoxia and/or drug vehicle) (n=5). The secondary outcome of this study used a human cell line (HCT-116) (n>45 cells) to focus on the underlying mechanism, assessed through fluorescent imaging with a plasmid-based PKA biosensor, as well as by expression of wild-type and non-phosphorylatable constructs of Bnip3.

Results:

In primary neonatal cardiomyocytes, hypoxia exposure reduced mitochondrial membrane potential ($p<0.01$), and drove mitochondrial superoxide production ($p<0.01$). However, both measures were completely attenuated with the application of misoprostol ($p<0.01$). Under the same conditions, hypoxia exposure significantly reduced basal and maximal mitochondrial respiration, which were rescued with misoprostol ($p<0.05$). In parallel overexpression studies, wild-type Bnip3 depolarized mitochondria by more than 50%, which was blocked with the application of misoprostol ($p<0.01$). However, when Bnip3 phosphorylation was inhibited with a neutral alanine mutation, misoprostol-induced cardiometabolic protection was lost ($p<0.01$). Finally, using a PKA-biosensor we showed that misoprostol triggers a 3-fold increase ($p<0.01$) in intracellular PKA activation.

Conclusions:

Taken together, our data demonstrates that misoprostol activates cAMP/PKA, causing the down-stream inhibition of Bnip3, which may serve to prevent hypoxia-induced cardiometabolic dysfunction in the neonatal heart.

Oral 232

FACTORS ASSOCIATED WITH BETWEEN-HOSPITAL DIFFERENCES IN UPTAKE OF THE MATERNAL NEWBORN DASHBOARD ACROSS ONTARIO

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Background:

We previously demonstrated with an aggregate Interrupted Time Series (ITS) analysis that the Ontario Maternal Newborn Dashboard (an audit and feedback intervention in 94 hospitals) was associated with improved performance on the majority of targeted indicators.

Objective:

This study aimed to account for between-hospital hospital variation by using a random effects ITS analysis and to examine potential effect modifiers measured at the hospital level.

Methods:

The manager/director representing each Ontario maternal-newborn hospital was invited to participate in a survey (88 individuals, 94 sites) assessing Dashboard attributes, clinical practice, and user needs. Fifty-four respondents consented and completed an online survey, representing 57 sites (response rate=64.7%). Six factors were assessed as potential Moderators, including participants' perceptions of: usefulness of the dashboard, available resources, and facilitators and barriers to use. Data on adherence to targeted indicators were obtained from BORN registry datasets, from November 2009-March 2015. Multivariable generalized linear mixed-effects regression analysis, accounting for clustering by hospital site, was used to model the effect of the intervention as both intercept and slope changes with effect moderation examined by including main and interaction effects with each candidate Moderator.

Results:

55 sites were included in analysis. The random effects analysis was consistent with the aggregate ITS analysis. Further, the reported presence of more barriers to clinical practice change was identified as a Moderator of the effect of the intervention, although not entirely as expected. More reported barriers attenuated the Dashboard's immediate positive impact on Group B-strep screening (OR=0.70 per additional barrier identified, 95% CI: 0.69 to 0.71), but was associated with a very slight and counterintuitive positive effect on the Dashboard's gradual impact (strengthening the slope change, OR=1.009, 95% CI: 1.008 to 1.010).

Conclusions:

Our analyses confirmed that there were significant improvements associated with the Dashboard, but found little evidence for effect modification based on the factors examined.

Oral 237

THE IMPACT OF MATERNAL MALNUTRITION ON GUT BARRIER DEFENCE. IMPLICATIONS FOR PREGNANCY HEALTH AND FETAL DEVELOPMENT?

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Background:

Small intestinal (SI) Paneth cells maintain gut mucosal integrity and interact with gut microbes and inflammatory molecules to influence host physiology. Little is known about the role of Paneth cells in intestinal homeostasis during pregnancy, including in response to maternal malnutrition. Further, it remains unclear how nutritional adversity impacts fetal gut development, specifically permeability and function of enteric glial cells (EGC), which are also critical to gut barrier homeostasis.

Objective:

We hypothesised that maternal malnutrition would alter maternal Paneth cell function and fetal gut development/function.

Methods:

Mice (n=7-8/gp) were fed a control diet during pregnancy (CON), undernourished by 30% of control intake from d5.5-18.5 of pregnancy (UN), *or* fed a 60% high fat diet from 8 weeks before, and during, pregnancy (HF). At d18.5 maternal and fetal SI integrity and Paneth cell function were assessed by immunohistochemistry and qPCR. mRNA expression of Paneth cell antimicrobial genes (*Lyz1*/*Lyz2*, *Pla2g2*, *Reg3g*, *Defa1*) were measured in maternal SI and tight junction (TJ) genes (*Cldns, ZO-1, Ocln*) and EGC markers (*Sox10, Plp1, S100b*) were measured in fetal gut. Groups were compared by 1-way ANOVA or Kruskal -Wallis; data presented are $p<0.05$ (Tukey's or Steel-Dwass *post hoc*).

Results:

Expression of *Reg3g* mRNA was lower in SI of UN and HF mothers vs. CON. *Lyz2* mRNA expression was lower in UN SI vs. CON and HF, and there was less low-intensity staining of immunoreactive-Lyz protein in HF SI vs. CON. Preliminary data showed fetal gut TJ *Cldn-3* mRNA was increased in HF fetuses vs. CON, associated with increased expression of the EGC marker *S100b*.

Conclusions:

Maternal malnutrition alters expression of key maternal SI antimicrobial genes, associated with altered fetal gut permeability and activation of EGCs. These findings may have implications for host-microbe interactions and immune activation in the gut, including long-term functional consequences for offspring gut function.

Oral 238

VALIDATION OF A PREFERENCE-BASED SCORING SYSTEM FOR HEALTH STATUS CLASSIFICATION SYSTEM-PRESCHOOLERS (HSCS-PS): A GENERIC HEALTH RELATED QUALITY OF LIFE MEASURE SUITABLE FOR CHILDREN OF PRETERM BIRTH

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Background:

Preference-based measures are considered powerful tools for assessing health related quality of life (HRQL) outcomes as well as for economic evaluations. To date, no preference-based measure exists in children<5 years of age. The Health Status Classification System-Preschoolers (HSCS-PS), a generic HRQL measure, developed by Dr. Saigal and colleagues, has the potential of being a preference-based measure because it was based on the Health Utilities Index (HUI).

Objective:

To validate a preference-based scoring system for the HSCS-PS.

Methods:

The HSCS-PS was mapped to the HUI resulting in the creation of the Health Utilities-Preschool (HuPS). Two scoring algorithms, HuPS2 and HuPS3, were generated corresponding to HUI2 and HUI3 respectively. A preliminary validation of HuPS was completed with children 2-6 years of age in the general population and 3 clinical groups (preterms, cancer, and neuromuscular disorders). Parent and clinicians completed the HuPS, HUI, and Pediatric Quality of Life Inventory (PedsQL) and a short clinical/demographic questionnaire. Construct validity was examined using "known groups" differences and through convergent validity. Reliability was assessed through inter-rater agreement using the intra-class correlation coefficient.

Results:

A total of 98 children participated (preterm=33). The preterm group had a significantly lower overall HRQL score than the general population for HuPS2 (difference of -0.13; p=0.02) and HuPS3 (-0.19; p=0.03). The mean HRQL scores for the preterm group were significantly greater than the neuromuscular group for HuPS2 (+0.16; p=0.004) and HuPS3(+0.26; p=0.002). The difference in HRQL was not significant between preterm and cancer groups (p=1.00). HuPS3 significantly (p<0.001) correlated with HUI3 (r^2=0.88) and PedsQL (r^2=0.83). HuPS2 significantly correlated (p<0.001) with HUI2 (r^2=0.91) and PedsQL (r^2=0.76). There was very good agreement between parents and clinicians for both HuPS2 (ICC=0.85) and HuPS3 (ICC=0.84).

Conclusions:

HuPS is a promising preference-based HRQL measure for preterms at pre-school age. Large sample size studies are required to further validate these observations.

Oral 239

IMPACT OF HIGH LEVELS OF CONTINUOUS POSITIVE AIRWAY PRESSURE ON CARDIAC OUTPUT IN PRE-TERM NEONATES: A PROSPECTIVE PHYSIOLOGICAL STUDY

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Background:

Many NICUs employ high (>8 cmH_2O) positive end-expiratory pressures (PEEP) on nasal continuous positive airway pressure (NCPAP) to prevent intubation and associated ventilator-induced lung injury, despite limited safety/efficacy data.

Objective:

This study sought to evaluate the physiological impact of high NCPAP PEEP.

Methods:

Fifteen preterm neonates at postmenstrual age ≥32 weeks (without congenital anomalies or acute intercurrent illness) on NCPAP PEEP of 5 cmH_2O were enrolled. PEEP was increased by 2 cmH_2O increments until 13 cmH_2O. At each increment, following 5 minutes washout, cardiac output (aortic velocity-time integral x heart rate) and cardiorespiratory parameters including blood pressure, heart rate, respiratory rate were measured over 10 minutes. Predefined cut-off values for changes in cardiorespiratory parameters were used as termination criteria. Data are presented as mean (SD), and were compared using one-way ANOVA.

Results:

The mean GA, age at study, and weight of subjects were 27.4 (2.6) weeks, 58.5 (35.5) days, and 2.3 (0.6) kg, respectively. Cardiac output (mL/kg/min) at PEEPs of 5, 7, 9, 11, and 13 cmH2O were not different at 295 (75), 290 (66), 281 (69), 286 (73), and 292 (58), respectively (P=0.986). Importantly there were also no differences in either aortic velocity-time integral or heart rate over these PEEP ranges. There were no significant differences in cardiorespiratory parameters; no subjects met cut-off criteria. Data collection was terminated in 2 subjects after PEEP 9 cmH2O due to lung over-distension subjectively noted on echocardiogram.

Conclusions:

High levels of NCPAP PEEP were well tolerated for short durations. Further physiological and clinical research is required on safety/efficacy in neonates with more severe lung disease, as well as its impact over longer durations.

Oral 243

ACTIVATION OF UTERINE NATURAL KILLER CELLS AND IMPAIRMENT OF SPIRAL ARTERY REMODELING IN EARLY-MID PREGNANCY AS A CONSEQUENCE OF MATERNAL OBESITY IN MICE

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Background:

Maternal obesity is associated with multiple adverse obstetric and perinatal outcomes. However, the mechanisms that link obesity to pregnancy complications remain unclear. Proper development of the placenta and establishment of utero-placental vasculature are essential for optimal fetal growth and survival. Uterine immune cells, particularly uterine natural killer cells (uNKs), play a fundamental role in promoting these events.

Objective:

Current study aims to develop a mouse model of obesity in pregnancy to examine the effects of obesity on uNK cell biology and placental development.

Methods:

6-week old female C57BL/6J mice were subjected to a high-fat diet (HFD; n=18) or a low-fat diet (LFD; n=18) for 13 weeks prior to/during pregnancy. Utero-placental tissues were collected at gestation day 10.5 (Gd10.5). Subpopulations of tissue-resident (tr) and conventional (c) uNK cells were quantified and characterized in their expression of the natural cytotoxicity receptor (NCR1) and CD69 activation marker. Arterial wall:lumen ratio calculations were performed for the assessment of placental vascular remodeling (n=9-11). Data were analyzed using unpaired Student's t-test.

Results:

A HFD resulted in the disruption of proportions of tr-uNKs and c-uNKs. Notably, within the tr-uNK population, we observed higher proportions of activated/mature cells as a result of HFD exposure. Moreover, arterial wall:lumen ratios in the HFD group was higher than those in LFD group, suggesting compromised spiral artery remodeling. The alterations in uNK biology most likely serve as a contributing factor towards the impairment of vascular remodeling in the placental beds of HFD-exposed mice observed in this study.

Conclusions:

Maternal exposure to a high-fat diet alters uNK cell proportions and state of activation in early pregnancy accompanied by changes in vascular remodeling. These cellular alterations suggest that maternal obesity may potentially lead to changes in the establishment of utero-placental blood flow. Further work is required to dissect the importance of these obesity-linked immunological changes in pregnancy.

Oral 249

COMPARISON OF THREE COOLING METHODS FOR NEONATAL THERAPEUTIC HYPOTHERMIA ON TRANSPORT: A SINGLE CENTER CANADIAN EXPERIENCE

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Background:

Therapeutic hypothermia (TH) is the standard of care for the term and near-term neonates with hypoxic-ischemic encephalopathy (HIE). The initiation and maintenance of TH within the target temperature for babies requiring transportation following birth outside tertiary care facilities remain a challenge.

Objective:

To report on our experience using three methods for TH on transport: passive cooling, cold gel packs, and use of a servo-controlled cooling device (TECOTHERM NEO).

Methods:

Between January 2013 and March 2015, neonates requiring TH were transported using passive cooling. In April 2015, active cooling using cold gel packs was introduced and in February 2017, a servo-controlled active cooling device was introduced. We compared the efficacy of reaching and maintaining the temperature within the target range between the three methods.

Results:

Eighty-five neonates with moderate to severe HIE were cooled on transport. The demographic variables are presented in table 1. All infants cooled using the servo-control device reached the target temperature compared to 67% and 81% in the passive and gel packs methods respectively (p = 0.02). The target temperature was achieved more quickly and maintained throughout transport as well as at the accepting site using the servo-control device. Additionally, the target temperature was achieved at least 112 minutes sooner with the servo-controlled method compared to the other two methods of cooling (table 2).

Conclusions:

Active cooling using a servo-controlled device is more effective in providing TH compared to the use of cold gel packs or passive cooling. Larger studies are required to assess the effect of improved temperature control during TH using a servo-controlled device for transport on preventing acute brain injury.

Table 1: demographic and illness severity

	Method of cooling on transport			
	Passive n = 42	**Gel packs** n = 27	**Servo-control** n = 16	**P value**
Gestational age, median (IQ)	40(38-41)	39(38-40)	38.5(37-40)	0.056
Birth weight , grams, mean (SD)	3424.1(706.3)	3294.6(377.9)	3153.9(627.4)	0.43
Male, n (%)	24(57%)	18(67%)	11(69%)	0.61
Apgar score at 10 minutes, median (IQ)	4(2.5-6)	6.5(4-8)	4.5(3-6.7)	0.029
Cord PH, mean (SD)	6.98(0.177)	7.01(0.167)	7.03(0.172)	0.59
Base Excess, mean (SD)	16.05(6.87)	13.6(7.98)	13.4(6.67)	0.31
Intubation, n (%)	30(71%)	10(37%)	8(50%)	0.007
Hypotension requiring intervention, n (%)	13(31%)	5(18.5%)	0 (0%)	0.03
Clinical seizures, n (%)	21(50%)	10(37%)	4(25%)	0.19

Table2: Cooling method and Therapeutic hypothermia efficiency

	Method of cooling on transport			P value
	Passive n = 42	**Gel packs** n = 27	**Servo-control** n = 16	
Reached target temperature, n (%)	28 (67%)	22 (81%)	16 (100%)	0.02
Time to target temperature from birth (minutes), mean (SD)	353.3 (199.1)	351.3 (175.5)	239.3 (106.9)	0.08
Maintained TH within the target, n (%)	12(29%)	9 (33%)	14 (88%)	<0.001
Temperature within the target at the tertiary center, n (%)	21 (50%)	16 (59%)	14 (89%)	0.03

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UMBILICAL CORD BLOOD LEVELS OF ANGIOGENIC AND GROWTH FACTORS AND RISK OF RETINOPATHY OF PREMATURITY IN PRETERM INFANTS.

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Background:

Retinopathy of Prematurity (ROP) is the pathological vascularization of developing retinal blood vessels in preterm neonates and is a leading cause of blindness globally. The pathogenesis of ROP is complex but angiogenic factors such as vascular endothelial growth factor (VEGF) and insulin like growth factors (IGF) are involved. Identifying early markers of ROP could lead to better care of at risk preterm infants.

Objective:

Our objective was to estimate umbilical cord blood levels of VEGF, IGF-1, IGFBP-3 and erythropoietin in preterm infants at risk of ROP.

Methods:

A prospective cohort observational study in neonates <1500 g and/ or <32 weeks gestation. Exclusion criteria included congenital and chromosomal anomalies. Umbilical venous cord blood samples were obtained within 30 minutes of birth. Levels of angiogenic and growth factors were measured by quantitative sandwich enzyme linked immunoassay. Mann-Whitney test was used for continuous variables and the χ^2 or Fisher's exact test for dichotomous data.

Results:

Demographic data demonstrated lower birth weight and gestation is associated with ROP ($p<0.001$). There was no significant difference between the ROP group and no ROP group in terms of Apgar score, cord pH, the infant's sex, mode of delivery, use of antenatal corticosteroids, preeclampsia in mothers, race, multiple births, and presence of chorioamnionitis. We found no significant differences between the ROP and no ROP group for erythropoietin, VEGF, and IGFBP-3 levels. The level of IGF-1 was 1.8 fold lower in infants that developed ROP ($p= 0.002$). Of the 26 infants who developed ROP, 17 had moderate (Stage ≤ 2) with IGF-1 levels 25 ng/ml, and 9 had severe ROP (>Stage 2) with IGF-1 14 ng/ml ($p =0.002$).

Conclusions:

Umbilical cord levels of IGF-1 were lower in infants who developed ROP. IGF-1 may serve as an early marker of ROP. Our results need validation in larger cohort.

Oral 251

AN INTEGRATIVE AND COLLABORATIVE APPROACH TO ASSOCIATING ADVERSE BIRTH OUTCOMES AND INDUSTRIAL AIR POLLUTION

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Background:

The relationship of many hazardous pollutants present in ambient air with adverse birth outcomes (ABO) is still unknown, particularly from those released by industry. The knowledge gap is even greater when considering the impact of mixtures of hazardous pollutants on pregnancy outcomes.

Objective:

We aimed to collaboratively overcome methodological limitations to identify potential hazardous mixtures of industrial air pollutants spatially related to the occurrence of ABO in Alberta.

Methods:

We applied integrative data analyses on large existing databases (2006-2012) from (i) the National Pollutant Release Inventory on chemicals released into air by industry; (ii) the Alberta Perinatal Health Program on births, known maternal risk factors for ABO, and the maternal postal code at birth; (iii) an area-level socioeconomic status index (SES). We developed a novel spatial data mining (DM) algorithm to identify significant spatial colocation rules of combinations of emitted chemicals and ABO (i.e., preterm birth [PTB], small for gestational age [SGA], and low birth weight at term [LBWT]). We used a Geographic Information System (GIS) to assign exposures to residences within 10 km of emission sites. We used epidemiological analysis to calculate the corresponding odds ratios of exposures to chemical mixtures and the occurrence of ABO, adjusted by maternal covariates and SES.

Results:

DM distinguished eleven rules combining three chemicals - gases, particulate matter and organics - as associated with ABO. GIS assigned exposure and epidemiological analysis identified seven rules with increased odds for induced PTB, SGA, and LBWT. One exclusively increased the odds for PTB (15%).

Conclusions:

The combined interdisciplinary use of data mining, GIS, and epidemiology strategies enabled us to identify the risks associated with mixtures of hazardous chemicals and ABO - findings that proved elusive when applying methodologies individually. These discoveries enhance our understanding of the role of chemical mixtures in ABO.

Oral 254

THE INCIDENCE OF ADVERSE NEONATAL OUTCOMES IN INDIGENOUS PREGNANCIES IN CANADA, THE UNITED STATES, AUSTRALIA AND NEW ZEALAND: A SYSTEMATIC REVIEW AND META-ANALYSIS

Marissa Anne Nahirney, University of Calgary; **Kaylee Ramage**, University of Calgary; **Cheryl Barnabe**, University of Calgary; **Amy Metcalfe**, University of Calgary

Background:

Indigenous populations in Canada, the United States, Australia, and New Zealand experience many health status inequities, of which adverse birth outcomes may reflect the greatest consequence to population health. Though these four countries share similar socio-political climates and colonial backgrounds, no stratified analysis by country has been conducted.

Objective:

We aimed to evaluate between-country differences in the incidence of high and low birthweight, large and small for gestational age, preterm birth, neonatal and perinatal mortality, and stillbirth among Indigenous infants.

Methods:

We conducted a systematic review and meta-analysis of peer-reviewed literature and a structured search of grey literature. We searched OVID Medline, EBSCO Embase, and CINAHL for peer-reviewed articles and governmental publications and non-governmental reports for grey literature published between 2009-2017. Articles with original data, reported sample sizes, and data on the Indigenous birth outcomes of interest in the four countries were included. We assessed study quality with the Newcastle-Ottawa scale. Meta-analyses for all studies, and sensitivity analyses of high-quality studies were conducted.

Results:

Of 2005 articles initially identified, 70 were included. Canada had the highest incidence of high birthweight (19.0%, 95% CI 13.0%-26.0%) and large for gestational age (19.0%, 95% CI 13.0%-22.0); whereas, Australia had the higher incidence of low birthweight (14.0%, 95% CI 12.0%-15.0%) and small for gestational age (16.0%, 95% CI 15.0%-17.0%) compared to the other countries. Australia and the US shared the highest proportion of pre-term births (13.0%, 95% CI 11.0%-14.0%/15.0%, respectively). All countries had similar proportions of perinatal mortality. Sensitivity analyses for high-quality studies demonstrated that the pooled proportions and the country-specific proportions did not differ significantly from the larger meta-analyses.

Conclusions:

Adverse neonatal outcomes persist for Indigenous infants and vary in severity between countries. Sharing of supportive health policies and research to resolve adverse neonatal outcomes between countries may be beneficial given their similar socio-political contexts.

Oral 255

EVIDENCE-BASED STRATEGIES FOR INCREASING ENGAGEMENT AND RECRUITMENT OF MALES IN MENTAL HEALTH RESEARCH – SYSTEMATIC LITERATURE REVIEW

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Background:

Males are less likely to seek help or engage in mental health research. Understanding barriers and facilitators for males participating in mental health studies is the critical link between developing strategies for recruiting males in mental health research.

Objective:

The aim of this study was to develop evidence-based strategies for improving recruitment of males in mental health research.

Methods:

A search of the literature was employed in two databases (Pubmed and CINAHL) with key words; male*, men, mental health/ mental illness/mental disorder, psycholog*, barriers, facilitators, recruiting, and research. One hundred and thirty-eight articles were generated. Of the 138, articles without evidence-based finding were excluded, yielding a final number of 56 articles

Results:

The four main strategies for recruitment that emerged from the literature. were: evolving masculinity ideology; overcoming self-stigma; strength-based approach; and careful use of language. Masculine ideology and stigma are reported as significant barriers to involvement in mental health research and interventions. Changing masculinity ideology and stigma requires significant time and collaboration with all members of society. A strength-based approach to masculinity ideology distinguishes healthy forms of masculinity from harmful ones in the moment. Working with healthy forms of masculinity and building upon the strengths of 'being a man' helps to restore a sense of pride. Strength-based approaches may resonate better with men than an emotion-based and symptom-reduction approach to mental health research and interventions. Strength-based discussions support the strengths associated with some aspects of traditional masculinity including the roles of partner, provider, and protector. Recruiting men for mental health research requires careful consideration of the use of language to describe experiences of mental health symptoms and interventions

Conclusions:

Increasing recruitment of males in mental health research requires normalizing mental health challenges in males, using language that is acceptable to men, and focusing on strength-based approaches to masculinity in recruitment scripts, studies, and interventions.

Oral 257

COST-EFFECTIVENESS OF PULSE OXIMETRY SCREENING FOR CRITICAL CONGENITAL HEART DEFECTS IN ONTARIO

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Background:

Critical congenital heart defects (CCHDs) are a leading cause of morbidity and mortality in newborns. Many jurisdictions in the USA and elsewhere have implemented routine pulse oximetry screening (POS) for CCHD, recently endorsed by Canadian Pediatric Society. Cost-effective analyses in USA and Europe support this approach, but the geographical setting of Ontario in relation to its vast yet sparsely populated regions presents unique challenges with regard to POS implementation.

Objective:

To estimate the cost-effectiveness of POS for CCHD in the context of its implementation in Ontario, Canada.

Methods:

A Markov model was constructed inputting values derived from an extensive literature review and relevant local databases. The base-case was a 24-hour clinically stable infant born in Ontario. The model employed the healthcare payer perspective and a lifetime horizon. A number of mutually exclusive health states representative of the natural course of CCHDs were created. The strategies compared were routine pulse oximetry screening versus no screening. Outcome measures, all discounted 1.5%, were quality-adjusted life months (QALMs), lifetime costs, and incremental cost-effectiveness ratios. An a priori threshold of CAD$4,166.67 per QALM (equivalent to CAD$50,000 per quality adjusted life year) was used. Probabilistic sensitivity analysis was conducted using multiple simulations of the model within expected range of variables included in the model.

Results:

The incremental cost of performing POS was estimated to be $27.27 per individual, with a gain of 0.02455 QALMs (Table 1). This yielded an incremental cost-effectiveness ratio [Δ Cost / Δ QALMs] of CAD$1,110.79, well below the pre-determined threshold for cost-effectiveness. A probabilistic sensitivity analysis estimated a 93% chance that routine implementation of POS would be cost-effective.

Conclusions:

Routine implementation of POS for CCHD is expected to be cost-effective with a high degree of certainty. Further validation of this model may be conducted following implementation to confirm these findings based on local population data.

Table 1: Cost and Adjusted Life Months with and without POS implementation

Strategy	Cost (CAD$)*	Quality-Adjusted Life Months*
Pulse Oximetry Screening	284,002.58	554.52592
No Pulse Oximetry Screening	283,975.31	554.50137
Incremental gains	27.27	0.02455

*Accounting for a "discounting rate" of 1.5%

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RISK OF PRETERM BIRTH IN A SINGLETON PREGNANCY FOLLOWING PRIOR PRETERM TWIN BIRTH: A COHORT STUDY

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Background:

A history of preterm birth (PTB) is a strong risk factor for PTB in future pregnancy. However, it remains unclear as whether prior PTB in twin pregnancy also increases the risk of PTB in a future singleton pregnancy.

Objective:

To determine the risk of singleton PTB following previous twin PTB and identify factors that are predictive of PTB in the subsequent singleton pregnancy.

Methods:

A retrospective study of all women with prior twin birth followed by singleton birth who gave birth between 2000-2016 at two tertiary medical centers in Toronto, Ontario. We compared risk of singleton PTB between women who experienced preterm vs. term birth in the index twin pregnancy. The analysis was further stratified by gestational age at birth, indication for PTB and chorionicity in the index twin pregnancy. Unadjusted odds ratios and confidence intervals were calculated for each of the objectives.

Results:

A total of 378 women met the study inclusion criteria, of whom 252 (66.7%) had PTB in the index twin pregnancy. The overall rate of PTB in the subsequent singleton pregnancy was 11.6% (44/378) and was significantly higher for women with prior twin PTB compared with women with prior term twin birth (17.5% vs. 6.3%, p= 0.003, OR 3.12, 95%-CI 1.42-6.85). The risk of PTB in the subsequent singleton pregnancy was related to the degree of prematurity in the index twin delivery. The association between previous twin PTB and subsequent singleton PTB was significant only for cases of prior spontaneous twin PTB (OR 3.27, 95%-CI 1.47-7.27) but not for cases of prior indicated twin PTB (OR 2.52, 95%-CI 0.86-7.38). Index twin delivery chorionicity was not a significant factor.

Conclusions:

History of preterm twin birth is associated with higher odds of subsequent preterm singleton birth, and the risk is related to the severity of prematurity in the index twin PTB.

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ROLES OF PROSTAGLANDIN E2 (PGE2) IN PREGNANCY – NEW PERSPECTIVES ON THE PRO-QUIESCENT ROLES OF THE DOWNSTREAM TARGET RGS2

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Background:

The prostaglandin pathway plays an important, but complex role in human labour. Targeting this pathway to treat preterm labour is not wholly effective or fully safe. Developing superior approaches requires further understanding of the mechanisms that govern myometrial function in labour. While PGE_2 is implicated as a pro-labour mediator, we have shown that it can also promote putatively pro-quiescent uterine functions. For example, PGE_2 upregulates *regulator of G-protein signalling 2* (RGS2), which selectively turns-off contractile signals. Additionally, RGS2 may play an anti-inflammatory role in myometrial smooth muscle. We hypothesize that via these mechanisms RGS2 can attenuate pro-labour signals in the uterus. RGS2 may then represent a novel means by which PGE_2 regulates uterine function in pregnancy.

Objective:

To investigate effects of PGE_2 on RGS2 expression and downstream functions in myometrial smooth muscle cells.

Methods:

Primary myometrial smooth muscle cells were isolated from myometrial biopsies from term non-labour C-section deliveries. Cultured cells were treated with PGE_2 and IL-1β to study effects on RGS2 expression. We then tested the effect of RGS2 on oxytocin-stimulated calcium flux (measure of contractility). Results were analyzed using a one-way ANOVA (Bonferroni *post-hoc*).

Results:

In myometrial cells PGE_2 treatment increased RGS2 expression ($n=7$, $p<0.05$). By contrast, pre-treating cells with an inflammatory stimulus (IL-1β) prevented the PGE_2-induced increase in RGS2. In cells highly expressing RGS2, oxytocin-induced calcium responses were significantly attenuated ($p<0.05$). Using siRNA knockdown of RGS2 and adenoviral overexpression, this functional response was demonstrated to be directly caused by RGS2. Additionally, when elevated RGS2 expression was established, there was a reduced inflammatory response to IL-1β, demonstrating a potential anti-inflammatory role for RGS2.

Conclusions:

PGE_2 may promote uterine quiescence, by upregulating the contraction-protective and anti-inflammatory RGS2. As RGS2 may be differentially regulated with labour, identification of factors that contribute to these changes may provide better insight into the mechanisms of term/preterm labour.

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UTERINE NATURAL KILLER CELLS PREVENT FETAL GROWTH RESTRICTION FOLLOWING MATERNAL POLYINOSINIC-POLYCYTIDYLIC ACID EXPOSURE

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Background:

Fetal growth restriction (FGR) affects 8% of pregnancies, causing severe perinatal morbidity. Excessive maternal inflammation is associated with FGR. Our lab is interested in how uterine Natural Killer (NK) cells, the most prevalent immune cells in the uterus during early pregnancy, respond to inflammation and contribute to FGR. We hypothesize that inflammation will disrupt normal functioning of uterine NK cells, leading to FGR.

Objective:

To determine the effect of maternal inflammation on uterine NK cell function and fetal growth.

Methods:

Maternal inflammation was induced by injection of polyinosinic-polycytidylic acid (polyI:C, 10mg/kg) on gestational day (GD) 8.5. To deplete NK cells, rats were injected with asialo GM1 antibodies on GD4.5. Changes in cytokines were assessed by qRT-PCR, and placental morphology analyzed by immunohistochemistry. Fetal growth was assessed by measuring fetal weight and crown-rump length. Statistical significance was determined using Student's *t*-test and ANOVA ($p<0.05$).

Results:

Compared to saline-injected dams, polyI:C decreased fetal weight, fetal crown-rump length, and placental weight by 15%, 4%, and 12%, respectively, on GD13.5 ($n\geq6$ dams, $p<0.05$). On GD18.5, polyI:C decreased fetal brain weight, fetal liver weight, fetal weight, and fetal crown-rump length by 9%, 10%, 9%, and 2%, respectively ($n\geq4$ fetuses, $p<0.05$). Decreased fetal weight correlated with increased production of inflammatory markers: interferon-gamma (3-fold), tumor necrosis factor-alpha (5-fold), interleukin-6 (10-fold), and perforin (4-fold) six hours following polyI:C injection compared to saline ($n\geq6$, $p<0.05$). At GD13.5, increased junctional zone depth (26%) and decreased labyrinth zone depth (24%) were observed following polyI:C ($p<0.05$). Immunodepletion of NK cells prior to polyI:C caused a 40% decrease in fetal weight compared to controls on GD13.5 ($n\geq4$ dams, $p<0.05$).

Conclusions:

Administration of polyI:C to pregnant rats resulted in FGR that was exacerbated in dams lacking NK cells, suggesting uterine NK cells have a protective role on fetal development following maternal inflammation.

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DEVELOPMENT AND VALIDATION OF A SCREENING TOOL TO IDENTIFY NEWBORN INFANTS AT HIGH RISK FOR LOW VITAMIN D STATUS

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Background:

Many infants in Canada are born with low vitamin D stores, putting them at risk of developing complications such as rickets, if untreated. Newborns are not routinely screened for vitamin D status. Identifying those at high risk is vital to providing targeted education to parents regarding supplementation for infants.

Objective:

The objective was to develop and validate a screening survey tool to identify newborns at high risk for low vitamin D status (25-hydroxyvitamin D (25(OH)D) <50 nmol/L).

Methods:

Healthy mother-infant pairs (n=697) were recruited at the Lakeshore General Hospital, Montreal, from March 2016 to October 2017. Parental demographic and lifestyle factors were surveyed. Newborn blood samples, collected <36 h after birth, were tested for serum 25(OH)D (Liaison, Diasorin Inc.). Content validity was based on 14 known risk factors. Logistic regression models were used to identify key variables associated with risk of low stores. Receiver operator curves (ROC) were used to demonstrate sensitivity and specificity of the screening tool against known vitamin D status.

Results:

Descriptive characteristics of mothers and infants are shown in Table 1. Five out of the 14 existing risk factors assessed were most predictive of neonatal low vitamin D status (P<0.05; Table 2). Regression coefficients for each risk factor were transformed into integer scores. The average of the totaled scores was taken as the cut-off score for infants at high risk. The screening tool had a sensitivity of 72.0% and specificity of 54.1%. Area under the ROC was 0.69 (95% CI 0.6474, 0.7283; P<0.0001).

Conclusions:

The screening survey tool successfully identified infants at high risk for low vitamin D status, however sensitivity and specificity are limited at this preliminary phase of the project. Current data reflect 17 months of a 3-year collection period. Collecting 3 full years of data is likely to improve the screening tool.

Table 1 – Characteristics of mothers and infants (n=697)

Parameter	Mean ± SD or n (%)
Mothers	
Age at delivery (y)	32.1 ± 5.4
Skin color, White*	428 (61%)
Maternal education, ≥ University	585 (84%)
Family income, > $70,000	369 (53%)
Not disclosed	126 (18%)
Pre-pregnancy BMI (kg/m^2)	24.9 ± 5.0
< 18.5	24 (3%)
18.5-24.9	399 (57%)
25-29.9	174 (25%)
≥ 30.0	100 (14%)
Season of delivery	
Summer	205 (29%)
Spring	157 (23%)
Fall	139 (20%)
Winter	196 (28%)
Infants	
Gestational age (wk)	39.6 ± 1.1
Male	356 (51%)
Birth weight-for-age Z-score†	0.2 ± 0.8
Birth length-for-age Z-score†	1.0 ± 1.2
Birth head circumference-for-age Z-score†	0.3 ± 1.3
Apgar score	
1 min	8.7 ± 1.2
5 min	9.4 ± 0.7
Serum 25(OH)D nmol/L	43.3 ± 20.6
< 50 nmol/L	464 (67%)

*Self-reported ethnicity, classified as white vs. non-white
†Using WHO Growth Standards

Table 2 – Significant risk factors* for low neonatal vitamin D status

Risk factor	As presented in the questionnaire	Regression coefficient	P-value	Score assigned†
Prenatal supplements	Did you take a multivitamin during your pregnancy?	0.8054	0.0388	5
Maternal skin color	How would you describe your skin color? (White vs. non-white)	0.9362	<0.0001	6
Season of delivery	In which season is the mother delivering? Summer (June 22 – Sep 21) Fall (Sep 22 – Dec 21) Winter (Dec 22 – Mar 20) Spring (Mar 21 – Jun 21)	0.1848	0.0201	1
Sun exposure during 3rd trimester	During the third trimester‡, how many minutes per day were you exposed to direct sunlight? (<30 min vs. ≥30min)	0.505	0.0096	3
Travel during 3rd trimester	During the third trimester, did you travel south to a sunny and warm climate?	1.3859	0.0031	9

*Other risk factors were considered but were not significant: vitamin intake before pregnancy, paternal skin color, maternal and paternal education, household income, smoke and second-hand smoke exposure during pregnancy, previous vitamin D recommendations from a health professional, pre-pregnancy BMI.
†Regression coefficient multiplied by a factor of 6.5 and rounded to nearest integer
‡If the third trimester fell within the months of April through October

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EFFECTS OF STEM CELLS ON INTESTINAL EPITHELIAL CELLS

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Background:

Necrotizing enterocolitis (NEC) is associated with intestinal epithelial injury. It has been shown that stem cells derived from amniotic fluid (AFS cells) and from bone marrow (MSCs), rescued mucosal injury associated with experimental NEC. However, the mechanism of action is not well understood.

Objective:

We aim to investigate whether AFS cells and MSCs have different effects on intestinal epithelial cells.

Methods:

AFS cells from amniotic fluid and MSCs from bone marrow were isolated and grown in cultures. The supernatant from cell cultures was collected to perform proteomic analysis. To validate the proteomic analysis, we co-cultured the intestinal epithelial IEC-18 cells with AFS cells or MSCs using Transwell system. Cell growth and wound healing of IEC-18 were measured. Data is compared using one-way ANOVA.

Results:

Proteomic analysis showed that there was a distinct difference in gene ontology biological process between AFS cells and MSCs. Supernatant from AFS cells had more proteins involved in cellular, developmental and metabolic processes compared to MSCs. Conversely, proteins released from MSCs were more involved in immune system process. Interestingly, molecular functional analysis in developmental process indicated that AFS cells proteins were involved in regulating cell growth or skin/epidermal development. *In vitro* studies confirmed that cell growth ($p< 0.05$) and wound healing ($p< 0.01$) of IEC-18 was promoted by AFS cells, but not by MSCs.

Conclusions:

There was a distinct protein expression profile characterizing AFS cells and MSCs. AFS cells were involved in cell growth as demonstrated by *in vitro* studies. MSCs were involved in immune response process. These findings suggest that AFS cells and MSCs have different roles that should be considered when planning stem cell therapy.

Oral 296

MATERNAL OBESITY ALTERS UTERINE NATURAL KILLER (UNK) ACTIVITY THROUGH A FUNCTIONAL KIR2DL1/S1 IMBALANCE

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Background:

Obese women have 3 times greater risk for pregnancy-related complications; however, the mechanisms underlying this association are unclear. uNK play a crucial role in placental development by regulating uterine angiogenesis, artery remodeling and maintaining maternal tolerance towards the fetus.

Objective:

We hypothesize that maternal obesity could alter uNK cell biology thereby contributing to pregnancy disorders.

Methods:

To test this hypothesis, uNK were isolated from uterine tissues (elective pregnancy terminations 7-12 weeks) of lean (BMI 20-24.9 kg/m^2; n= 104) or obese (BMI ³30 kg/m^2; n= 80) women. uNK activating (NKp30, NKp44, NKp46, NKG2D, KIR2DS1) and inhibitory (NKG2A, KIR2DL1, KIR2DL4, LILRB1) receptor expression levels and the ability of uNK to secrete crucial angiogenic and tissue remodeling cytokines important in pregnancy were measured using flow cytometric and multiplex-ELISA strategies. The ability of uNK to respond to HLA-C2 (cognate KIR2DL1/S1 ligand) was also examined using ectopically expressing K562 cells. Differences in continuous variables between BMI groups were analyzed for statistical significance by non-parametric two-tailed Mann-Whitney U-test.

Results:

uNK activity (i.e. CD107a mobilization) was shown to be greater in uNK from obese women. Altered activity in obese uNK was accompanied by altered production of the angiokines PlGF and VEGF, with amounts of PlGF showing increased and VEGF showing decreased secretion. Flow cytometry revealed a distinct natural killer receptor composition in uNK from obese women, with higher expression of KIR and lower expression of NKp46 and NKG2A. Detailed examination identified an imbalance in the expression of KIR2DL1 and KIR2DS1 receptors, with increased expression of activating KIR2DS1 and reduced proportion of inhibitory KIR2DL1 in uNK from obese women. Notably, this imbalance associated with enhanced HLA-C2-induced activity and altered kinetics of TNFα production following KIR2DL1/S1 activation.

Conclusions:

Our findings provide insight into how maternal obesity shapes uNK function in early pregnancy through alterations in uNK receptor expression.

Experiment	Lean uNK	Obese uNK	*P* value
Basal uNK activity (% of CD107a; 4 hours)	2.6% ± 0.6	5.4% ± 1.0	0.008
PMA-stimulated uNK (% of CD107a; 4 hours)	5.9% ± 0.9	11.8% ± 1.8	0.003
uNK pg/ml VEGF secretion (V-Plex ELISA)	18.4 ± 10.0	6.9 ± 4.0	0.004
uNK pg/ml PlGF secretion (V-Plex ELISA)	0.3 ± 0.2	1.01 ± 0.3	0.01
NKG2A MFI (AU)	2051 ± 123.6	1349 ± 283.8	0.02
NKp46 MFI (AU)	2567 ± 250.6	1529 ± 284.4	0.007
% of uNK KIR^+	35.6% ± 2.7	46.0% ± 3.6	0.03
% of uNK $KIR2DL1^+$	34.5% ± 5.6	23.8% ± 4.1	0.04
% of uNK $KIR2DS1^+$ MFI (AU)	4105 ± 751.2	9339 ± 2249	0.02
K562 target cell activation (% of uNK $CD107a^+$; 4 hours)	0.44% ± 0.2	0.45% ± 0.1	n.s.
K562-HLA-C2 activation (% of uNK $CD107a^+$; 4 hours)	0.3% ± 0.2	4.2% ± 2.0	<0.05
Secretion of TNFα upon KIR2DL1/S1 crosslinking *vs* IgG (pg/ml) (V-Plex ELISA)	74.83 ± 30.8 *vs* 114.9 ± 34.8	69.05 ± 38.7 *vs* 58.4 ± 35.1	0.003

MFI: Median fluorescence intensity
AU: Arbitrary units
n.s.: non significant

Oral 307

INTRAUTERINE GROWTH RESTRICTION AND ANTENATAL CORTICOSTEROIDS: WHAT ARE THE EFFECTS ON CHILDHOOD GROWTH TRAJECTORIES?

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Background:

Intrauterine growth restricted (IGUR) fetuses exposed to antenatal corticosteroids (ACS) may have reduced growth during childhood.

Objective:

We aim to compare childhood growth trajectories in IUGR and normally grown fetuses exposed to single versus multiple ACS courses from the Multiple Courses of Antenatal Corticosteroids for Preterm Birth Study (MACS). We hypothesize that growth is reduced in IUGR exposed children, and that their growth velocity is decreased if exposed to multiple ACS courses.

Methods:

This is a retrospective cohort study of the MACS trial, which tested single versus multiple ACS courses. IUGR was defined as estimated fetal weight below the 10^{th} percentile on pre-randomization ultrasound. We compared weight, height, and body mass index (BMI) at 2 years and 5 years for IUGR fetuses compared with normal sized fetuses, examining the effect of multiple ACS courses, and for interaction with preterm delivery using multivariable linear regression. To assess growth trajectories, we fit generalized linear mixture models to account for repeated measures over time, and for multiple gestations.

Results:

Of the 1728 children followed up at 5 years, data were available for 1607 (93%) at age 2, and 1595 (92%) at age 5. IUGR prevalence was 18.3%. IUGR was associated with lower weight at age 5 (mean difference = -0.53kg [95% confidence interval: -0.96,-0.10]; p=0.016) and shorter stature (-0.74cm [-1.48,-0.01]; p=0.046). Multiple ACS courses were not associated with reduced growth, and we found no interaction with IUGR. Mixture models did not demonstrate time-varying IUGR effect modification on weight or height growth velocities. BMI growth velocity decelerated more in IUGR affected children between age 2 and 5 years.

Conclusions:

There is no effect of multiple ACS courses on childhood growth, regardless of IUGR exposure. IUGR is associated with lower weight and height in childhood after controlling for preterm birth, however the evidence for time-varying IUGR effects is inconsistent.

Oral 308

PLACENTAL GROWTH FACTOR FOR PREDICTING ADVERSE OUTCOMES RESULTING FROM HYPERTENSIVE DISORDERS OF PREGNANCIES: A SYSTEMATIC REVIEW

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Background:

Hypertensive disorders of pregnancy (HDPs), including pre-eclampsia, complicate about 10% of pregnancies and are a major cause of maternal and perinatal morbidity and mortality. Studies have suggested that placental growth factor (PlGF), might be useful in the prediction of both pre-eclampsia and its prognosis. It is important to summarise findings from these studies if PlGF is to be useful in clinical practice for directing the care of women with pre-eclampsia.

Objective:

To systematically review findings from studies reporting the use of PlGF, either independently or combined with other variables, as a prognostic test for women with suspected or confirmed pre-eclampsia, so as to direct potential use.

Methods:

Electronic searches were conducted in core databases e.g. MEDLINE (Ovid) using key words and subject headings, from inception until January 2017 to identify relevant articles. Quality of included studies was using the Quality in Prognostic Studies (QUIPS) checklist and relevant study information and predictive performance measures were extracted for each study.

Results:

Seventeen out of the 220 studies identified were included in the review. Nine studies (52.9%) recruited only women at preterm (<37 weeks gestation). Placental growth factor (alone or combined with soluble fms-like tyrosine kinase-1sFlt-1) showed moderate to high evidence (likelihood ratios of ≥5 or ≤0.2, or area under the receiver operating characteristic curves ≥0.70) for identifying women at highest risk of preterm delivery or adverse neonatal outcomes (10/12) studies, but showed no clinically useful performance for the prediction of adverse maternal outcomes alone.

Conclusions:

Placental growth factor may aid in identifying those women at the highest risk of iatrogenic delivery so that the clinicians can be prepared to manage them effectively and prevent complications. Future studies should determine an optimum threshold for the marker to guide delivery

Oral 311

NORMATIVE DATA FOR LEAN MASS IN HEALTHY TERM INFANTS FROM 1 MONTH TO 3 YEARS OF AGE

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Background:

Dual-energy X-ray absorptiometry (DXA) use for assessment of developmental programming of body composition during early childhood is of increasing importance. However, studies on longitudinal measures of body composition from the neonatal period to childhood are scarce.

Objective:

Therefore, this study aimed to assess lean mass (LM) of healthy infants from ≤ 1 mo until 3 y of age.

Methods:

Healthy term-born infants of appropriate-weight-for-gestational-age from a published trial were studied (NCT00381914). Infants (35 boys; 35 girls) with 25-hydroxyvitamin D [25(OH)D] values of ≥ 50 nmol/L at ≤ 1 mo were measured at baseline, 3, 6, 9, 12 and 3 y of age using standardized anthropometry. Plasma 25(OH)D concentration was measured using liquid chromatography tandem mass spectrometry. LM was measured using DXA (APEX version 13.2.3, Hologic 4500A) in infant whole-body mode until 12 mo, and whole body with paediatric software at 3 y. Data was analysed (SAS 9.4) using mixed model ANOVA; mean ± SD, $p<0.05$.

Results:

Infants were predominantly breastfed (98% ≥ 3 mo) and of healthy body weights and lengths over the study (Table 2). All maintained 25(OH)D concentrations > 50 nmol/L during infancy (≤ 1 to 12 mo), however 6.5% had 25(OH)D < 50 nmol/L at 3 y. There was steady LM accretion of 327.4±12.5 g/mo representing 95% increment in infancy. LM accretion from 12 mo to 3 y was 98.1±10.6 g/mo representing a 53% increment (Table 2). Overall, boys had more LM compared to girls (6166.1±2176.3 g vs 5595.2±2073.8 g; $p=0.018$). Percent LM showed an undulating pattern across infancy and into childhood (Table 2).

Conclusions:

This data, based on a healthy sample of infants, characterises LM accretion during the critical first few years of life and will aid in the interpretation of body composition by clinicians and public health researchers.

Table 1: Characteristics of participants at baseline (n = 70)

Variables	Mean (± SD) or n (%)
Infants	
Age, d	34.6 ± 5.8
Parity (% first born)	25 (35.7)
Sex (male)	35 (50)
Birth weight, g	3539.7 ± 495.9
Birth Weight-for-Age Z score¶	0.47 ± 0.97
Season of birth	
Summer and Spring	41 (58.6)
Fall and Winter	29 (41.4)
Plasma 25(OH)D_3 (nmol/L)	88.2 ± 21.3
Maternal	
Mother's age at delivery (y)	32.9 ± 3.7
Mother's ethnicity* (white)	62 (88.6)
Household income (> CA $75,000 /annum)	44 (63.8)

*Self-reported ethnicity. ¶ Z-score according to WHO growth standards

Table 2: Mean SD (n) for growth and lean mass of term infants from ≤1 mo to 3y of age.

Variable	≤ 1 mo (26 – 52 d)	3 mo (89 – 107 d)	6 mo (164 – 200 d)	9 mo (270 – 312 d)	12 mo (356 – 381 d)	3y (1074 – 1311 d)
Weight, g						
Total	4635.8 ± 733.9^a (70)	6180.6 ± 744.6^b (62)	7689.9 ± 890.8^c (58)	8842.1 ± 1047.9^d (55)	9713.1 ± 1212.5^e (52)	14829.5 ± 1614.2^f (46)
Girls	4379.5 ± 513.0^a (35)	5935.4 ± 553.5^b (35)	7392.0 ± 622.9^c (35)	8532.3 ± 785.5^d	9350.5 ± 970.1^e (35)	14901.9 ± 1419.3^f (23)
Boys	4892.2 ± 833.4^a (35)	6442.1 ± 837.6^b (30)	8031.9 ± 1031.8^c (27)	9163.3 ± 1195.5^d (27)	10075.7 ± 1335.9^e (26)	14757.1 ± 1817.8^f (23)
Length/ Height§, cm						
Total	54.9 ± 2.5^a (70)	61.1 ± 2.1^b (62)	66.8 ± 2.4^c (58)	71.3 ± 2.5^d (55)	75.5 ± 2.8^e (52)	95.9 ± 3.8^f (46)
Girls	54.0 ± 2.0^a (35)	60.6 ± 1.7^b (32)	66.2 ± 2.2^c (31)	70.9 ± 2.1^d (28)	75.0 ± 2.3^e (26)	95.9 ± 3.9^f (23)
Boys	55.8 ± 2.7^a (35)	61.7 ± 2.9^b (30)	67.4 ± 2.6^c (27)	71.8 ± 2.8^d (27)	75.9 ± 3.2^e (26)	95.8 ± 4.3^f (23)
Weight-for-Age Z score¶						
Total	0.18 ± 0.97 (70)	-0.04 ± 0.92 (62)	0.03 ± 0.96 (58)	0.20 ± 1.00 (55)	0.31 ± 1.04 (52)	0.29 ± 0.82 (46)
Girls	0.09 ± 0.89 (35)	-0.02 ± 0.74 (32)	0.04 ± 0.71 (31)	0.22 ± 0.76 (28)	0.30 ± 0.83 (26)	0.44 ± 0.58 (23)
Boys	0.27 ± 1.05 (35)	-0.06 ± 1.08 (30)	0.01 ± 1.20 (27)	0.17 ± 1.21 (27)	0.33 ± 1.23 (26)	0.13 ± 1.00 (23)
Length-for-Age /Height§ – for-Age Z score¶						
Total	0.10 ± 1.11 (70)	0.13 ± 0.93 (62)	0.01 ± 1.10 (58)	0.07 ± 1.08 (55)	0.23 ± 1.13 (52)	-0.04 ± 0.95 (46)
Girls	-0.01 ± 0.99 (35)	0.26 ± 0.78 (32)	0.17 ± 0.97 (31)	0.25 ± 0.86 (28)	0.39 ± 0.85 (26)	0.07 ± 0.72 (23)
Boys	0.20 ± 1.22 (35)	-0.01 ± 1.06 (30)	-0.16 ± 1.23 (27)	-0.12 ± 1.27 (27)	0.07 ± 1.34 (26)	-0.15 ± 1.14 (23)
Lean mass, g						
Total	3763.9 ± 459.5^a (70)	4479.2 ± 640.4^b (60)	5424.7 ± 826.6^c (52)	6399.3 ± 949.0^d (47)	7346.9 ± 1169.1^e (43)	9748.6 ± 1283.1^f (43)
Girls	3571.8 ± 332.9^a (35)	4224.0 ± 495.8^b (31)	5188.3 ± 768.8^c (27)	6121.3 ± 953.6^d (25)	6817.4 ± 1016.1$^{e\#}$ (20)	9536.4 ± 1220.1^f (22)
Boys	3956.0 ± 491.6^a (35)	4752.0 ± 672.1^b (29)	5680.0 ± 825.6^c (25)	6715.3 ± 858.4^d (22)	7807.4 ± 1114.0$^{e\#}$ (23)	9971.4 ± 1338.9^f (21)
Lean mass percent (%)						
Total	77.0 ± 5.9^a (70)	69.6 ± 6.8^b (60)	68.6 ± 9.1^a (52)	71.5 ± 9.5^a (47)	74.7 ± 7.8^a (43)	65.7 ± 4.4^{a,d,e} (43)
Girls	77.0 ± 5.9^a (35)	67.9 ± 6.5^b (31)	67.8 ± 8.0^c (27)	70.9 ± 10.5 (25)	72.3 ± 8.6 (20)	63.9 ± 3.7 (22)
Boys	77.0 ± 5.9 (35)	71.4 ± 6.8 (29)	69.6 ± 10.2^c (25)	72.1 ± 8.5^e (22)	76.8 ± 6.5^e (23)	28.3 ± 4.4 (21)

Means with different superscript letters indicate statistically significant differences between time points while variables with superscript # indicate where there are statistically significant differences between genders. ($P < 0.05$, post-Tukey adjustment). § Children's heights were measured at 3 y. ¶ Z-scores according to WHO growth standards.

Oral 312

FETAL MYELOMENINGOCELE REPAIR IN CANADA

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Background:

Fetal surgery for myelomeningocele (fMMC) halves the incidence of both hind-brain herniation and the need for ventriculo-peritoneal shunting for ventriculomegaly and improves motor outcomes in children when compared to those undergoing postnatal surgery.

Objective:

Our aim was to assess the need for a fetal therapy program for fMMC repair in Canada.

Methods:

We reviewed all cases of fMMC that were referred to Mount Sinai Hospital from 2008-2017 and assessed their potential eligibility for fetal surgery using the inclusion and exclusion criteria used in the MOMS Trial (NEJM 2011).

Results:

We identified 130 cases of fMMC. Mean maternal age at referral was 32±6 years and body mass index (BMI) was 25±6 kg/m^2. Gestational age at diagnosis was 21.5±5.1 weeks Fifty-two cases (40%) were ineligible for in-utero repair. Reasons for exclusion were maternal age <18 years (n=2), BMI ≥35 kg/m^2 (n=9), associated fetal anomalies (n=24), uterine anomalies (n=2), diagnosis after 26 wks (n=7), previous history of preterm delivery (n=4), absence of hind-brain herniation (n=16) or multifetal pregnancies (n=12). Six fetuses (4.6%) had chromosomal anomalies, all of which had other anomalies. Twenty-four patients had a combination of maternal and fetal contra-indications. Of the remaining 78 eligible patients, 42 (54%) terminated their pregnancy, leaving only 36 of 130 (28%) as potential candidates for fMMC repair. Five of 24 (20%) patients referred since publication of the MOMS trial have undergone fMMC repair, 3 of which were done in Toronto

Conclusions:

Twenty-eight percent of fetuses with MMC are potential candidates for prenatal repair and 20% of these actually underwent surgical intervention. With an estimated number of 150 cases of spina bifida/year in Canada, this would mean 42 potential surgical candidates, of whom, at least 8 would undergo fMMC repair. These numbers support the need for a national fMMC repair program in Canada.

Oral 315

THE IMPACT OF FUNDED NIPT ON THE UTILIZATION OF PRENATAL SCREENING AND DIAGNOSTIC TESTING IN ONTARIO

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Background:

Prenatal screening for Down syndrome (DS) is routinely offered to all pregnant women in Ontario. Several different multiple marker prenatal screening options (MMS) are available. Non-invasive prenatal testing (NIPT) became available in Ontario in late 2012 on a private-pay basis. In early 2014, the Ontario Ministry of Health and Long Term Care (MOHLTC) began funding NIPT for women who met certain eligibility criteria.

Objective:

To assess the impact of publicly funded NIPT on the utilization of MMS, NIPT and prenatal diagnostic testing (PND).

Methods:

A retrospective cohort study based on pregnancy, labour, birth, and early newborn care data collected by the Better Outcomes Registry & Network (BORN) was performed. We used uptake rate to describe the utilization of MMS, NIPT and PND. Expected date of delivery (EDD) was used to describe date ranges. Descriptive statistics were generated to describe the characteristics of the study population, the utilization of MMS, NIPT, and PND.

Results:

The study included 534,210 singleton pregnancies. Following the advent of funded NIPT, the uptake of MMS increased slightly from 66.5% to 68.1%. The uptake of NIPT among MMS positive women increased substantially from 3.2% to 48.8%. In contrast, the uptake of PND among MMS positive women decreased from 54.9% to 30.8%. The uptake of any follow-up testing (NIPT/PND) among this group increased from below 60% to 75%. After NIPT was funded, the greatest decline in PND was seen in women with a MMS risk in the range of 1:101 to 1:200 (from 51% to 22%).

Conclusions:

The shifting test utilization patterns demonstrate how public policy and funding decisions impact women's choices regarding prenatal testing.

Oral 316

BIOLOGICAL DETERMINANTS OF TYPE 2 DIABETES IN OFFSPRING BORN TO MOTHERS WITH TYPE 2 DIABETES: THE NEXT GENERATION BIRTH COHORT

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Background:

Children of mothers with youth-onset type 2 diabetes (T2D) are at increased risk of developing youth-onset T2D themselves. In Manitoba, Indigenous youth have the highest rate of youth-onset T2D. A compounding risk factor is a private HFN1α G319S polymorphism in affected Oji-Cree youth that causes a dose-dependent decrease in insulin secretion.

Objective:

Evaluate the biological determinants of T2D in Indigenous youth born to mothers with youth-onset T2D and determine their association with HNF1α genotype.

Methods:

T2D determinants were compared among 115 youth from The Next Generation Cohort Study at two time-points: children ages 7.0-9.9 years and adolescents ages 14.0-16.9 years. Chi-square tests were used to compare sex, T2D status and HNF1α genotype between groups. Repeated measures ANOVA compared blood pressure and lipids (triglycerides, cholesterol, and apolipoproteins A and B). Friedman and Kruskal-Wallis tests compared age at assessment, BMI z-score, oral glucose tolerance test (OGTT), hemoglobin A1c (HbA1c), albumin:creatinine ratio (ACR), ALT, AST, insulin, and c-reactive protein (CRP). Characteristics were also compared between HNF1α genotypes

Results:

A total of 11.4% of children developed T2D, versus 59.3% of adolescents ($p<0.0001$). Children had a median BMI z-score of 2.9 compared to 1.5 for adolescents ($p=0.001$). Median AST was 26.5 in children versus 19.5 in adolescents ($p=0.0077$). Blood pressure, lipoproteins, OGTT, HbA1C, ACR, ALT, insulin, and CRP were not significantly different between groups. When grouped together, HbA1C (GG: 5.5% vs. G/S: 5.7% vs. S/S: 8.8%; $p=0.0052$), insulin (GG: 103 vs. G/S: 202; $p=0.05$) and T2D status (G/G: 5.7% vs. G/S: 28.1% vs. S/S: 72.7%; $p<0.0001$) were significantly different between genotypes. Remaining risk factors were not significant.

Conclusions:

T2D is very common among adolescents of mothers with youth-onset T2D. Early childhood obesity may increase incidence of T2D in adolescence. Homozygosity for the HNF1α G319S allele may be associated with decreased glycemic control (higher HbA1c) and subsequent diagnosis of T2D.

Oral 317

CEPHALOCENTESIS IN THE MANAGEMENT OF SEVERE FETAL HYDROCEPHALUS

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Background:

Fetal hydrocephalus occurs in 0.39-0.87/1,000 births. Cephalocentesis has been used since the 19th century to facilitate vaginal delivery.

Objective:

Our aim was to assess its role in hydrocephalic fetuses and associated perinatal, delivery and neurodevelopmental outcomes.

Methods:

We reviewed all cephalocenteses done at Mount Sinai Hospital, Toronto and National Maternity Hospital, Dublin from 1985-2017. Data were extracted from maternal and paediatric charts, procedure, L&D and autopsy records.

Results:

We identified 62 cases of cephalocentesis. Mean gestation at diagnosis and at delivery were 32.9±5.4 and 37.5±3.4 wks respectively. In Toronto, fetal IV sedation, analgesia and KCl has been offered since 2005. Volume of cerebrospinal fluid drained was 487±443 mL. Two patients underwent repeated cephalocenteses. Labour was induced in 41 cases(66%). There were 3 uncomplicated LSCS's: one for failure to progress and chorioamnionitis, one for fetal bradycardia and parental request for full resuscitation and one following KCl at parental request. Fifty (80.6%) delivered spontaneously vaginally: 25(40.3%) cephalic and 25 (40.3%) breech, 9(14.5%) needed operative vaginal delivery. There were 45(73%) stillbirths, 17(27%) following fetal KCl and 28(45%) were spontaneous. There were 13(21%) neonatal deaths. Four(6.5%) children survived cephalocentesis with mild to severe neurodevelopmental delay on follow-up examination. Excluding cases where KCl was used, perinatal mortality associated with cephalocentesis was 91%. Instrument size ranged from 22G to 9F; notably, in two survivors with normal cognition, smaller (21-22G) needles were used.

Conclusions:

We suggest that there is still a role for cephalocentesis in modern obstetrics to facilitate vaginal delivery for severe fetal hydrocephalus and to minimize maternal risks of CS and birth related trauma. Although this procedure is associated with very high mortality, parents should be counselled that survival may rarely occur, possibly related to instrument size and method of termination. We suggest that fetal analgesia and KCl should be considered whenever cephalocentesis is planned.

Oral 320

TRAUMA-INFORMED CARE AND NATURAL DISASTERS: PRELIMINARY RESULTS FROM PREGNANT WOMEN POST-2016 FORT MCMURRAY WILDFIRE

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Background:

The Fort McMurray Wood Buffalo 2016 wildfire was the most devastating natural disaster in modern Canadian history. Adverse effects on pregnant women have been associated with stress from natural disasters. Previous research has demonstrated the effectiveness of expressive writing at mitigating stress.

Objective:

This pilot project aims to examine the impact of expressive writing on pregnant women post disaster.

Methods:

208 pregnant women were randomly assigned to an expressive, neutral or no-writing group. Writing group participants completed questionnaires, followed by 15-minute writing sessions on four consecutive days. Questions focused on fears, relationships, past traumatic experiences and trauma associated with the wildfire. Thematic analyses of participant responses were conducted.

Results:

Preliminary results are a combination of qualitative and quantitative findings. Results indicate that 70% of the participants experience post-traumatic stress, and 30% exhibit symptoms consistent with a diagnosis of PTSD. Interestingly, 64% of the women who responded to a trauma-related question reported that their most traumatic life experience was one other than the wildfire. The 20% of women who opted not to answer the trauma-related question had the highest mean score on the IES-R (34.41), PDEQ (19.14), PDI (32.00), EPDS (9.88), STAI-State (42.57) & PSS (29.14). Women described profound fear of loss, concern for their unborn children, disruption to relationships, enhanced connection, increased economic strain, re-evaluation of priorities, heightened gratitude, and opportunities for growth. Resilience strategies (e.g. family time, exercise, meditation) were identified. Resiliency scores were highest (76.7) for those who reported that the wildfire was their most traumatic life experience.

Conclusions:

Findings highlight the need for attentiveness to past traumatic life experiences that may be triggered by, and compound adverse effects of, natural disasters. Availability of trauma-informed services that are mindful of potential past traumas and aim to avoid re-traumatizing those seeking assistance, are essential.

Oral 321

MICRORNA MIR-200B KNOCKOUT MICE HAVE PULMONARY HYPERTENSION ASSOCIATED WITH HIGHER ENDOTHELIN RECEPTOR-A EXPRESSION

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Background:

Pulmonary hypertension (PH), due to abnormal lung vasculature, is one of the leading causes of morbidity and mortality in babies diagnosed with congenital diaphragmatic hernia (CDH). In lungs of CDH patients, higher expression of microRNA-200b (miR-200b) is associated with better outcomes. To study the role of miR-200b, we created a miR-200b knockout mouse and found that these mice present with PH, similar to CDH patients. Endothelin receptor-A (ETA) is a known vasoconstrictor involved in PH and a potential target of miR-200b.

Objective:

The objective of this study was to investigate the role of ETA and miR-200b in lung development.

Methods:

PH in the miR-200b KO mouse was determined by echocardiography on six miR-200b KO and six wild-type (WT) 8-week-old mice. Pulmonary acceleration time (PAT), and cardiac output were measured. Expression of ETA protein was determined by immunohistochemistry, and western blotting. Quantification of ETA mRNA was done by RT-qPCR.

Results:

Echocardiography confirmed PH in miR-200b KO mice as it showed decreased PAT ($P < 0.0001$) and increased cardiac output ($P < 0.0057$) in miR-200b KO mice. Immunohistochemistry showed high expression of ETA in both KO and WT lungs in endothelial cells. We observed increased expression of ETA around the arteries of KO mice compared to that of WT mice. Western blotting showed higher levels of ETA protein in lungs of KO mice. Higher expression of ETA mRNA in the lungs of mir-200b KO was found by RT-qPCR (standardized to endogenous gene TBP), though not statistically significant ($p=0.1109$, $n=6$).

Conclusions:

PH in the miR-200b KO mouse suggests that miR-200b plays a role in the development of PH in CDH patients. Higher expression of ETA found in the lungs of the miR-200b KO mice indicates that miR-200b can regulate ETA expression which could contribute to the better outcomes observed in CDH patients with higher miR-200b expression.

Oral 325

INVESTIGATING THE ROLE OF THE HNF-1αG319S POLYMORPHISM IN EARLY-ONSET TYPE 2 DIABETES (T2D) IN MANITOBAN INDIGENOUS YOUTH

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Background:

Manitoba Indigenous youth have the highest rates of T2D in Canada. This epidemic has been linked historically with a shift away from traditional diets high in fat to diets high in carbohydrates. Moreover, 40% of Manitoban youth with T2D carry a polymorphism in the hepatocyte nuclear factor-1α (HNF-1αG319S) gene which strongly associates with β-cell dysfunction and T2D. Therefore, we hypothesize that an interaction between the G319S variant and diet composition drives pancreatic β-cell dysfunction in early-onset T2D.

Objective:

To define the mechanisms through which the HNF-1αG319S impacts β-cell function and the additive influence of dietary exposures during different developmental periods.

Methods:

CRISPR/Cas9 was used to knock-in the G>A.955 single nucleotide substitution into clonal MIN6 β-cells and a C57/BL6 mouse model. *In vitro* and *in vivo* studies including immunoblotting, qPCR, glucose-stimulated insulin secretion (GSIS) assays, cellular bioenergetics (Seahorse XF24) assays, and assessments of glucose tolerance were performed.

Results:

HNF-1α protein expression was reduced ~40% in G319S-MIN6 cells concomitant with a 4-fold downregulation in glucokinase (*Gck*; glucose metabolism) and a 2-fold upregulation in carnitine palmitoyltransferase-1A (*Cpt1A*; fatty-acid beta-oxidation). G319S-MIN6 did not affect GSIS; however, basal insulin secretion decreased 4-fold relative to WT-MIN6. G319S-MIN6 cells maintained a 15-fold insulin secretion index (ISI) and robust bioenergetics under lipotoxic stress, which impaired GSIS in WT-MIN6. Male G/S mice fed a "standard chow" diet (70% carbohydrate, 10% fat) spontaneously developed glucose intolerance and fasting hyperglycemia indicative of a diabetes phenotype.

Conclusions:

HNF-1αG319S alone is not detrimental to GSIS in MIN6 β-cells, although diminished basal insulin secretion may trigger hyperglycemia via excessive glucose production. Our findings suggest G319S-MIN6 are resistant to lipotoxicity whereas high-carbohydrate diets may be sufficient to induce a diabetes phenotype in G/S mice. Future studies will examine how dietary exposures during different developmental periods, including pregnancy, affect the metabolic health outcomes of HNF-1αG319S carriers.

Oral 326

CYCLOOXYGENASE INHIBITORS FOR TREATING PRETERM LABOUR? A REVIEW OF THE SCIENTIFIC EVIDENCE

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Background:

Prostaglandins are used in the management of labour, to promote cervical ripening and uterine contractility. In contrast, inhibitors of prostaglandin synthesis have provided a target to manage preterm labour. In particular, the cyclooxygenase (COX) enzyme(s) that determine the rate of prostaglandin synthesis. Inhibition of COX by for example indomethacin, can prevent production of purportedly "pro-labour" prostaglandins. Despite limited success, tocolysis by COX-inhibition carries serious adverse fetal effects due to inhibition of developmental homeostatic prostaglandin functions. The discovery that there are two COX enzymes, COX-1 and COX-2, led to the development of selective inhibitors targeting COX-2 and this presented an opportunity to spare homeostatic (COX-1) prostaglandin synthesis during tocolysis. However, subsequent clinical studies have called into question the appropriateness of COX-2 selective tocolysis.

Objective:

To determine whether there is sufficient basic science evidence to support or refute a role for COX enzyme involvement in labour onset.

Methods:

MEDLINE and EMBASE databases were systematically searched to identify basic science studies comparing expression and activity of COX enzymes in gestational tissues at term and preterm.

Results:

Thirty-four studies were included. Twelve studies on amnion and chorion reported significantly higher COX expression or activity with labour. However in the myometrium and decidua, the most relevant therapeutic target tissues, nine reported no labour-associated differences. In the myometrium five studies reported higher mRNA, but not protein expression with labour.

Conclusions:

There is insufficient evidence to support or refute a role for COX-2 in the onset of term or preterm labour to justify the use of COX-2 targeted tocolysis. The function of COX in labour onset and progression merits further investigation to refine clinical labour management.

Oral 331

LASER TREATMENT OF TWIN ANEMIA-POLYCYTHEMIA SEQUENCE: A SINGLE INSTITUTION EXPERIENCE

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Background:

Primary twin anemia-polycythemia sequence (TAPS) affects 3-5% of all monochorionic pregnancies. The condition occurs due to chronic net feto-fetal transfusion between anastomotic placental vessels which, if left untreated, can lead to severe perinatal morbidity and demise. Antenatal diagnosis with ultrasound screening affords the opportunity to intervene with fetoscopic laser photocoagulation of these anastomoses.

Objective:

We aimed to describe our institutional experience for treatment of primary TAPS using fetoscopic laser.

Methods:

We conducted a retrospective database review of all cases of primary TAPS treated with fetoscopic laser photocoagulation at our center. Maternal and perinatal outcome data is reported, where appropriate as median (range). At the time of abstract submission, outcome data was available for five of the eight cases, with final outstanding data collection pending.

Results:

Between August 2011 to August 2017, eight cases of TAPS treated with laser were identified. Median maternal age was 30.2 years (range 21 – 39). All cases affected monochorionic diamniotic twins with median gestation of TAPS diagnosis at 23^{+3} weeks' (range 16^{+0} – 26^{+4}). Fetoscopic laser was conducted at a median gestation of 23^{+6} weeks' (range 18^{+2} – 27^{+2}), all demonstrating successful resolution of ex-donor anemia and ex-recipient polycythemia without any intraoperative complications, major maternal complications, nor repeat laser for recurrence. Amnioinfusion was required for adequate visualisation in seven cases with total median fetoscopy time being 45 minutes (range 28 – 63). Final perinatal outcome data is currently available for ten offspring, as three twin-sets remain pending. PPROM occurred in two cases (day-1 and day-4 post-laser), with median delivery gestation being 28^{+6} weeks' (range 24^{+0} – 36^{+2}) and laser-delivery interval of 6.6 weeks. There were no cases of perinatal loss with offspring survival at 100%.

Conclusions:

This is the largest single-center series of laser treatment for primary TAPS to date, with these results suggesting favourable maternal and perinatal outcomes.

Oral 332

PHENOTYPE ANALYSIS OF WOMEN WITH PREECLAMPSIA: IMPLICATIONS FOR DISEASE PATHOGENESIS AND SCREENING

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Background:

The heterogeneous syndrome described as preeclamspia comprises new-onset hypertension accompanied by evidence of end-organ damage or fetal growth restriction. Screening programs designed to identify women at highest risk in early pregnancy combine maternal characteristics with measures of impaired placental function (abnormal uterine artery Doppler and maternal biomarkers). In screen-positive women, low-dose aspirin reduces the risk of preterm preeclampsia by 2/3^{rds} but has no effect upon fetal growth[1].

Objective:

We aimed to evaluate the strength of the association between preeclampsia and ischemic placental disease in a recently-reported cohort study of healthy 856 nulliparous women[2].

Methods:

Secondary analysis of the Placental Health Study, phenotyping healthy nulliparous women and comparing their clinical outcomes with standardized placental histopathology. Hypertensive complications were classified according to current ACOG guidelines.

Results:

Within the study population, 20/856 (2.3%) developed preeclampsia. Of these, only 5 (25%) expressed utero-placental vascular pathology features while 5/16 (31%) with 2nd trimester measurement of maternal serum placenta growth factor (PlGF) had values <10th centile. Only 7/20 (35%) had bilateral abnormal uterine artery Doppler studies at 20-22 weeks. No patient with preeclampsia had all 3 findings classically associated with this disease. In comparison with normotensive women, no significant differences were found with use of any assisted reproductive technologies, 1st degree family history of hypertension or elevated body mass index.

Conclusions:

Healthy nulliparous women are at low risk of developing preeclampsia and the underlying pathogenesis is only weakly associated with measures of placental dysfunction. These data illustrate our lack of knowledge regarding disease pathogenesis and may explain why low-dose aspirin is ineffective in preventing late-onset preeclampsia.

[1]Rolnik D et al, NEJM, 2017

[2]Wright E et al, Obstet Gynecol, 2017

Oral 334

ANTENATAL MIDWIFERY CARE AND REDUCED PREVALENCE OF SMALL-FOR-GESTATIONAL-AGE BIRTH AND OTHER ADVERSE INFANT BIRTH OUTCOMES FOR WOMEN OF LOW SOCIOECONOMIC POSITION

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Background:

The literature investigating the association between midwifery versus physician-led antenatal care and infant birth outcomes for women of low socioeconomic position (SEP) is limited by methodological weaknesses, including lack of control for confounders, inadequate power, and non-representative samples.

Objective:

To address these limitations we conducted a population level, cohort study among women of low SEP with low to moderate medical/obstetric risk to determine if antenatal midwifery care was associated with lower odds of small-for-gestational-age (SGA) birth, preterm birth, and/or low birth weight (LBW) compared to general practitioner (GP) or obstetrician-led models of care.

Methods:

For this retrospective cohort study, patients were included who: received antenatal midwifery, GP, or obstetrician care, were residents of British Columbia, Canada, carried a singleton fetus, delivered between 2005 and 2012, had low to moderate medical/obstetric risk, and received medical insurance premium assistance (n=57,872). The primary outcome was SGA birth (< the 10th percentile). Secondary outcomes included preterm birth (< 37 weeks completed gestation) and LBW (< 2,500 g.). Generalized estimating equation logistic regression models were used to estimate adjusted odds and 95% confidence intervals.

Results:

Our analysis included 4,705 midwifery patients, 45,114 GP patients, and 8,053 obstetrician patients. Odds of SGA birth were reduced for patients receiving antenatal midwifery vs. GP care (adjusted odds ratio (AOR) 0.71, 95% CI: 0.62-0.82) or obstetrician care (AOR 0.59, 95% CI: 0.50-0.69). Odds of preterm birth were also lower for antenatal midwifery vs. GP (AOR 0.74, 95% CI: 0.63-0.86) or obstetrician patients (AOR 0.53, 95% CI: 0.45-0.62). Likewise, odds of LBW were reduced for patients receiving antenatal midwifery vs. GP (AOR 0.66, 95% CI: 0.53-0.82) or obstetrician care (AOR 0.43, 95% CI: 0.34-0.54).

Conclusions:

Antenatal midwifery care in British Columbia is associated with lower odds of SGA birth, preterm birth, and LBW for women of low SEP, compared to physician-led models of care.

Table 1: Frequencies, Proportions and Adjusted Odds Ratios for Small-for-Gestational-Age Birth, Preterm Birth, and Low Birth Weight by Antenatal Model of Care, British Columbia, 2005-2012, (n=57,872)

	Midwife n= 4,705	GP n= 45,114	Obstetrician n= 8,053	Midwife vs. GP	Midwife vs. Obstetrician	GP vs. Obstetrician
	n(%)	n(%)	n(%)	OR (95% CI)	OR (95% CI)	OR (95% CI)
SGA[a]	227/4,695 (4.83)	3,179/45,002 (7.06)	689/ 8,025 (8.59)	0.71 (0.62-0.82)	0.59 (0.50-0.69)	0.83 (0.76-0.91)
Preterm[b]	207/4,702 (4.40)	2,848/45,028 (6.32)	698/8,033 (8.69)	0.74 (0.63-0.86)	0.53 (0.45-0.62)	0.72 (0.65-0.79)
LBW[c]	91/4,704 (1.93)	1,438/45,091 (3.19)	393/8,046 (4.88)	0.66 (0.53-0.82)	0.43 (0.34-0.54)	0.65 (0.58-0.74)

All models adjusted for maternal age, parity, pre-pregnancy body mass index, infant sex, smoking status and substance use.
[a]Model also adjusted for mental illness, and Local Health Area socioeconomic rank. Odds ratios based on 4,095 births with SGA and 57,722 total births with no missing information for this analysis.
[b]Model also adjusted for medical risk, prior obstetric risk, birth year, receipt of social assistance, alcohol use, mental illness, neighbourhood SEP, Local Health Area socioeconomic rank, Local Health Area income inequality, and northern residence. Odds ratios based on 3,753 preterm births and 57,763 total births with no missing information for this analysis.
[c]Model also adjusted for prior obstetric risk. Odds ratios based on 1,922 births with LBW and 57,841 total births with no missing information for this analysis.

Oral 341

FIRST AND SECOND TRIMESTER FETO-PLACENTAL BIOMARKERS IN WOMEN LIVING WITH HIV ACCORDING TO ANTIRETROVIRAL THERAPY EXPOSURE

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Background:

Antiretroviral therapy (ART) reduces the risk of HIV perinatal transmission. However, studies have shown an association between ART during pregnancy, particularly protease inhibitor (PI) -based therapies, and perinatal complications, which could be explained through placental dysfunction.

Objective:

To assess the association between first and second trimester feto-placental biomarkers and type of ART / duration of exposure to ART in women living with HIV (WLWH).

Methods:

Data of 342 WLWH who had been screened for Down Syndrom using first and second trimester feto-placental biomarkers (PAPP-A, AFP, free β-hCG / total hCG, estriol, inhibin A), recruited through 2 prospective Canadian cohorts (CHU Sainte-Justine, Montreal and BC Women's Hospital, Vancouver), were analyzed. The levels of each biomarker (after a logarithmic transformation) were compared according to the type of ART and the duration of exposure using multiple linear regressions.

Results:

After adjustment for the following control variables: race, maternal age, gestational age, body mass index, parity, smoking and fetal sex, AFP was significantly increased in women on PI-based ART (β = 0.139, 95% CI = [0.055-0.223], p = 0.001), and in women on ART not containing PI (β = 0.141, 95% CI = [0.043-0.239], p = 0.005) compared to women not on ART. However, there was no significant association between the type of ART and the level of PAPP-A, free β-hCG, estriol, total hCG and inhibin A. No significant associations were shown between duration of ART and biomarker levels, except for estriol concentration which increased significantly with duration of ART exposure (β = 0.005; IC = [0.001-0.008], p = 0.011).

Conclusions:

Serum concentrations of first and second trimester feto-placental biomarkers is not significantly affected by ART except AFP and estriol. These data are generally reassuring for the consequences of early ART during pregnancy. Further analyzes of placental function, including PlGF and Sflt1 assays, are in progress.

Oral 343

TNF MEDIATES IMPACT OF MATERNAL OBESITY ON FETAL GUT DEVELOPMENT

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Background:

Maternal diet-induced obesity (mDIO) predicts increased risk of offspring obesity, and may be associated with altered fetal gut development as obesity is associated with increased gut inflammation and endoplasmic reticulum (ER) stress.

Objective:

As low-grade inflammation accompanies maternal obesity, we hypothesized that TNF, a master regulator of inflammation, mediates mDIO-induced fetal gut ER stress and inflammation.

Methods:

Female C57BL/6 wildtype (Wt) and TNF knockout (KO) mice were fed a control (CON; Wt n=7, KO n=10) or high-fat (mDIO; 60% kcal fat; Wt n=8, KO n=9) diet for 6 weeks prior to and throughout gestation. At E18.5 fetal small intestines were collected. Western Blot and qPCR were used to quantify mRNA and protein levels of key ER stress modulators. NF-κB activity was assessed by ELISA. Significance was assessed by ANOVA with Bonferroni-adjusted post-hoc.

Results:

Relative phosphorylation of protein kinase R (PKR)-like endoplasmic reticulum kinase (PERK) and eukaryotic Initiation Factor 2α (eIF2α) were similar between groups in Wt fetal gut (CON *vs* mDIO). Interestingly, mDIO was associated with decreased mRNA levels of ER-chaperone glucose-regulated protein 78 (*grp78*; $p<0.001$) and its transcriptional regulator spliced X-box binding protein (*sXBP*; $p<0.05$) in Wt but not in KO fetal gut (CON *vs* mDIO). Fetal gut NF-κB activity was increased with mDIO in Wt ($p<0.001$) but not in KO fetuses (CON *vs* mDIO). *TNF*, *IL-6*, *IL-1β*, and *NF-κB* mRNA levels were similar between Wt groups.

Conclusions:

Contrary to our hypothesis, mDIO is associated with a decrease in ER stress-related factors in Wt, but not KO fetal gut. NF-κB activity is increased with mDIO in Wt, but not KO fetal gut. Therefore, it appears that TNF may mediate a decrease in ER-stress markers and increased NF-κB activity in the developing fetal gut in obese pregnancies.

Oral 344

PATERNAL OBESITY DISRUPTS PLACENTAL DEVELOPMENT AND IS ASSOCIATED WITH FETAL HEPATIC ER STRESS IN A MURINE MODEL

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Background:

Paternal obesity is associated with offspring metabolic dysfunction, but has been largely overlooked as a mediator of fetal-placental development.

Objective:

We hypothesized that paternal obesity contributes to disrupted placental development, and fetal hepatic ER stress leading to metabolic dysfunction.

Methods:

Male C57BL/6 mice were fed either a control (CD, n=7; 17% kcal fat) or high fat diet (PHFD, n=6; 60% kcal/fat) for 10 weeks prior to mating with control-fed females. At E18.5, placental and fetal hepatic tissues were collected. Protein and transcript levels of key factors in tissue remodelling, apoptosis, angiogenesis and UPR/ER stress were investigated. Hypoxia was evaluated via carbonic anhydrase (CA) IX immunostaining.

Results:

Paternal obesity did not impact fetal or placental weights. PHFD placentae had lower *VEGF* mRNA levels and increased in CAIX staining versus CD. Male PHFD placentae had decreased vascularization and tissue remodelling *VIP*, *VPAC1*, and *MMP9* mRNA levels, while female PHFD placentae had decreased *MMP7* and *Wnt1* levels ($p<0.05$). Female placentae had reduced levels of pro-apoptotic Bcl2-family members *Bax*:*Bcl2*, *Bad*, and *Bid* ($p<0.05$). Both male and female PHFD placentae had increased levels of ER stress-related phospho-PERK ($p<0.0001$), without changes in phospho-eIF2α, *ATF4*, *CHOP*, phospho-IRE1α or *ATF6* compared to CD. In the liver, fetal levels of *VEGF*, *VEGFR*, and *HIF1α* ($p<0.05$) and pro-survival factors of the UPR: (*ATF6*, *EDEM1*, *PDI*, *GAAD34*, *GRP78*, phospho-eIF2α, *ATF4*) were increased ($p<0.05$) in PHFD females compared to CD. In male PHFD fetuses, only levels of phospho-PERK and phospho-eIF2α ($p<0.05$) were increased.

Conclusions:

Our data suggest that paternal obesity results in impaired placental signalling and matrix remodelling, and is associated with placental hypoxia. Although PHFD was not strongly associated with placental ER stress, PHFD resulted in fetal hepatic ER stress in a sex-specific manner, which may be mediated by hypoxia in females. These changes could contribute to postnatal hepatic metabolic dysfunction.

Oral 351

MATERNAL DIET-INDUCED OBESITY (MDIO) INDUCES MATERNAL INTESTINAL INFLAMMATION AND ALTERED PLACENTAL VASCULARIZATION AND PLACENTAL HYPOXIA

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Background:

We have shown that mDIO is associated with low-grade inflammation and shifts in the maternal intestinal microbiota. Since mDIO predicts offspring obesity, we hypothesized that maternal intestinal inflammation and altered placental function may underpin the developmental origins of obesity.

Objective:

We investigated whether mDIO was associated with maternal intestinal inflammation and altered placental angiogenesis promoting placental hypoxia.

Methods:

Female C57BL/6 mice were fed a high-fat (mDIO; 60% kcal fat; n=10) or control diet (17% kcal fat, n=10) for 6 weeks prior to mating and throughout gestation. At E14.5, maternal intestinal barrier integrity was assessed. Maternal fecal microbiota was investigated by 16S rRNA V3 region sequencing. Intestinal NFκB activity and antimicrobial Beta (β)-defensin 3 were measured by ELISA. Placental angiogenesis (vascular endothelial growth factor, VEGF), vessel density (cluster of differentiation 31, CD31), vessel maturity (alpha-smooth muscle actin, α-SMA) and hypoxia (carbonic anhydrase IX, CAIX) were investigated via immunohistochemistry and immunofluorescence. Placental pro-angiogenic and hypoxic pathways were assessed by RT-qPCR. Significance was assessed with a Student's t-test or 2-way ANOVA with *post hoc* Sidak, where appropriate.

Results:

mDIO modified pregnancy-induced maternal microbial composition, but intestinal barrier integrity was unchanged. Maternal intestinal NFκB activity was elevated and β-defensin 3 was reduced with mDIO compared to control. Placental VEGF and CD31 immunostaining were increased, but vascular α-SMA immunostaining was decreased as a result of mDIO. This was associated with placental hypoxia (CAIX). Placental mRNA levels of VEGF, hypoxia-inducible factor 1-alpha (HIF1-α), and platelet-derived growth factor (PDGF) were similar between groups.

Conclusions:

mDIO was associated with shifts in the maternal intestinal microbiota, increased intestinal inflammation and reduced antimicrobial β-defensin 3, but did not compromise maternal intestinal barrier integrity. Although mDIO was associated with elevated placental markers of angiogenesis and vessel density, vessels appear to be immature which appears to result in placental hypoxia.

Oral 352

EPIGENETIC PROGRAMMING BY ANCESTRAL STRESS ACCELERATES AGE-RELATED PHYSICAL AND MENTAL HEALTH DECLINE

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Background:

Biological age is determined by the rate of mental and physical health decline. One of the risk factors associated with premature aging and disease incidence is prenatal stress. Recent literature has demonstrated that biological signatures of prenatal stress may propagate across multiple generations and compromise the chances of healthy aging in unexposed offspring. Here we investigated age-dependent changes in depression and anxiety-like behaviours, stress response and epigenetic regulation by microRNA (miRNA) expression.

Objective:

We proposed that ancestral prenatal stress can accumulate across multiple generations to accelerate aging in terms of mental and physical health via epigenetic regulation.

Methods:

In this study, F4 generation male and female rat offspring were derived from a lineage in which their ancestral mothers (F0-F3) were stressed during pregnancy. Depression and anxiety-like behaviours were assessed at the age of 6 (young), 12 (middle aged) and 18 (aged) months using a forced swim task and elevated plus maze. Behavioural outcomes were related to plasma corticosterone levels and cortical miRNA profiling via deep sequencing to identify epigenetic regulatory pathways. Morbidity and mortality were also recorded.

Results:

Our findings indicate that aging increases the incidence of both depression- and anxiety-like behaviours, which were further exacerbated by stress. Aging and stress synergistically disturbed the stress response and accelerated age-associated decline in overall health and longevity with sex-specific disease incidence. Moreover, ancestral stress altered cortical miRNA expression in a sex-specific manner, in particular markers related to major depressive disorder and stress-related immune deficiency.

Conclusions:

The findings suggest that ancestral programming by stress is a significant determinant of lifetime mental health trajectories and risk of common age-related diseases through altered epigenetic regulation. Disease incidence may be regulated by sex-specific pathways. MiRNAs may represent predictive biomarkers of age-related diseases.

Oral 357

UMBILICAL ARTERIAL BLOOD FLOW IN THE 3RD TRIMESTER AND ITS ASSOCIATION WITH NEURODEVELOPMENTAL OUTCOMES IN CHILDREN WITH CONGENITAL HEART DISEASE

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Background:

Children with congenital heart disease are at increased risk of adverse long-term neurodevelopmental outcomes. Altered fetal middle cerebral arterial (MCA) Dopplers suggestive of brain sparing (low Pulsatility Index, PI) as well as placental pathology have been documented in fetal heart disease.

Objective:

We investigated the relationship between MCA and umbilical arterial, UA, flow patterns in fetal transposition of the great arteries (TGA) and hypoplastic left heart syndrome (HLHS) on growth and 2-year neurodevelopmental outcomes.

Methods:

We identified children with d-TGA and HLHS within the Western Canadian Complex Pediatric Therapies Follow-Up Program who had a 3rd trimester fetal echocardiogram between October 2004 and August 2014. MCA and UA PI measurements were obtained via offline analysis of fetal echocardiograms. The relationship with birth and 2 year somatic measures, and 2 year Bayley Scales of Infant and Toddler Development III composite scores were analyzed using two-sided Pearson correlations (r). Univariate regression models and subsequent multiple linear regression models were constructed to evaluate the magnitude of the observed relationships.

Results:

Children with d-TGA (n=24) and HLHS (n=36) were included. MCA PI did not correlate with birth somatic measures or 2-year neurodevelopmental outcomes. UA PI, however, inversely correlated birth and 2 year head circumference (r=-0.36, p=0.005 and r=-0.25, p=0.05), length (r=-0.27, p=0.039 and r=-0.40, p=0.001) and weight (r=-0.31, p=0.015 and r=-0.44, p=0.001), and 2-year cognitive (r=-0.30, p=0.019), language (r=-0.30, p=0. 022) and motor scores (r=-0.27, p=0.04). Multivariate analysis also demonstrated consistent correlation between elevated UA-PI and adverse 2 year growth and neurodevelopmental outcomes.

Conclusions:

A higher UA PI, suggestive of placental insufficiency, in fetal HLHS and d-TGA is associated with worse 2-year growth and neurodevelopmental outcomes. This could represent an additional insult that contributes to long-term outcomes. Understanding these risk factors allows for early identification and intervention to improve outcomes.

Oral 363

MORTALITY AND MATERNAL SUBSTANCE USE IN GASTROSCHISIS

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Background:

Adverse outcomes in babies with gastroschisis (GS) born to mothers with reported substance use have not been well investigated. Although mortality rates in children born with GS have been steadily improving over recent years, several factors have been reportedly associated with poor outcomes. Lower maternal age is associated with an increased incidence of gastroschisis. In addition maternal age could be associated with differing rates of substance use.

Objective:

We hypothesized that maternal substance use is associated with higher mortality in children with GS.

Methods:

We conducted a retrospective study of all patients with gastroschisis treated in Manitoba between1991 and 2016. Using logistic regression, we examined associations between mortality and maternal substance use (yes/no) with and without adjusting for the confounding effects of maternal age. We report odds ratios (ORs), adjusted ORs (adjORs) and confidence intervals (95%CI). Causal analysis using directed acyclic graphs indicated no other potential confounders in our extensive clinical data.

Results:

The overall mortality rate in the 175 patients with known maternal substance use was 7.4% (7.9% among the 191 patients overall). The mortality rate of GS children whose mothers reported substance use was almost 11-fold higher than those who did not (0.128 vs. 0.012; OR=11.7; 95%CI: 2.2, 216). Though maternal age showed only marginal association with substance use (OR=0.94; 95%CI: 0.88, 1.00), the effect of substance use increased when adjusted for maternal age (adjusted OR =14.6; 95% CI: 2.7, 273). When unknown maternal substance use was assumed to be “No”, substance use remained significant (adjOR=5.3; 95%CI: 1.6, 24.1).

Conclusions:

To our knowledge, this is the first report implicating maternal substance use and increased mortality in children with GS. Importantly, maternal substance use remains significant after adjusting for maternal age. These findings, still requiring confirmation in a larger multi-center analysis, may provide critical prenatal information for parents.

Oral 366

NEURODEVELOPMENTAL AND GROWTH OUTCOMES OF PRETERM INFANTS BORN OUTSIDE TERTIARY PERINATAL CENTERS COMPARED TO INBORN INFANTS

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Background:

Infants born in tertiary perinatal centres (inborn) have higher survival and lower morbidity than outborn infants. However, there is limited information regarding the long term neurodevelopmental and growth outcomes among outborn preterm infants.

Objective:

To compare the neurodevelopmental and growth outcomes at 36 months corrected age (CA) between outborn and inborn infants born < 29 weeks gestational age (GA).

Methods:

In this retrospective cohort study, we included infants born <29 weeks GA admitted to Foothills Medical Centre, Calgary between January 2000 and December 2012, who had neurodevelopmental(ND) assessment up to 36 months CA. Infants with intrauterine infection, major congenital and chromosomal anomalies were excluded. Our primary outcome was composite of death or neurodevelopmental impairment (NDI). We compared ND and growth outcomes between inborn and outborn infants using univariate analysis and multivariate logistic regression.

Results:

Of 1235 eligible infants, 175 (14%) were outborn. Outborn infants were lower in GA (25.8±1.7 wk vs 26.2±1.5 wk), had lower chorioamnionitis rate (15% vs 24%), were less likely to receive antenatal steroids (55% vs 90%) and maternal antibiotics (51% vs 68%). Neonatal morbidities were similar between the two groups except that outborn infants had higher rates of severe brain injury (24% vs 12%) and mortality (22% vs 11%). Of 1078 survivors, 1048 (97%) were followed. There was no difference in ND outcomes between the outborn and inborn survivors (Table). Multivariate regression analysis after controlling for GA, gender, chorioamnionitis, antenatal steroids and maternal age showed outborn status was not associated with composite outcome of death or NDI (adjusted OR: 1.09, 95% CI, 0.69, 1.70) and NDI (adjusted OR 1.00, 95% CI 0.61,1.66). Growth outcomes were not significantly different between two groups.

Conclusions:

In this cohort, neurodevelopmental and growth outcomes do not appear to be significantly different between outborn and infants at 36 months corrected age.

Table: Comparison of neurodevelopmental outcome of inborn and outborn infants

	Outborn n = 131	Inborn n = 917	aOR (95% CI)**
Cerebral palsy, n (%)	12 (9.3)	67 (7.4)	0.94 (0.41-2.15)
Cognitive delay*, n (%)	34 (30)	233 (28.2)	1.03 (0.60-1.76)
Hearing impairment, n (%)	3 (2.4)	42 (4.7)	0.14 (0.01-1.07)
Visual impairment, n (%)	12 (9.2)	66 (7.2)	0.60 (0.24-1.51)
Any ND impairment, n (%)	46 (39.7)	305 (36.5)	1.00 (0.61-1.66)

* Cognitive score < 85

** adjusted for GA, gender, antenatal steroid, chorioamnionitis, maternal age

Percentages exclude missing values

Oral 368

PRENATAL AND EARLY POSTNATAL PREDICTORS OF CHILD COMMUNICATIVE TRAJECTORIES FROM 12 TO 36 MONTHS

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Background:

Delayed communication abilities is one of the earliest identifiable symptoms of developmental problems (Collison et al., 2016). However, relatively little is known about individual patterns of communicative development in toddlerhood, which is the prime period for the emergence of communication and language problems.

Objective:

The objectives of this study are to (a) identify subgroups of communicative development trajectories during the infant and toddler period and (b) examine the prenatal and early postnatal predictors of these trajectories.

Methods:

Participants were 3,387 mother-child pairs from the All Our Families (AOF) cohort. Mothers completed questionnaires during the prenatal period (34-36 weeks gestation) regarding psycho-social risk and demographics. Data regarding the infant (e.g., birth weight, pre-term delivery) were collected from medical records and maternal report at 4-months post-delivery. Development of communication skills was assessed at 12, 24, and 36 months with the Ages and Stages Questionnaire (ASQ; Bricker, Squires, & Mounts, 1995) Communication subscale. Mothers also reported on developmental delay diagnoses at age 36 months.

Results:

Growth-mixture model analyses revealed three distinct communication trajectories from 12 to 36 months: a normative-stable class (85%), a low-improving class (13.5%), and a low-declining class (1.5%). Predictor analyses revealed that low social support, high prenatal stress and depression, pre-term birth, and low income were all significant risk factors for belonging in the improving versus normative class. Maternal history of miscarriages and a family history of language delays significantly distinguished the declining class from both the normative and improving classes. By age 3, over half of the declining class had a developmental delay diagnoses, compared to 9% in the improving class and 1% in the normative class.

Conclusions:

This study highlights potential targets for both pre- and postnatal prevention and intervention programs that can work toward decreasing existing disparities in child communicative development.

Oral 369

ESTIMATING UMBILICAL VENOUS CATHETER INSERTION DEPTH IN NEWBORNS USING BIRTH WEIGHT OR BODY MEASUREMENT: A RANDOMIZED TRIAL

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Background:

Incorrectly positioned umbilical venous catheters (UVC) are associated with increased rates of complications in newborns. A retrospective study reported surface measurement (SM: umbilicus to nipple distance in cm minus 1) was more accurate than birth weight (BW) based formula [(3× birth weight (Kg) + 9)/2+1)] for estimating UVC insertion depth.

Objective:

(a) To compare the proportion of optimum UVC position determined by ultrasound between SM and BW based insertion depths formulae. (b)To compare the proportion of optimum UVC tip position between the two methods based on birth weight, and growth status of the infants.

Methods:

In this prospective randomized trial, infants undergoing UVC insertion were randomly assigned to either SM or BW based formula. The optimum UVC position was then verified using ultrasound in addition to the standard radiography. The primary outcome was optimum UVC position (defined as the catheter tip in the inferior vena cava between the hepatic vein confluence and right atrial opening) determined by ultrasound read by an investigator blinded to the assignment. Intention to treat analysis was performed.

Results:

Of the 196 infants, 97 were assigned to SM based and 99 to BW based formula. There was no difference in the primary outcome between infants assigned to SM or BW based formula (35% vs 27%, Relative risk (RR), 1.28; 95% CI 0.84 -1.95). Among ELBW (<1000g), proportion of optimum UVC position was significantly higher with SM based as compared to BW based formula [14/32 (44%) vs 6/31 (19%), p = 0.03]. Similarly, for SGA/LGA infants, SM based formula showed improved positioning compared to BW based formula [8/15 (53%) vs 4/16 (25%), p = 0.10].

Conclusions:

Overall we did not observe significant difference in proportion of optimum UVC positions based on the two formulae. However, SM based formula seems superior in ELBW infants and SGA/LGA infants.

Oral 374

FIRST-TRIMESTER SCREENING FOR FETAL ANEUPLOIDIES USING PLACENTAL GROWTH FACTOR: THE GREAT OBSTETRICAL SYNDROME (GOS) STUDY

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Background:

Fetal trisomy 21 is associated with trophoblastic hypoplasia, placental hypovascularity and low concentrations of maternal serum placental growth factor (PlGF), a protein synthesized by trophoblasts and promoting placental angiogenesis and vasculogenesis. However, maternal PlGF is not currently included in most screening programs.

Objective:

We aimed to estimate the ability of first-trimester maternal serum PlGF to identify fetal aneuploidies.

Methods:

We conducted a prospective cohort study of singleton pregnancy at 11-13 weeks. Maternal serum PlGF concentration was measured using BRAHMS PlGF plus KRYPTOR automated assays. PlGF and nuchal translucency were log-transformed and reported as multiple of the median (MoM) adjusted for crown-rump length. Detection rates were calculated using receiver-operator characteristics curves.

Results:

We observed 21 (0.4%) cases of fetal aneuploidies out of 4765 participants. Trisomy 21 (13 cases; 0.85 MoM; IQR: 0.80 – 0.93), trisomy 18 (2 cases; 0.77 MoM; IQR: 0.66 – 0.87), and trisomy 13 (2 cases; 0.68 MoM; IQR: 0.61 – 0.75) were associated with low PlGF concentrations. The low PlGF values observed in the cases of monosomy X (2 cases; 0.85 MoM, IQR: 0.82 – 0.88, p=0.05), triploidy (0.78 MoM, p=0.11) and 47 XX i(22)(p10) (0.18 MoM, p=0.08) were not statistically different from the controls. A model including maternal age, nuchal translucency and PlGF could have identified all (100%) cases of trisomy 21 and 6 (75%) of the other fetal aneuploidies at a false-positive rate of 9%.

Conclusions:

First-trimester maternal PlGF is associated with the risk of fetal aneuploidy, especially trisomy 21.

Oral 329

SEVERE PERINATAL AND MATERNAL MORBIDITY AND MORTALITY ASSOCIATED WITH OPERATIVE VAGINAL DELIVERY, BY PELVIC STATION, COMPARED WITH CESAREAN DELIVERY IN THE SECOND STAGE OF LABOUR

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Background:

The literature on perinatal and maternal morbidity after operative vaginal delivery (OVD) compared with cesarean delivery (CD) is inconsistent, at least partly because previous studies were limited by the absence of information on pelvic station.

Objective:

To quantify severe perinatal and maternal morbidity/mortality associated with OVD by pelvic station compared with CD in the second stage of labour.

Methods:

We carried out a retrospective cohort study among all deliveries in Canada, 2003 to 2013, with data from the Canadian Institute for Health Information. We included all full term OVD and CD with a prolonged second stage of labour (N=58,819). The primary outcomes were composite severe perinatal morbidity/mortality (i.e., convulsions, assisted ventilation, severe birth trauma, and neonatal death) and composite severe maternal morbidity/mortality (i.e., severe postpartum hemorrhage, sepsis, cardiac complications and death). Logistic regression was used to adjust for maternal age, parity, birth weight, residence, and year.

Results:

Among women with dystocia, forceps and vacuum deliveries were associated with higher rates of perinatal morbidity/mortality compared with CD (forceps AOR 1.56, 95% CI 1.13-2.17; vacuum AOR 1.44, 95% CI 1.06-1.97; Table 1). Odds ratios for perinatal morbidity/mortality were not significantly different among midpelvic vs low vs outlet deliveries by forceps (p=0.34) or vacuum (p=0.43). Maternal morbidity/mortality rates were lower following vacuum delivery compared with CD for fetal distress (vacuum AOR 0.43, 95% CI 0.32-0.57; Table 1). Odds ratios for maternal morbidity/mortality were not significantly different among midpelvic vs low vs outlet deliveries by forceps or vacuum. Rates of third- and fourth-degree perineal lacerations were high among OVDs at all pelvic stations (e.g., 23.0% in low pelvic forceps deliveries).

Conclusions:

OVD is associated with significantly higher rates of perinatal morbidity/mortality compared with CD. Although maternal morbidity/mortality rates are lower following vacuum delivery, rates of severe perineal lacerations are high following OVD, irrespective of pelvic station.

Table 1. Rates, adjusted odds ratios (AOR), and 95% confidence intervals (CI) for perinatal and maternal outcomes by mode of delivery and pelvic station among term singleton deliveries with prolonged second stage, Canada (excluding Quebec), 2003-2013

Dystocia		Cesarean delivery	Forceps				Vacuum				
		n=9300	All stations n=9648	Outlet n=549	Low n=4901	Mid n=4198	All stations n=15614	Outlet n=2344	Low n=5191	Mid n=2158	NOS n=5921
Outcome											
Severe perinatal morbidity and mortality	%	0.66	0.93	1.09	0.82	1.05	0.86	0.77	0.92	1.02	0.79
	AOR (95% CI)	Ref	**1.56 (1.13-2.17)**	1.77 (0.76-4.13)	1.38 (0.92-2.06)	**1.74 (1.18-2.58)**	**1.44 (1.06-1.97)**	1.35 (0.79-2.30)	**1.54 (1.05-2.26)**	1.62 (0.98-2.67)	1.32 (0.89-1.95)
Severe maternal morbidity and mortality	%	1.65	1.53	0.91	1.47	1.69	0.98	0.98	0.85	1.11	1.05
	AOR (95% CI)	Ref	1.03 (0.81-1.29)	0.58 (0.24-1.42)	0.96 (0.72-1.27)	1.17 (0.88-1.56)	**0.64 (0.51-0.81)**	**0.62 (0.40-0.97)**	0.56 (0.40-0.79)	0.74 (0.48-1.15)	0.69 (0.51-0.93)
Fetal distress		**Cesarean delivery**	**Forceps**				**Vacuum**				
		n=5734	**All stations n=5917**	**Outlet n=257**	**Low n=2944**	**Mid n=2716**	**All stations n=9237**	**Outlet n=1350**	**Low n=3516**	**Mid n=1672**	**NOS n=2699**
Outcome											
Severe perinatal morbidity and mortality	%	1.80	1.94	0.78	1.83	2.17	1.78	1.41	1.82	1.97	1.78
	AOR (95% CI)	Ref	1.14 (0.87-1.49)	0.44 (0.11-1.79)	1.07 (0.77-1.50)	**1.27** (0.92-1.77)	**1.03** (0.80-1.32)	0.78 (0.48-1.29)	**1.06** (0.77-1.45)	1.20 (0.80-1.81)	1.02 (0.72-1.45)
Severe maternal morbidity and mortality	%	2.18	1.59	2.33	1.46	1.66	0.93	0.96	0.82	1.14	0.93
	AOR (95% CI)	Ref	0.77 (0.59-1.01)	1.14 (0.49-2.62)	0.73 (0.51-1.04)	0.78 (0.55-1.10)	**0.43 (0.32-0.57)**	**0.43 (0.24-0.77)**	**0.38 (0.25-0.58)**	0.52 (0.31-0.85)	**0.43 (0.28-0.67)**

NOS, not otherwise specified; OR, odds ratio.
All models are adjusted for maternal age, parity, birth weight, province, and fiscal year of birth.
Bold text denotes statistically significant associations defined as p-value<0.01.

Poster 009

METHYLATION OF GENES IN ADOLESCENTS WITH TYPE 2 DIABETES THAT IS ASSOCIATED WITH EXPOSURE TO MATERNAL DIABETES DURING PREGNANCY

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Background:

Obesity affects about 500 million people worldwide and over 30% of the population is obese in North America. In the recent years, the mounting evidence describes a strong association between environmental exposures during early life (pre- and postnatal) and the conditioning of biological responses over the lifecourse of the offspring that define disease risk. Obesity and type 2 diabetes (T2D) are also increasing in children at alarming rates, predisposing youth to an earlier onset of associated complications and increasing the burden of health care provision.

Objective:

Maternal diabetes during gestation alters the methylome of the offspring in infancy and persistence of differentially methylated regions in older children is associated with obesity and obesity-related complications in the offspring.

Methods:

Peripheral blood mononuclear cells were obtained from a retrospective cohort of children diagnosed with obesity and T2D with clinical documentation of maternal diabetes status during pregnancy. We have sequenced for iCARE cohort (n=23 T2D, n=10 controls) samples. Saturation analysis indicates that samples with more than 10 million reads are reproducible (estimate correlation > 0.97). Data were analyzed using diffReps software with a criterion of 500bp window size and Negative Binomial (NB) test was applied to obtain the differentially methylated regions(DMRs).

Results:

147443 DMRs were obtained in T2D samples compared to normal. Obese adolescents with T2D tended to be more hypomethylated. We identified several novel DMRs, out of which 816 were in proximal promoter region of genes. DMRs in several metabolic pathways were highly represented. These genes included APOC2, GPIHBP1, CPT1B, P2RX4, AKT1, GRB10, among others

Conclusions:

Our results indicate that diabetes during pregnancy affects the methylation of genes involved in various metabolic pathways in the cells of the exposed offspring that had developed T2D as adolescents. This suggests that DNA methylation could play a crucial role in defining the risk for youth-onset T2D.

Poster 011

ORAL FEEDING ON NASAL CONTINUOUS POSITIVE AIRWAY PRESSURE (NCPAP) AND HEATED HUMIDIFIED HIGH FLOW NASAL CANNULA (HHFNC) FOR PULMONARY INSUFFICIENCY IN PRETERM INFANTS: A PARADIGM SHIFT

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Background:

To reduce lung injury, non-invasive respiratory support modalities (nCPAP and HHFNC) are increasingly being utilized in preterm infants. Due to the immature aero-digestive coordination during oral feeding and perceived risk of aspiration, health-care providers are reluctant to initiate oral feeds while infants are on nCPAP which delays establishment of oral feeds and may contribute to oral aversion.

Objective:

We hypothesized that oral feeding preterm infants with birth postmenstrual age (PMA) of <33 weeks while on nCPAP compared with HHFNC or No Respiratory Support (NRS) would not result in increased oxygen desaturation episodes, defined as ≥3% decrease in SpO_2 with the nadir reaching <90%.

Methods:

Preterm infants were studied using our Safe Individualized Nipple-Feeding Competence (SINC) protocol. The SINC protocol takes into consideration the PMA, respiratory stability and sucking/swallowing competency. Using a pulse-oximeter, we measured frequency and duration of SpO_2 desaturation events during oral feeds while infants were on nCPAP, HHFNC or NRS. A negative binomial regression model was estimated for the number of episodes when O_2 desaturations (≥3% decrease) had a nadir of <90%, using log transformed total oral feeding time (minutes) as an offset variable (evidence of over-dispersion, p=0.0058).

Results:

The SpO_2 stability data are given in Table 1. Fourteen infants comprised this pilot study with five oral feeds in each group (nCPAP, HHFNC and NRS). The rate ratios and 95% CI were CPAP vs. NRS: 0.22 (0.06-0.89; *P=0.03*), HHFNC vs. NRS: 0.85 (0.25-2.92; *P=0.80*) and CPAP vs. HHFNC: 0.26 (0.07-1.03; *P= 0.05*).

Conclusions:

We provide evidence that oral feeding on nCPAP does not increase clinically relevant oxygen desaturation episodes compared to HHFNC and NRS. Our data have the potential to change the current paradigm of how we manage respiratory care in preterm infants leading to these infants safely reaching their full feeds milestone and being discharged from the hospital earlier.

Support Type	nCPAP	HHFNC	NRS
Study PMA (weeks)	36.2±0.73	39±1.73	35.8±0.58
Oral feed volume (ml)	8.02±0.44	9.26±0.70	8.36±0.50
Total oral feed time (mins)	7.00±2.17	8.40±1.51	5.10±1.38
O_2 desaturation events <90% (n)	1.80±1.20	9.60±3.71	5.80±2.01
O_2 desaturation Rate (events/minute) 95% Confidence Interval (CI)	0.31 (0.11-0.90)	1.18* (0.5-2.77)	1.39† (0.57-3.39)
SpO2 at the time of aliquot (%)	98.6±0.16	94.94±1.16	96.1±1.54
Lowest SpO2 during O_2 desaturation (%)	92.54±1.62	88.76±1.49	86.7±2.21
Desaturation duration (s) ¶	10.1±1.12	8.36±0.82	8.15±0.36
Recovery time (s)¶	8.31±1.52	9.12±0.69	7.39±0.62

Mean ±SEM. *CPAP vs. HHFNC=0.05. †CPAP vs. NRS=0.03.
¶This data represent analysis of all ≥3% decrease in SpO_2 from baseline values, and not restricted to those with the nadir <90%.

Poster 012

REVIEW OF STILLBIRTH IN A CANADIAN TERTIARY CARE CENTRE

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Background:

It was observed that our tertiary centre stillbirth rate was higher than both the provincial rate of 0.67% at 0.76%. There was little information available to determine the cause of the increased rate in stillbirths. Research has identified risk factors for stillbirth.

Objective:

The objective of our study was to identify those risk factors present in stillbirth deliveries in our tertiary care centre and determine if the regional population has an increase in modifiable risk factors.

Methods:

The charts of 183 stillbirth deliveries with a gestational age greater than or equal to 20 weeks or a birth weight greater than or equal to 500g between April 1, 2011 and March 31, 2016 were reviewed. Information collected from maternal charts includes maternal demographics, known risk factors of stillbirth during pregnancy, delivery parameters, and pathologic examination.

Results:

The autopsy rate was 42.5%, placental pathology rate was 100%, and karyotype was found in 20.2% of the reviewed cases. Cause of stillbirth was unexplained in 45.4% of the cases. There was a significantly higher rate of deaths caused by abruption ($p = .002$), known cord accident ($p < .001$), preterm birth ($p < .001$), and twin complications ($p = .028$) but a lower rate caused by ascending infection ($p < .001$) and placental lesion ($p < .001$) than reported in the literature and there was an increased rate of smoking ($p < .001$), intravenous drug use ($p < .001$), Type 1 and 2 diabetes ($p = .042$), and preexisting hypertension ($p = .007$).

Conclusions:

The stillbirth rate in our centre is higher than the national rate although not significantly. The rate of autopsy and karyotype was low in our centre. Identified risk factors present in our population may contribute to the increased rate of stillbirth.

Poster 014

RESPIRATORY MORBIDITY IN LATE PRE-TERM TWIN NEONATES

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Background:

A recent RCT by Gyamfi-Bannerman et al. provided evidence that the administration of corticosteroids to women with a singleton pregnancy at risk of late-preterm birth (34+0 to 36+6 weeks) decreases neonatal respiratory morbidity. The question of whether the findings of this RCT can be extrapolated to twins is of major interest. The answer to this question depends on whether late-preterm twins face similar risk of respiratory morbidity compared to late-preterm singletons.

Objective:

Our aim was use a prospective cohort of twins to assess the rate of respiratory morbidity among late-preterm twins.

Methods:

We used a cohort study design based on data from an RCT on mode of delivery in twin pregnancies (Twin Birth Study). We restricted the analysis to women who gave birth at 34-36 weeks' gestation. The primary outcome was the same composite outcome of respiratory morbidity that was used in the RCT of Gyamfi-Bannerman et al.

Results:

A total of 2,324 women with twins who gave birth during the late-preterm period met the study inclusion criteria. The overall rates of respiratory morbidity and severe morbidity were 16.5% and 9.3%, respectively, and were similar to the corresponding rates in the placebo group of the RCT by Gyamfi-Bannerman et al (14.4% and 12.1%, respectively). The rate of respiratory morbidity was highest at 34 weeks and decreased with each week of gestation (Figure 1). 4) Factors that were independently associated with respiratory morbidity were birth at 34 or 35 weeks and being the second twin (Figure 2).

Conclusions:

This large prospective study of twins demonstrated that the overall rate of respiratory morbidity in late-preterm twins is similar to that reported in late-preterm singletons and is especially high among those born at 34 weeks. These findings provide support to the idea that the benefits of steroids in late-preterm singleton pregnancies may be extrapolated to late-preterm twins.

Factors	Risk of respiratory morbidity Adjusted OR (95%-CI)	
	Respiratory morbidity	Severe respiratory morbidity
Gestational week at birth		
34 weeks (vs. 36 weeks)	**4.4 (3.1-6.3)**	**4.3 (2.7-6.9)**
35 weeks (vs. 36 weeks)	**2.2 (1.6-3.1)**	**2.6 (1.7-4.2)**
Non-presenting twin	**1.3 (1.1-1.5)**	**1.2 (1.0-1.5)**
Exposure to antenatal corticosteroids	1.0 (0.7-1.4)	0.9 (0.6-1.5)
Cesarean section	1.2 (0.9-1.6)	1.4 (1.0-2.1)
Monochorionicity	1.0 (0.8-1.4)	1.0 (0.7-1.5)

Poster 015

RESVERATROL SUPPLEMENTATION IMPROVES MATERNAL GLUCOSE TOLERANCE AND PREVENTS GESTATIONAL DIABETES-INDUCED CARDIOMETABOLIC DISEASE DEVELOPMENT IN THE RAT OFFSPRING

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Background:

Gestational diabetes mellitus (GDM), which affects 5-10% of pregnancies, is characterized by hyperglycemia in the third trimester of pregnancy. GDM increases cardio-metabolic disease risk in the offspring. Resveratrol (RESV), a naturally produced polyphenol, has anti-oxidant properties and positive metabolic health effects.

Objective:

We hypothesize that RESV administration (150 mg/kg/day) to pregnant GDM dams in the third trimester of pregnancy and during lactation will improve maternal glucose tolerance and protect their offspring from GDM-induced obesity and heart disease.

Methods:

Six weeks prior to mating, female Sprague-Dawley rats consumed a high fat and sucrose (HFS) diet (45% kcal fat) to induce GDM, while lean control females received a low fat (LF) diet (10% kcal fat). In the third trimester, a subgroup of pregnant HFS-fed rats was supplemented with RESV (150 mg/kg). After weaning, offspring were randomly assigned to a HFS or LF diet for 12 weeks. Offspring lipid levels were analyzed by ELISA and dual-energy X-ray absorptiometry scans were used to assess lean and fat body mass. Echocardiography was used to assess cardiac function and morphometry.

Results:

RESV improved maternal glucose tolerance, without affecting maternal body weight. In neonatal offspring, RESV prevented GDM-induced elevated body and heart weights ($p<0.05$). GDM induced obesity in 15 week-old offspring which was prevented in offspring exposed to GDM+RESV ($p<0.05$). Liver, cardiac, and circulating triglycerides were reduced in GDM+RESV offspring versus GDM offspring ($p<0.05$). Consumption of HFS by the offspring increased fat mass and percent body fat in all groups ($p<0.05$). GDM+RESV offspring exhibited similar heart weights to that of lean offspring but had reduced left ventricular posterior wall thickness against GDM offspring ($p<0.05$). Functional parameters were similar in all groups.

Conclusions:

Maternal RESV supplementation during the third trimester of pregnancy and lactation prevented GDM-induced obesity, cardiac hypertrophy, and cardiac and hepatic steatosis in the offspring.

Poster 021

EXAMINING THE EFFECTS OF HYPERTENSION ON THE MICROCIRCULATION OF THE EYE IN PREGNANCY USING OPTICAL COHERENCE TOMOGRAPHY

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Background:

Earlier studies suggest the hemodynamic changes that accompany normal pregnancy invoke an autoregulatory (AR) response in the inner retinal circulation causing the retina to thin. Women with complicated pregnancies thin their maculae in the first 20 weeks of gestation similar to those with normal pregnancy. However, thinning may be lost later in gestation due to either loss of gain of the AR reflex, or due to definitive capillary leak. One of the common causes of capillary leak is a hypertensive disorder of pregnancy (HDP).

Objective:

The objectives of this study were 1) to interrogate the upper threshold of AR control in pregnant patients with HDP with and without chronic hypertension (cHTN), and 2) to examine the relationship between sustained increases or decreases in mean arterial pressure (MAP) and macular thickness.

Methods:

We followed a prospective cohort of pregnant patients at risk for HDP from gestational age < 20 weeks to delivery. Macular thickness was measured at each clinical encounter using Optical Coherence Tomography (OCT). MAP was estimated using an oscillometric device. MAP at the time of first discovery of capillary leak was taken as evidence that the upper threshold for AR had been breached. The relationship between MAP and retinal thinning or loss of thinning was examined in patients with cHTN where MAP changed greater than ±5 mmHg over the course of pregnancy without evidence of capillary leak.

Results:

In women with cHTN (n=11), we found a reciprocal relation between MAP and macular thickness ($p < 0.00005$). In women where loss of retinal thickness occurred due to breach of the upper threshold of AR (n=19), capillary leak occurred at a normal blood pressure often weeks before BP started to rise.

Conclusions:

OCT can reliably detect capillary leak as an early marker of patients destined to develop a HDP with high risk of hypertensive emergency.

Poster 024

DIFFERENTIAL EFFECT OF PRENATAL PSYCHOLOGICAL STRESS AND INTERLEUKIN (IL)-1ß ON MATERNAL AND OFFSPRING CYTOKINE GENE EXPRESSION IN UTERUS: MATCH OR MISMATCH?

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Background:

Maternal stress and inflammation are recognized as important contributors to pregnancy and offspring outcomes. Previously we showed that exposing pregnant rats to two-hit stress leads to increased gestational length variation and reduces maternal F0/ offspring F1 weight gain.

Objective:

We proposed that stressors exert differential effects on F0 and F1 uterine gene expression of cytokines, involved in pregnancy maintenance and parturition, when combined than either alone.

Methods:

F0 dams received psychological Stress (restraint/forced swimming; gestational days [GD]12-18) and/or immune stress (IL-1β 5µg/d i.p., saline as sham; GD17-delivery). Mothers were sacrificed at weaning and F1 females as virgin adults for uterus collection. mRNA abundance of *Il1a, Il1b,* IL-1 receptor antagonist *Il1rn, Il6* and *Il10* was analysed by qRT-PCR, expressed relative to Cyclophilin. Two-way ANOVA, significance at $P \leq 0.05$.

Results:

IL-1β upregulated gene expression in maternal uteri independent of psychological Stress exposure. Remarkably, F1 cytokine expression patterns were opposite to those in mothers. *Il1a* expression was not affected in F0 tissues, while Stress*IL-1β interaction reduced F1 *Il1a* to levels below those of controls ($P<0.01$). In F0, IL-1β upregulated its own mRNA abundance ($P=0.05$) whereas *Il1rn* was upregulated by IL-1β and Stress separately ($P<0.05$ and $P<0.01$). Contrarily, in F1 addition of IL-1β after Stress mediated the separate effects ($P=0.001$). IL-1β increased *Il6* 8-fold in F0 ($P<0.01$), while two-hit F1s displayed the lowest expression levels (Stress*IL-1β $P<0.05$). Immune stress upregulated maternal *Il10* abundance as well ($P<0.01$), with an opposite trend seen in offspring.

Conclusions:

Our results support the hypothesis that stressors exert different effects on F0 and F1 uterine cytokine gene expression when combined versus each alone, though this appears generation-dependent. The dampened outcomes in adult progeny could fit in the match/mismatch fetal programming concept, with offspring expecting a stressful life, thus having lower baseline expression. Putting F1s through gestation may reveal whether these are signs of maladaptation or resilience.

Poster 028

HEALTH CARE PROVIDER ATTITUDES TOWARD SHARED DECISION-MAKING FOR MODE OF DELIVERY AFTER A PREVIOUS CAESAREAN

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Background:

Shared decision-making (SDM) interventions for next birth after caesarean section (NBAC) increase patient knowledge, realistic risk perceptions, and reduce decisional conflict however they are not associated with increased SDM.

Objective:

Identify perceived barriers and facilitators to implementing SDM and a patient decision aid (PDA) into routine practice for choice of NBAC.

Methods:

Online survey administered to primary maternity care providers (fall 2016) in a health authority in western Canada with the highest regional caesarean section rate in the country (36.6% 2014-15). Questions explored provider demographics, clinical decision-making patterns, access to health service resources, experience with adverse outcomes, experiences with SDM, patient-provider communication, and the provider perceptions subscale of the Control Preferences Scale (CPS). Quantitative data were summarized and stratified for hospital acuity level and professional role. Qualitative survey responses were analyzed using thematic analysis.

Results:

Ninety-three surveys were completed by family physicians (n=26), midwives (n=39), and obstetricians (n=28), representing 48% of maternity care providers in the region. Respondents perceived the key barrier to PDA implementation was having limited surgical and anaesthesia services for emergency caesarean to support the option of planned vaginal birth after caesarean. Perceptions of limited resources created patient safety and medico-legal concerns among providers. Key facilitators were present included strong agreement with SDM for patients considering NBAC (80.6%) and having time to engage in SDM (79.6%). Respondents perceived that the optimal time to begin SDM for NBAC was early postpartum after the caesarean (66.7%) to facilitate information exchange before women form a preference for NBAC. Most providers (84%) preferred that the individual patient make the decision for NBAC, either alone (n=40) or after considering the provider's opinion (n=38).

Conclusions:

Resource and medico-legal concerns may negatively impact the feasibility and acceptability of implementing a decision aid for NBAC. These factors require interventions to support PDA implementation at the provider and organizational levels.

Poster 029

EXPOSURE TO GESTATIONAL AND PRE-GESTATIONAL DIABETES INCREASES CARDIOVASCULAR RISK IN YOUTHS AND YOUNG ADULTS

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Background:

One in 20 Canadian children are exposed to gestational (GDM) or type 2 diabetes (T2D) in utero.

Objective:

We investigated if this exposure increases cardiovascular risk (CVR) in adolescence and early adulthood.

Methods:

We designed a prospective birth cohort (1979-2005) from Manitoba administrative data and followed it until 2015 (10-35 years old). Inclusion criteria was exposure to GDM (diabetes diagnosed between 20 gestational weeks and 6 weeks post-partum; n=9344), T2D (diabetes diagnosed <20 gestational weeks; n=3481), or no diabetes in pregnancy (n=332 540). Exclusions included congenital cardiac anomalies and diabetes other than GDM or T2D. The main outcome was a composite of overt cardiovascular disease (eg. myocardial infarction, stroke) and/or cardiovascular risk factors (eg. dyslipidemia, hypertension, T2D) determined by hospitalisations (≥1), physician visits (≥2 within 3 years), or drug prescription (≥2). Chi-square tests and ANOVA were used to investigate statistical significance ($\alpha \leq 0.05$) of these preliminary results.

Results:

Offspring exposed to no diabetes, GDM, or T2D respectively had similar age at follow up (21.8±6.7 vs 20.1±6.2 vs 19.5±6.2 years), female sex (49.2% vs 47.4% vs 48.8%) and birth weight (3.47±5.30 vs 3.61±5.87 vs 3.53±6.39 kg). At up to 25 years of follow up, 15 778 (4.6%) offspring had developed ≥1 CVR. Exposure to maternal diabetes increased incidence of CVR (4.4% vs 6.9% vs 10.8%, p<0.0001) and reduced age at first CVR (20.2±6.1 vs 18.4±5.9 vs 16.5±5.4 years old, p<0.0001). Although the proportion of males and females affected by CVR was similar (4.0% vs 5.1%), maternal diabetes exposure might increase female's risk (CVR incidence in males: 3.9% vs 5.7% vs 9.2%, p<0.0001; females: 5.0% vs 8.3% vs 12.5%, p<0.0001).

Conclusions:

Exposure to maternal diabetes increases risk for early-onset cardiovascular disease. Future analyses will include a survival analysis and will adjust for potential confounders (sex, preterm birth, age, birthweight, maternal age at birth).

Poster 030

POSITIVE SOCIAL DETERMINANTS OF HEALTH COULD PREVENT CARDIOVASCULAR RISK AFTER EXPOSURE TO MATERNAL DIABETES IN YOUTH AND YOUNG ADULTS

Laetitia Guillemette, University of Manitoba; **Elizabeth Sellers**, Children's Hospital Research Institute of Manitoba; **Brandy Wicklow**, Children's Hospital Research Institute of Manitoba; **Garry X Shen**, University of Manitoba; **Randy Fransoo**, University of Manitoba; **Vernon Dolinsky**, University of Manitoba; **Joseph Gordon**, University of Manitoba; **Davinder Jassal**, University of Manitoba; **Allison Dart**, Children's Hospital Research Institute of Manitoba; **Todd Duhamel**, University of Manitoba

Background:

Prenatal exposure to gestational (GDM) or type 2 diabetes (T2D) may increase cardiovascular risk (CVR) in offspring.

Objective:

We investigated if positive social determinants of health (SDoH) previously associated with chronic diseases could prevent CVR after these exposures.

Methods:

We designed a prospective birth cohort (1979-2005) from Manitoba administrative and clinical data and followed it until 2015 (10-35 years old). Inclusion criteria was exposure to GDM (diagnosed between 20 gestational weeks and 6 weeks post-partum; n=9344) or T2D (diagnosed <20 gestational weeks; n=3481). Exclusions included congenital anomalies and diabetes other than GDM or T2D. The main outcome was a composite of overt cardiovascular disease (eg. myocardial infarction, stroke) and/or risk factor (eg. dyslipidemia, hypertension, T2D) determined by hospitalisations (≥1), physician visits (≥2 within 3 years), or drug prescription (≥2). SDoH were breastfeeding initiation (BFI), male gender, and high school completion (HSC) if ≥17 years old. Chi-square tests and ANOVA were used to investigate statistical significance ($\alpha \leq 0.05$) of these preliminary results.

Results:

Offspring exposed to GDM or T2D had similar age at follow up (20.1±6.2 vs 19.5±6.2 years), birthweight (3.61±5.87 vs 3.53±6.39 kg), BFI (79.8% vs 77.2%), and female sex (47.4% vs 48.8%), but different rates of preterm birth (7.6% vs 16.9%) and HSC (52.1% vs 44.4%). At up to 25 years of follow up, 1023 (8.0%) offspring had developed ≥1 CVR. Having 3 SDoH nearly halved CVR incidence vs having two or less (5.1% vs 9.0%, $p<0.0001$).

Conclusions:

Positive SDoH such as BFI and HSC could prevent CVR after exposure to maternal diabetes. Sex differences might indicate need to promote equity in prevention and treatment of CVR. Future analyses will add income and urban vs rural living in the model and adjust for potential confounders (preterm birth, age, birthweight, maternal age at birth).

Poster 031

STRUCTURAL AND SOCIAL: BARRIERS TO LATE TERMINATION OF PREGNANCY CARE IN CANADA

Tamar Austin, Simon Fraser University; **Erica Kilius**, Simon Fraser University; **Melanie Basso**, BC Women's Hospital + Health Centre; **Caitlin Johnston**, BC Women's Hospital + Health Centre

Background:

Although abortion is part of the lived experience of women, there is little published qualitative research on the topic, and even less for late termination of pregnancy (ToP) services in Canada. The resulting lack of information leaves program evaluators and caregivers with little guidance when creating and assessing abortion services.

Objective:

A literature review was undertaken to assess patient experiences with late ToP care.

Methods:

The databases Ovid, Sociological Abstracts, CINAHL, and Google Scholar were used to search peer-reviewed literature, using keywords: late pregnancy termination, abortion, fetal anomaly, induction, patient experiences, qualitative, quality of care, access to care, Canada. Qualitative research articles were preferred. Exclusion criteria included: articles over fifteen years old, not written in English, and from countries with healthcare systems that differed widely from Canada's. Of the 252 papers reviewed, 23 were selected for full reading based on relevance to the topic.

Results:

Our review suggests that a number of structural and social barriers influence women's ToP experiences; however, late ToP was not well explored. Patients identified the abortion system in Canada as fragmented and often inaccessible. Wait times, lack of pain management, and privacy concerns were cited as negatively affecting patient experience. Location and travel, compounded by multiple appointments, was mentioned as a significant barrier to care. Non-judgmental, knowledgeable staff were valued by women and perceived as providers of higher quality of care. While unbiased staff and practitioner-provided information were seen as a source of empowerment for women during their decision-making process, it remains unclear to what extent this influenced women's final decisions, and whether different means of communication played any part.

Conclusions:

The experiences of women undergoing late termination of pregnancy in Canada are poorly understood. More research is required to develop a better understanding of women who undergo late ToP to improve programs and services.

Table 2. Characteristics of articles most frequently cited.

Articles	Country	Sample Size	Data Collection	Methodology	Explored
Alex and Hammarstrom, 2004	Sweden	5 women, aged 19-33	Semi-structured in depth interviews, 1 month after their abortion	Qualitative, content analysis, feminist methodology	Explored women's narrative of their experiences, themes including: decisionmaking process, abortion experiences, post-abortion experiences.
Andersson et al. (2014)	Sweden	23 women	33 women completed interviews, of those 33, 23 were interviewed	Cross-sectional	Women's expectations and experiences of undergoing second trimester abortion
Cano and Foster, 2016	Canada	16 women	Semi-structured phone interviews of women in the Yukon who underwent an abortion	Thematic, qualitative	Document women's experiences obtaining abortion services in the Yukon; expore financial and personal costs, as well as how services can be improved
Fischer and Lafarge, 2014	UK	361 women	Qualitative data was selected from a cross-sectional online survey examining women's experiences of a fetal anomaly termination.	Thematic, qualitative	Explored themes of what women consider 'good' abortion care; environment, timeframe, level of care, role of healthcare professionals, acknowledging women's circumstances, and enabling women to make choices.
Foster et al, 2016	Canada	300 women	Semi-structured phone interviews of women across Canada who had had an abortion within the last five years.	Thematic, qualitative	Document women's experiences obtaining abortion services, explore how access to services could be improved.
Foster et al, 2017	Canada	33 women, who had abortions between 2009-2014, and then after 2015.	Semi-structured phone interviews	Thematic, qualitative	Document women's experiences obtaining abortions care in NB; examine the ways in which geography, age, and language affect access to care
Jones et al. (2017)	Austrailia	10 qualitative studies	Meta-synthesis of 10 qualitative studies	Systematic review	Women's experiences with labour and birth, in the context of second semester termination due to fetal anomoly
Kerns et al. (2012)	United States of America	21 women over the age of 18	21 women were interviewed over the telephone 1 week after their procedure	Grounded Theory	How women who are terminating a pregnancy, due to fetal anomoly or maternal complications, decide between a surgical termination (D&E) or a medical abortion (induction)
Korenromp et al. (2007)	Netherlands	217 women and 169 men	217 women and 169 men filled out a questionnaire 4 months after the termintion		Identifying the short-term factors influencing the psychological outcomess of those who have experienced termination due to fetal anomoly, in order o identify those patients most vulnerable to psychopathology
LaFarge et al. (2014)	United Kingdom	14 qualitative studies	meta-analysis of 14 studies	systematic review	Women's experiences with pregnancy termination due to fetal anomoly
McCoyd (2006)	United States of America	30 women between the ages of 21 - 45 years	30 women across the United States were interviewed over a 10 month period	Grounded Theory	The decision-making and bereavment process of women who undergo the termination of a desired pregnancy following the diagnosis of a fetal anomoly
McLemore et al, 2014	USA	5,255 women (aged 15 or older) who had first trimester abortions (between 12-14 weeks gestation)	Women completed surveys	Thematic, qualitative	Open question of "Is there anything you'd like to tell us about your experience?". Themes included clinic- and patient- level factors that impact how patients rate their experience.
Mukkavaara et al. (2011)	Sweden	6 women between the ages of 15 - 25 years	6 women were interviewed in person, 1 -4 months after their procedure	Qualitive narrative approach	Women's experience with abourtion in the second trimester
Norman, 2012	Canada	Surveys	Statistics Canada data from 1975-2005 on age-specific abortion and first abortion rates were collected.	Mixed methods.	Abortion rates since legalization of abortion services in 1988

Poster 032

SAGE: COLLABORATIONS THROUGH DATA SHARING – TALES FROM THE FIELD

Jennifer Zwicker, University of Calgary; **Hannah Lloyd-Jones**, PolicyWise for Children & Families; **Peter W. Choate**, Mount Royal University

Background:

SAGE (Secondary Analysis to Generate Evidence) is a collaborative data repository platform connecting stakeholders through the secondary use of data related to health and social wellbeing, and increasing the value of data by using it in new ways to inform policy and practice.

Objective:

To highlight success stories and lessons learned from SAGE with two case studies in data sharing. Shared learnings: key incentives for sharing data in an ethical manner to encourage collaboration, inform policy and build capacity, as well as strategies for overcoming barriers to data sharing.

Methods:

SAGE's development and governance structure was informed by in-depth literature reviews, an environmental scan, and by engaging experts. SAGE's evaluation model focuses on the continual learning of lessons and understanding of successes.

Results:

Accessing secondary data allows researchers to better understand challenges. Dr. Zwicker used the All Our Families dataset to explore whether visiting certain types of healthcare providers during preconception and pregnancy leads to a greater likelihood that women will receive certain types of advice. To change the conversation around Fetal Alcohol Spectrum Disorder (FASD), Dr. Choate analysed the *What Albertans Know about FASD* dataset. Many FASD-only surveys draw upon existing stereotypes, whereas this dataset helps to alleviate that bias issue. Both teams will use their findings to formulate recommendations for relevant policy makers and professionals. Dr. Zwicker's project includes a student capacity building opportunity. By building trust with researchers and facilitating ethical access to data, SAGE helps strengthen capacity and inform policy and practice.

Conclusions:

SAGE has overcome significant barriers to data sharing but challenges persist. Our vision is to improve outcomes for Alberta's children, youth, families and communities by sharing data and to contribute to cultural change in academia where it becomes second nature for researchers to design their studies for secondary data use in an ethical and legal manner.

Poster 043

THE RATIO OF SOLUBLE FMS-LIKE TYROSINE KINASE-1 AND PLACENTAL GROWTH FACTOR AS A PREDICTIVE TOOL IN WOMEN WITH PREECLAMPSIA: A META-ANALYSIS.

Swati Agrawal, University of Oxford; **Ana Sofia Cerdeira**, University of Oxford; **Christopher Redman**, University of Oxford; **Manu Vatish**, University of Oxford, U.K.

Background:

Globally the maternal morbidity secondary to preeclampsia remains high. There is an important need for simple, accurate and non-invasive biomarkers to predict preeclampsia which would permit risk stratification and appropriate management. The role of angiogenic factors in the pathogenesis of preeclampsia has been clearly outlined, demonstrating the balance between sFlt-1 (anti-angiogenic) and PlGF (pro-angiogenic) being altered in favour of anti-angiogenesis. The combination of sFlt-1 and PlGF as a ratio has been used as a mathematical expression of this imbalance, which on average heralds the onset of disease and may be present before the appearance of clinical symptoms.

Objective:

The objective was to explore the predictive accuracy of the sFlt-1 and PlGF ratio in pre-eclampsia.

Methods:

The methodological quality of the included studies was assessed by two independent reviewers using QUADAS-2. We followed the methods for conducting meta-analyses of observational studies to define our inclusion criteria as 1) Original research studying the sFlt-1/PlGF ratio in plasma/serum for predicting preeclampsia; 2) Analyses after 19 weeks of gestation; 3) Excluding multiple and non-viable pregnancies 4) Sufficient data to construct a 2 x 2 diagnostic table.

Results:

The 15 manuscripts analyzed were published between 2007 and 2017, from all over the world with no preponderance to a particular region. A total of 534 cases of preeclampsia and 19587 controls were included in the meta-analysis. The ratio was found to have high sensitivity (80%), specificity (92%) and positive likelihood ratio (10.5) and a low negative likelihood ratio (0.22) in predicting preeclampsia in both high and low-risk patients. Most of the studies have not made a distinction between early and late onset disease and therefore, the analysis could not be done.

Conclusions:

The attributes of the sFlt-1 and PlGF ratio should prove useful to help in decision making, and treatment stratification of pre-eclampsia, thus decreasing health care costs.

Poster 045

BARRIERS AND FACILITATORS TO PERINATAL CARE AND SUPPORT FOR CRIMINALIZED WOMEN

Martha Jane Paynter, Dalhousie University School of Nursing

Background:

In response to Julie Bilotta's traumatic, unassisted birth experience in 2012 at the Ottawa Carleton Detention Centre, a group of student nurses, midwives, lawyers, social workers, doulas, policy researchers and professionals in these fields created a non-profit organization to provide interdisciplinary support services to criminalized women in Nova Scotia in pregnancy and post-partum. WWW serves women and trans women at the Central Nova Correctional Facility in Dartmouth (provincial jail), the Nova Institute for Women in Truro (federal prison) and in community-based transitional housing.

Objective:

This presentation aims to illustrate the challenges facing criminalized women to receive adequate support and care in pregnancy and early postpartum. It aims to improve health care provider understanding of often invisible barriers and offer strategies to improve support.

Methods:

WWW services include support for pregnant inmates for abortion, miscarriage, labour and delivery, postpartum and breastfeeding, and NICU. WWW provides referrals to public health, legal support, housing and parenting education. WWW members facilitate monthly women's health workshops on topics determined by the women: contraception, STIs, fertility, stress, parenting and self-care. WWW advocates for women to live with and breastfeed their infants and children while incarcerated. As scholarly service, the work of this organization provides valuable insight into the experiences of criminalized women in pregnancy and post partum and illuminates the institutional structures that create barriers to care.

Results:

WWW has served 18 women since it first gained clearance to a carceral facility in 2014. Hundreds of women have attended WWW-facilitated women's wellness workshops. WWW advocacy campaigns include a ban on solitary confinement for pregnant women, the right to breastfeed/pump, and broad campaigns for improved housing options on release.

Conclusions:

WWW fills a critical gap in support services for criminalized women in pregnancy and post partum and illuminates barriers and facilitators to reproductive health support for this population,

Poster 047

PLACENTAL AUTOPHAGY: A MARKER FOR PLACENTAL DYSFUNCTION IN OBESE WOMEN

Matthew Cohen, Western University; **Aidan Pucchio**, University of Guelph, **Barbara DeVrijer**, Western University; **Trevor Shepherd**, Western University; **Genevieve Eastabrook**, Western University

Background:

Autophagy is a physiologically important cellular stress response which can be impaired in tissues of obese individuals and has been implicated in placentally mediated diseases of pregnancy.

Objective:

The objective of this study is to compare markers of autophagy in placentas from obese and non-obese pregnant women.

Methods:

Placentas were collected following elective caesarean sections of uncomplicated, singleton, term pregnancies in obese (pre-pregnancy BMI >30 kg/m2) and normal-weight controls (pre-pregnancy BMI <25). Patient demographics were collected and analyzed. Expression and localization of autophagy in placental tissue was assessed by immunohistochemistry (IHC) using antibodies for p62 and LC3B on formalin-fixed paraffin-embedded tissue. Expression of the same proteins were quantified using western blots.

Results:

Placentas were collected from 30 subjects: 15 obese patients and 15 normal-weight controls (BMI 42.3 vs. 21.1 kg/m2, $p<.05$). The fetal weight was significantly higher in the elevated BMI group with a mean difference of 625 g +/-213 g ($p<.05$). Placenta weight was also significantly higher in the obese group, with an average difference of 169.7gm +/-51.2 ($p<.05$). In the central location of obese patient placentas, there were significantly lower IHC scores for LC3B, indicating decreased autophagy (3.3±0.7 vs. 4.7±1.3, $p<.05$). There was a trend toward decreased IHC-scores in the middle and peripheral locations of obese patient placentas. Western blot analysis confirmed a similar trend, with decreased LC3B in all sites of obese placentas. There were significantly lower IHC scores for LC3B in the placentas of male neonates compared to females within the obese patient group (3.6 ±1.4 vs. 5.4 ±1.1, $p<.05$).

Conclusions:

Our study demonstrates impaired placental autophagy in obese compared to normal weight populations. Placentas of male neonates had evidence of dysfunctional autophagy compared to female counterparts in the obese patient group. These differences may provide insight into the underlying mechanism of placentally mediated diseases of pregnancy in obese patients.

Poster 048

CONNECTING WITH ADOLESCENT MOTHERS: PERSPECTIVES OF EXPERT HOSPITAL-BASED PERINATAL NURSES

Ashley Desrosiers, School of Nursing, University of Ottawa; **Wendy E. Peterson**, School of Nursing, University of Ottawa; **Barbara Davies**, School of Nursing, University of Ottawa; **Judy Rashotte**, School of Nursing, University of Ottawa; Children's Hospital of Eastern Ontario

Background:

In Canada, approximately 12,000 infants are born annually to adolescent mothers (AM) (<20 years old). The pervasiveness of challenging life circumstances and poor health outcomes associated with AMs identify the dyad as an at-risk group. During the maternal-newborn hospital stay, nurses have an opportunity to engage with, assess and teach mothers. Unfortunately, AMs and nurses have reported that negative nursing attitudes and behaviors negatively impact AMs' hospital experiences and their transition to motherhood.

Objective:

To examine how perinatal nursing care for AMs is influenced by characteristics of individual nurses and the hospitals in which they work.

Methods:

Thorne's interpretive descriptive approach was employed for this multiple-case qualitative study design. A purposive sampling technique was used to recruit nurses expert in providing adolescent-friendly care, as identified by their clinical leaders, from eight perinatal units at four hospital sites in one city in Ontario. Twenty-seven nurses were interviewed and described how they adapted their care for AMs, how they learned to provide adolescent-friendly care and the facilitators and barriers to providing adolescent-friendly care. Data were analyzed for recurring themes.

Results:

Nurses identified unconditional acceptance and the formation of genuine connections as overarching themes of the provision of adolescent-friendly perinatal care. They described treating mothers the same regardless of age and/or background. These nurses reiterated the importance of adapting care by being lenient, yet knowing when to enforce rules. Participants explained that there are challenges in providing care to AMs such as adolescent development and the fact that some youth live chaotic lives. However, nurses described caring for AMs as rewarding and they put forth additional effort as they value all mothers having a positive experience.

Conclusions:

This research contributes to our understanding of the care experiences and educational needs of nurses and has implications for nursing education and the development of adolescent-friendly hospital policies.

Poster 049

IMPROVING CARE FOR LATE PRETERM INFANTS: A MAPPING REVIEW OF DISCHARGE GUIDELINES

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Background:

The transition of late preterm infants (LPIs) (34 0/7 and 36 6/7 weeks of gestation) from hospital to home can be stressful for parents because the LPI's immature central nervous system makes it difficult to anticipate and respond to their needs creating a barrier for confident care. Discharge guidelines should be implemented to ensure that the LPI is mature enough for safe discharge and their parents have acquired the necessary skills and resources to properly care for their infant at home.

Objective:

To identify prevalent discharge recommendations for LPIs and determine how these recommendations vary among discharge guidelines.

Methods:

A mapping review of the literature was undertaken to identify recommendations included in LPI discharge guidelines. Systematic searches were undertaken on relevant databases as well as targeted websites for practice guidelines. Guidelines or reviews were included if they were published in 2013-2017 and provided an overview of or discussed discharge recommendations specifically for the LPI population. Results were summarized in narrative and tabular forms.

Results:

After applying the criteria of relevance (i.e., within 4 years), 8 guidelines and 3 reviews met the inclusion criteria. Among the 13 thematic areas identified across guideline recommendations, feeding and hyperbilirubinemia were universal themes while cardiorespiratory issues, thermal instability, infection, support from health care providers, parent education and parent-infant bonding were among the most common. None of the guidelines discussed all 13 themes.

Conclusions:

Several guidelines were excluded after the criteria of relevance was applied, indicating that many currently utilized guidelines are due for revision. Feeding and comorbidities such as hyperbilirubinemia, cardiorespiratory issues and thermal instability are important criteria surrounding the discharge of LPIs. Findings of this mapping review will inform systematic review(s) to develop evidence informed LPI discharge recommendations for each thematic area.

Table 1. Thematic areas identified across guideline recommendations

Documents	Thematic Areas													# of thematic areas per document (out of 13)
	Feeding	Support from health care providers	Parent-infant bonding	Cardiorespiratory issues	Hypoglycemia	Hyperbilirubinemia	Infection	Thermal Instability	Parental Education	Sleep Practice	Readmission	Social support (non-medical)	Home environment	
Whyte 2017 (1)	x	x	x	x	x	x	x	x		x	x		x	11
Barkemeyer 2015 (2)	x	x	x	x		x		x	x	x	x		x	10
Phillips et al. 2013 (3)	x	x	x		x	x	x		x	x		x	x	10
CTL2013 (4)	x	x	x	x		x	x	x	x					8
BWH 2016 (5)	x	x	x	x		x	x	x	x	x		x	x	11
AHS 2017 (6)	x	x	x	x	x	x	x	x	x	x				10
WAPC 2013 (7)	x		x	x	x	x	x	x	x	x	x			10
Zlotnik 2013 (8)	x	x	x	x	x	x	x	x	x	x				10
KMS 2014 (9)	x	x	x	x	x	x	x	x	x	x		x	x	12
Forsythe & Allen 2013 (10)	x	x		x		x	x	x	x		x		x	9
Horgan 2015 (11)	x	x		x	x	x		x	x					7
# of documents that discuss each thematic area (out of 11)	**11**	**10**	**9**	**10**	**7**	**11**	**9**	**10**	**10**	**8**	**4**	**3**	**6**	

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Poster 051

"VID-KIDS" VIDEO-FEEDBACK INTERACTION GUIDANCE FOR IMPROVING INTERACTIONS BETWEEN DEPRESSED MOTHERS AND THEIR INFANTS: A RANDOMIZED CONTROL TRIAL (RCT)

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Background:

Postpartum depression (PPD) is 'toxic' to infant development because depression diminishes maternal sensitivity/responsiveness to infant cues. Infants perceive these behaviours as stressful, triggering cortisol release, which, at persistently elevated levels, constrains a critical period of brain development.

Objective:

Treating PPD has not consistently improved maternal-infant interaction quality or children's developmental outcomes. Parenting training, such as VID-KIDS, promotes sensitive, responsive interactions that may help infants of depressed mothers develop optimally.

Methods:

VID-KIDS is a brief (3-session), nurse-guided intervention designed to improve maternal-infant relationships, reduce maternal depressive symptoms, and optimize infant cortisol. A feasibility pilot (n = 12), showed positive, large effects on maternal-infant interaction quality (d =1.43) and infant cortisol patterns (d=.5). VID-KIDS offers mothers a strengths-based approach for improving sensitivity and positive responsiveness toward their infants by promoting "serve and return" (e.g. baby smiles, mother smiles back) interactions. We are presently conducting a CIHR-funded RCT to evaluate VID-KIDS on: 1) maternal-infant interaction quality (primary outcome), and 2) infant cortisol patterns, infant development, maternal PPD and parenting stress (secondary outcomes). After baseline assessment, over the following 9 weeks, mothers randomized to the intervention receive 3 video-feedback sessions during home visits conducted at 3-week intervals, followed by post-test and delayed post-test (2 month) assessments.

Results:

Recruitment of depressed mothers with infants aged 2 – 6 months is underway via partnership with Calgary Public Health. To date, 23 dyads have enrolled. If successful, future aims are to conduct economic evaluation, commercialize VID-KIDS for dissemination by Nursing Child Assessment Satellite Training (NCAST) Programs, and examine potential integration of VID-KIDS into existing Calgary Public Health services.

Conclusions:

VID-KIDS fills a critical gap in PPD support programs that focus on maternal depression to the detriment of maternal-infant relationships and child development. This presentation will describe the video-feedback intervention protocol and progress to date for a parallel group RCT.

Poster 052

ASSESSING EFFECT OF CATHETER TYPE AND POSITION ON CENTRAL LINE-ASSOCIATED BLOOD-STREAM INFECTIONS IN THE NICU

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Background:

Central venous catheter usage in NICU remains associated with serious complications such as bloodstream infection. Also, low position (underdiaphragmatic) of umbilical venous catheter (UVC) is often tolerated despite not recommended. Few is known about the CLABSI risk associated with low position.

Objective:

To determine global central line associated bloodstream infections (CLABSI) rates for each central catheter subtype and position, and specific rates according to birth weight and gestational age. Dwell time before infection and microorganism associated were also evaluated.

Methods:

For this retrospective cohort study in a level 3 NICU from April 1st 2011 to March 31st 2016, information about catheter insertion, sociodemographic characteristics and bloodstream infections was extracted from local CVC and CLABSI databases, patient medical record, post catheter insertion X rays and Canadian Neonatal Network database. Difference in CLABSI rates and type of microorganisms involved were analyzed using Cox regression and Chi^2. Difference in dwell time was analyzed using a one-way ANOVA and evolution in time of the proportion of each of type of catheter presented as observational data.

Results:

1577 neonates were included and 2440 CVC were studied. CLABSI rate varied between 6.91 to 11.19 per 1000 catheter-days. Table 1 includes primary and secondary outcomes. Median dwell time before infection is 7 days for high UVC, 5 days for low UVC and 11 days for PICC ($p < 0.001$). Higher CLABSI rates particularly concerned neonates of < 32 wks GA and of BW < 1500g. PICC inserted by radiology team had lower CLABSI rate than those inserted by NICU team (3.44 vs 10.24, $p < 0.001$).

Conclusions:

CLABSI rates are significantly higher with UVC compared with PICC line and femoral CVC, particularly for newborn < 1500g. Low UVC compared to high UVC is associated to higher CLABSI rates. Dwell time is shorter for all UVC compared with PICC and femoral CVC.

Table 1. Primary and secondary outcomes

	High UVC	Low UVC	PICC Line	Femoral CVC	*p value*
Global CLABSI rate *	11.49[a,b,c]	17.31[d]	6.92[b,d]	5.14[c,d]	< 0.001
CLABSI* according to BW					
< 1000 g	23.57	42.90	10.92	2.62	< 0.001
1000-1500 g	9.98	21.23	7.02	5.52	0.02
> 1500 g	0.00	3.87	3.87	6.03	0.07
CLABSI* according to GA					
< 28 wks	25.13	35.60	10.59	0.00	< 0.001
28-32 wks	7.77	27.37	6.45	18.40	< 0.001
> 32 wks	0.00	4.01	3.52	0.50	0.17
Dwell time median (days) **	7 [5,9]	5 [3,8]	11 [7,20]	19 [8,32]	< 0.001
Microorganisms, n (%)					0.33
CoNS	30 (94)	31 (76)	90 (79)	6 (86)	
Staph aureus	1 (3)	2 (5)	11 (10)	0 (0)	
Gram-negative rods	1 (3)	4 (10)	6 (5)	0 (0)	
Candida sp.	0 (0)	0 (0)	2 (2)	0 (0)	
Other	0 (0)	4 (9)	4 (4)	1 (14)	

* CLABSI rate expressed per 1000 catheter-days ** IQR [25th, 75th]

a. p value = 0.002 when high UVC vs low UVC b. p < 0.001 when high UVC vs PICC c. p = 0.008 when high UVC vs femoral CVC d. p < 0.001 when low UVC vs PICC and femoral CVC (Cox regression adjusted for BW and SNAP II)

Poster 053

MENADIONE INCREASES ENDOGENOUS CARBON MONOXIDE PRODUCTION IN PREGNANT MICE.

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Background:

Pre-eclampsia (PE) is a multifactorial disease affecting 5-8% of pregnancies worldwide. 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), compared to a baseline level of approximately 1.5%. Despite its vasodilatory and anti-inflammatory properties, therapeutic CO administration is not widely accepted. Menadione (MD), a synthetic form of vitamin K, increases endogenous CO production in perfused human term placental tissue. Thus, the use of menadione to increase CO production in female mice was investigated.

Objective:

To quantify CO production in pregnant mice treated with MD, and elucidate its effects on maternal-fetal health.

Methods:

Pregnant CD-1 mice (Charles River, USA) were given either regular water or 6.5 g/L menadione sodium bisulfite (Sigma-Aldrich) *ad libitum* from GD10.5 to GD17.5. Water consumption was measured as average daily water intake per gram of body weight (mL/24 hr:g). Maternal and fetal %COHb levels for the treated and control groups were compared and calculated from CO peak area values using gas chromatography (GC). 20% w/w sonicates of perfused maternal hepatic, renal, splenic and placental tissue were also prepared to quantify tissue CO levels using GC.

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 ($p<0.05$).

Conclusions:

MD is an alternative method of increasing CO production in healthy, pregnant mice. Further investigation in a mouse model of PE is necessary to support the possibility of therapeutic benefit for this disease.

Poster 056

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

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Background:

Hypoxia is a common feature of pregnancy complications leading to placental oxidative stress and cardiac dysfunction in offspring. Loading the mitochondrial antioxidant MitoQ onto nanoparticles (nMitoQ) restricts nMitoQ to the placenta and prevents potential off-target effects on the fetus. We have previously shown that placental-conditioned media from nMitoQ-treated hypoxic dams improved fetal neuronal development.

Objective:

We hypothesized that placental oxidative stress will lead to secretion of factors that will alter fetal cardiomyocyte development and this will be prevented by nMitoQ treatment.

Methods:

Pregnant rats were intravenously injected with nMitoQ (125 μM) or saline on gestational day (GD)15. Rats were further subdivided into two groups exposed to hypoxia (11% O_2) or normoxia (21% O_2) from GD15-21 (term; 22 days). On GD21, placental cultured media was prepared and used to assess the effect of placental secreted factors on normal cardiomyocyte growth in male and female fetuses separately. Dihydrodichlorofluorescein (DCF), hematoxylin & eosin staining and enzyme-linked immunosorbent assay (ELISA) were used to assess placental oxidative stress, structure and inflammatory factor secretion respectively.

Results:

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

Conclusions:

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

Poster 057

THE DOH IS RISING

Howard Berger, St. Michael's Hospital; **Nir Melamed**, Sunnybrook Health Sciences Centre; **Beth Murray-Davis**, McMaster University; **Haroon Hassan**, BORN Ontario; **Karizma Mawjee**, St. Michael's Hospital; **Joel G Ray**, St. Michael's Hospital; **Michael Geary**, St. Michael's Hospital; **Jon Barrett**, Sunnybrook Health Sciences Centre; **Sarah McDonald**, McMaster University

Background:

Non-communicable diseases of pregnancy, mainly diabetes, obesity, and hypertension have a significant impact on perinatal outcomes and the long-term health of mothers and their infants.

Objective:

Our objective was to describe the prevalence of each of these conditions, both in isolation as well as combined, in order to establish their magnitude.

Methods:

We conducted a cross-sectional study to determine the prevalence of pre-existing diabetes (D), obesity (O) and hypertension (H) for women who had a singleton or twin hospital birth > 20 weeks gestation in Ontario, Canada between 2012-2016, using data from the Better Outcomes Registry & Network (BORN). Prevalence for D, O, H and all combinations (DO, DH, OH, D/O/H (with OR operator), D+O+H (with AND operator)) were calculated with 95% confidence intervals. Subgroup analyses were conducted to assess the effect of birth type (singletons and twins), parity, ethnicity, and maternal age at delivery, on the prevalence of D, O, and H.

Results:

During the study period there were 506,483 singleton or twin births in Ontario and approximately 19% of women had either D/O/H; the rates of D, O, H and combinations thereof are shown in table 1. There was a significant increase in the rate of D, O and H as well as combinations therein with multiparity (p<.0001) and black ethnicity (p<.0001). Twin pregnancies had a significantly higher prevalence of O, H, OH and D/O/H than twins (P<0.0001). A significant increase in the rate of D, H, DH, OH, DO and DOH was also seen with increasing maternal age (P<0.0001).

Conclusions:

Multiparity, black ethnicity, advanced maternal age and twin pregnancies were all factors associated with a higher prevalence of diabetes, obesity and/or hypertension, which affect one fifth of the pregnant population in Ontario. The presence of combinations of these factors are described and can be used to assess impact on maternal-fetal health.

TABLE 1: Prevalence for pre-existing Diabetes, Obesity and Hypertension among women who had a hospital live or stillbirth in Ontario

Disease States	Prevalence per 1,000 (95%CI)		
	All (n = 506,483)	Singletons (n = 497,664)	Twins (n = 8,819)
Diabetes	10.8 (10.6-11.1)	10.8 (10.5-11.1)	12.2 (9.9-14.6)
Obesity	178.2 (177-179.3)	177.6 (176.4-178.7)	212.4 (202.6-222.1)
Hypertension	11.2 (10.9-11.5)	11.1 (10.8-11.3)	18.9 (16.1-21.8)
Diabetes + Obesity	4.8 (4.6-5)	4.7 (4.6-4.9)	5.9 (4.3-7.5)
Diabetes + Hypertension	1.0 (0.9-1.1)	1.0 (0.9-1.1)	1.6 (0.8-2.4)
Obesity + Hypertension	5.5 (5.3-5.7)	5.4 (5.2-5.6)	8.9 (6.9-10.9)
OR (Diabetes, Obesity, Hypertension)	189.7 (188.5-190.9)	189 (187.8-190.2)	228.1 (218-238.1)
AND (Diabetes, Obesity, Hypertension)	0.71 (0.63-0.78)	0.70 (0.63-0.78)	0.91 (0.28-1.55)

Poster 059

EARLY VERSUS LATE ONSET PREECLAMPSIA IN TWINS - THE PLACENTAL PERSPECTIVE

Amir Aviram, Sunnybrook Health Sciences Centre; **Jon Barrett**, Sunnybrook Health Sciences Centre; **Arthur Zaltz**, Sunnybrook Health Sciences Centre; **Christopher Sherman**, Sunnybrook Health Sciences Centre; **John Kingdom**, Mount Sinai Hospital; **Nir Melamed**, Sunnybrook Health Sciences Centre

Background:

It has been suggested that early and late onset preeclampsia are different diseases in singletons, and studies have shown that among this population, placental pathology differ between the two disease. Nonetheless, the pathology findings in twin gestations with hypertensive disorders demonstrate lower prevalence of maternal malperfusion lesions, suggestive of different etiopathology in twins.

Objective:

We aimed to assess placental findings in twin gestations diagnosed with preeclampsia.

Methods:

We performed a retrospective study of all women diagnosed with DCDA twin gestations and preeclampsia who delivered in a tertiary medical center (2001-2015), and who had a placental pathology evaluation. Placental lesions were classified to maternal vascular malperfusion, umbilical cord anomalies, fetal vascular malperfusion, and other lesions. Placental findings of women with early onset PE (≤34 weeks) were compared with placental findings of women with late onset PE (>34 weeks).

Results:

Overall, 73 women (40 (54.8%) with late onset PE and 33 (45.2%) with early onset PE) were included. No significant differences were found with regards to maternal and obstetrical characteristics. The presence of 2 or more different types of maternal malperfusion lesions in the early onset PE group was found. Yet, on multivariable analysis, this difference was not significant (aOR 0.26, 95% CI 0.04-1.74, p=0. 16). We did not find any significant differences in other placental lesions. As for the neonates, higher rates of NICU admission were noted in the early onset PE group, and lower median birthweight.

Conclusions:

In our cohort, we did not find differences between placentas of early onset versus placentas of late onset preeclampsia in DCDA twin gestations. Our results may suggest that contrary to singleton gestations, the mechanism responsible for preeclampsia in twins may differ, thus the differences in placental pathology between early- and late-onset preeclampsia are less substantial.

Variable	Early onset PE (≤34 weeks) (n=33)	Late onset PE (>34 weeks) (n=40)	p value
Maternal and Obstetrical characteristics			
Maternal age, years*	37 [11]	37 [7]	0.81
Maternal age > 35 years, n(%)	19 (57.6)	24 (60.)	0.83
Nulliparity, n(%)	26 (78.8)	30 (75.0)	0.70
GA at delivery, weeks*	33 [4]	36 [2]	<0.001
Gestational DM, n(%)	3 (9.1)	7 (17.5)	0.30
Pre-gestational DM, n(%)	1 (3.0)	0 (0)	0.27
Neonatal outcomes	(n=65)	(n=78)	
Male neonate, n(%)	29 (43.3)	33 (42.3)	0.91
Birth weight, grams*	1,675 [869]	2,470 [705]	<0.001
Birth weight<10th percentile, n(%)	25 (37.3)	25 (32.5)	0.54
Birth weight<3rd percentile, n(%)	18 (26.9)	13 (16.9)	0.15
Placental findings			
Placental weight, grams*,†	316 [147]	402 [147]	<0.001
Placental weight<10th percentile, n(%)†	26 (43.3)	27 (41.5)	0.84
Marginal/vilamentous insertion, n(%)	52 (77.6)	55 (70.5)	0.33
Single umbilical artery, n(%)	1 (1.5)	0 (0)	0.46
Hypercoiled umbilical cord, n(%)	5 (7.5)	9 (11.5)	0.41
Maternal malperfusion, n(%)	38 (56.7)	34 (43.6)	0.12
Maternal malperfusion - any 2 findings, n(%)	13 (19.4)	6 (7.7)	0.04
Maternal malperfusion - any 3 findings, n(%)	2 (3.0)	0 (0)	0.12
Placental hemorrhage, n(%)	2 (3.0)	1 (1.3)	0.47
Fetal vascular malperfusion, n(%)	14 (20.9)	13 (16.7)	0.51
Chronic villitis, n(%)	3 (4.5)	9 (11.5)	0.12
Any placental pathology, n(%)	23 (34.3)	26 (33.3)	0.90

* Data is presented as median [IQR] or n (%)

† Data available for 65 cases of late onset PE and 60 cases of early onset PE

All percentages relating to maternal characteristics are based on the number of mothers (half the number of neonates)

NA - Not applicable; GA - Gestational age; CD - Cesarean delivery; DM - Diabetes mellitus; NICU - Neonatal intensive care unit;

Poster 060

PREECLAMPSIA WITH OR WITHOUT PRECEDING GESTATIONAL HYPERTENSION FROM A PLACENTAL PERSPECTIVE - ARE THEY THE SAME DISEASE?

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Background:

Gestational hypertension (GHTN) and preeclampsia share common characteristics, yet remain distinct disorders. Nonetheless, GHTN may develop into PE. The differences in pathology findings between the two disorders is scarcely reported.

Objective:

To compare placental findings of women with isolated GHTN, isolated PE and GHTN which developed into PE (combined GHTN/PE).

Methods:

Retrospective cohort study of women with singleton gestations, who delivered at a referral center (2001- 2015), with pregnancy related hypertensive disorders. Placental findings were categorized to maternal vascular malperfusion, umbilical cord anomalies, fetal vascular malperfusion, and other findings. Women with chronic hypertension were excluded. Placental findings of women with combined GHTN/PE were compared to women with isolated PE or GHTN.

Results:

Overall, 774 women were included - 270 (34.9) had isolated PE, 391 (50.5) had isolated GHTN and 113 (14.6) had combined GHTN/PE. Isolated PE vs. combined GHTN/PE: no significant differences were noted other than lower prevalence of maternal age > 35 years, and higher rates abruptio placenta and neonatal resuscitation in the combined group. Combined GHTN/PE was more likely to be associated with a marginal/villamentous insertion (MVI) of the umbilical cord (aOR 1.65, 95% CI 1.03-2.63). Comparing isolated GHTN with combined GHTN/PE, women in the combined group had a lower median maternal age, gestational age at delivery, birthweight and placental weight (Table). After accounting for confounders, it was also more likely to be associated with MVI (aOR 3.3, 95% CI 2.0-5.4). On multivariable regression, no differences were found with regard to maternal malperfusion lesions. In a sub-analysis of pregnancies ≤ 34 weeks, the same results were observed.

Conclusions:

From placental perspective, there are no major differences in malperfusion lesions between preeclampsia originating from GHTN, isolated preeclampsia or isolated gestational hypertension. These findings suggest that GHTN and PE are not distinct disorders from placental pathology perspective, but rather share the same spectrum.

Variable	Isolated GHTN (n=391)	GHTN and PE (n=113)	Isolated PE (n=270)	Isolated GHTN vs. GHTN and PE: p value	Isolated PE vs. GHTN and PE: p value
Maternal and Obstetrical characteristics					
Maternal age > 35 years, n(%)	138 (35.3)	29 (25.7)	99 (36.7)	0.06	0.04
Nulliparity, n(%)	249 (63.8)	68 (60.2)	176 (65.4)	0.58	0.33
GA at delivery, weeks*	36 [6]	31 [7]	31 [7]	<0.001	0.13
GA at delivery < 37 weeks, n(%)	217 (55.5)	97 (85.8)	214 (79.3)	<0.001	0.13
GA at delivery < 34 weeks, n(%)	119 (30.4)	73 (64.6)	158 (58.5)	<0.001	0.27
Gestational DM, n(%)	47 (12.0)	9 (8.0)	17 (6.3)	0.23	0.55
Pre-gestational DM, n(%)	15 (3.8)	5 (4.4)	6 (2.2)	0.78	0.24
Neonatal outcomes					
Birth weight, grams*	2,415 [1,616]	1,250 [1,439]	1,421 [1,578]	<0.001	0.17
Birth weight<10th percentile, n(%)	182 (47.4)	62 (55.4)	144 (53.9)	0.14	0.80
Birth weight<3rd percentile, n(%)	121 (31.5)	44 (39.3)	89 (33.3)	0.12	0.27
Placental findings					
Placental weight, grams*,†	369 [212]	244 [217]	263 [240]	<0.001	0.24
Marginal/vilamentous insertion, n(%)	189 (48.3)	77 (68.1)	154 (57.0)	<0.001	0.04
Maternal malperfusion, n(%)	270 (69.1)	93 (82.3)	204 (75.6)	0.006	0.15
Maternal malperfusion - any 2 findings, n(%)	133 (34.0)	66 (58.4)	128 (47.4)	<0.001	0.05
Maternal malperfusion - any 3 findings, n(%)	35 (9.0)	31 (27.4)	61 (22.6)	<0.001	0.31
Maternal malperfusion - any 4 findings, n(%)	5 (1.3)	7 (6.2)	14 (5.2)	0.003	0.69
Fetal vascular malperfusion, n(%)	100 (25.6)	31 (27.4)	78 (28.9)	0.69	0.77
Any placental pathology, n(%)	231 (59.1)	81 (71.7)	176 (65.2)	0.02	0.22

* Data is presented as median [IQR] or mean ± standard deviation

† Data available for 108 cases of GHTN and PE, 234 cases of isolated PE and 331 cases of isolated GHTN

NA - Not applicable; GHTN - Gestational hypertension; PE - Preeclampsia; GA - Gestational age; DM - Diabetes mellitus

Poster 061

THE "PLACENTAL" CUT-OFF BETWEEN EARLY AND LATE ONSET PREECLAMPSIA

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Background:

Late-onset preeclampsia (LPE) is more common than early-onset preeclampsia (EPE), and the pathophysiology of the two may differ. Yet, controversy exist regarding the gestational age cut-off which differentiate EPE from LPE.

Objective:

We aimed evaluate placental findings of preeclampsia in singleton gestations at different gestational ages in order to find a cut-off which differentiate EPE from LPE.

Methods:

A retrospective analysis of women with singleton gestations diagnosed with preeclampsia >=28 weeks of gestation, who delivered at a single referral center (2001-2015). Women with chronic hypertension were excluded. Placental abnormalities were classified into lesions related to maternal vascular malperfusion, fetal vascular malperfusion, umbilical cord anomalies and other findings. Placental findings were compared by gestational age at delivery.

Results:

Overall, 299 women with singleton gestation and preeclampsia were eligible for analysis. Out of all of the placental pathology parameters examined, maternal malperfusion lesions emerged as potential candidates to define the cut-off gestational age between LPE and EPE, as the prevalence of these findings decreased significantly after 34 weeks of gestation. The prevalence of any maternal malperfusion finding was 70-100% up to 34 weeks of gestation, declining to <50% at 35 weeks of gestation and beyond (p=0.001) (Figure). The same pattern was observed for 2 or more different types of maternal malperfusion lesions (p<0.001), and for three or more different types of placental malperfusion lesions (p=0.008). In a sub-analysis, comparing women with preeclampsia up to 34 weeks with those with later onset preeclampsia, women with early onset preeclampsia were characterized by a lower nulliparity rate and higher rates of birth weights below the 10^{th} or the 3^{rd} centiles, and placental weight < 10^{th} centile (Table).

Conclusions:

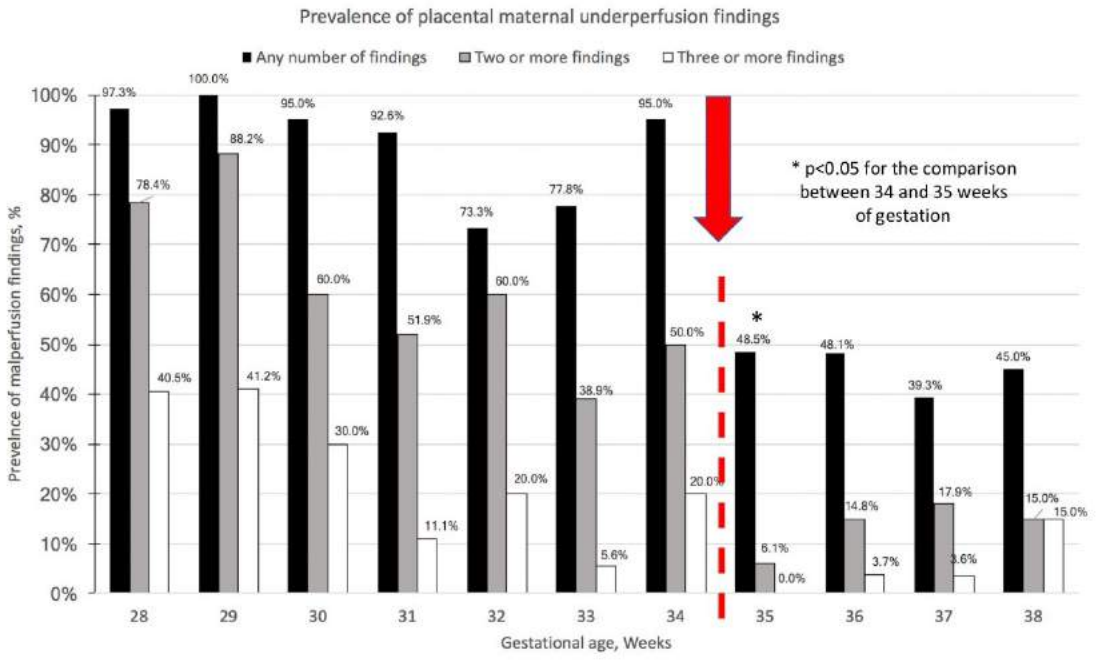
Based on the prevalence and diversity of maternal malperfusion lesions found in the placenta, EPE may be defined as preeclampsia≤34 weeks of gestation, and LPE as preeclampsia>34 weeks of gestation.

Table

Variable	Preeclampsia ≤ 34 weeks (n=191)	Preeclampsia > 34 weeks (n=108)	
Nulliparity, n(%)	112 (58.6)	77 (72.0)	0.02
Abruptio placenta, n(%)	2 (1.0)	3 (2.8)	0.26
Cesarean delivery, n(%)	174 (91.1)	70 (64.8)	<0.001
Birthweight<10th centile, n(%)	136 (71.2)	26 (24.1)	<0.001
Birthweight<3rd centile, n(%)	89 (46.6)	13 (12.0)	<0.001
5-minutes Apgar score<7, n(%)	19 (10.1)	4 (3.7)	0.049
Umbilical cord arterial pH<7.1, n(%)	1 (0.5)	1 (0.9)	0.68
Admission to NICU, n(%)	185 (96.9)	32 (29.6)	<0.001
Placental weight, grams	221 [96]	459 [153]	<0.001
Placental weight <10th centile, n(%)	118 (67.0)	22 (23.7)	<0.001

GDM - Gestational diabetes mellitus; HELLP - Hemolysis, Elevated Liver enzymes and Low Platelets; NICU - Neonatal intensive care Unit

Figurep



Poster 063

OUTCOMES FOLLOWING HYPOXIC RESPIRATORY FAILURE AT BIRTH ASSOCIATED WITH PREVIABLE RUPTURE OF MEMBRANES

Michelle Baczynski, Mount Sinai Hospital; **Shannon Ginty**, Mount Sinai Hospital; **Prakeshkumar Shah**, Mount Sinai Hospital; **Patrick McNamara**, Hospital for Sick Children; **Dany Weisz**, Sunnybrook Health Sciences Centre; **Amish Jain**, Mount Sinai Hospital

Background:

Previable rupture of membranes [pROM, < 23 weeks gestational age (GA)] is often associated with refractory hypoxic respiratory failure (rHRF) after birth, necessitating advanced management strategies such as rescue high frequency ventilation (HFV) and pulmonary vasodilation with inhaled nitric oxide (iNO). Outcomes of neonates after receipt of such treatment are not well documented.

Objective:

To compare clinical outcomes of neonates who developed rHRF and were treated with HFV+iNO vs. those who did not develop rHRF.

Methods:

This retrospective study included all neonates born after pROM with a latency period of ≥ 2 weeks in a single center over a 6 year period. Neonates with rHRF < 72 hours of age (defined as FiO2 > 0.6 for ≥ 2 hours) and received HFV+iNO constituted the study group, while those without rHRF in the same period formed the comparison group. The baseline characteristics, common neonatal outcomes and neurodevelopmental outcomes at 18-24 months were compared between groups. Logistic regression analysis was performed to identify factors associated with development of rHRF and mortality.

Results:

A total of 32 and 21 neonates formed the study and comparison groups respectively (Figure 1). Overall, the mortality and disability among survivors in the cohort was 28% and 22% respectively. Although study group had lower GA at ROM and increased severity of illness on admission, following receipt of HFV+iNO, there was no significant difference in clinical outcomes (Table 1). Lower GA at ROM was associated with rHRF, while lower GA at birth, higher SNAP score on admission and vaginal delivery were associated with lower survival (Table 2).

Conclusions:

Following treatment with HFV+iNO, there is no difference in mortality or morbidity among pROM neonates who developed rHRF compared to those who did not.

Figure 1: All infants identified who were born following previable rupture of membranes <23 weeks gestational age with a latency period of ≥ 2 weeks.

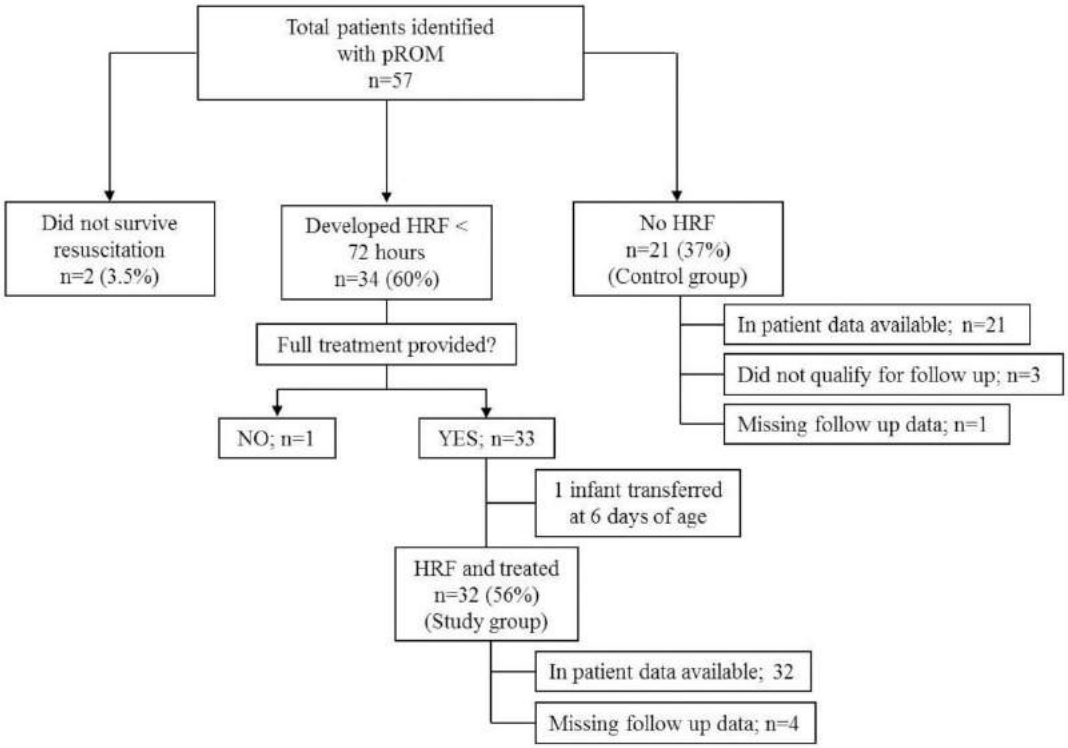


Table 1: Comparison of infants with pROM who developed rHRF < 72 hours of age and received HFV+iNO vs. those who did not develop rHRF.

Variable	Treated rHRF n=32	No rHRF n=21	P value
Gestational age at birth (weeks)	28.0 (2.4)	28.3 (3.6)	NS
Birth weight (grams)	1119 (313)	1110 (599)	NS
Gestational age at ROM (weeks)	18 (16, 19)	21 (19, 22)	<0.01
Latency period (weeks)	10 (8, 13)	7 (4, 10)	0.03
Oligohydramnios	28 (88%)	16/17 (94%)	NS
Pathological chorioamnionitis	22/30 (73%)	11/20 (55%)	NS
Antenatal corticosteroids	30 (94%)	19/20 (95%)	NS
Caesarean delivery	13 (41%)	8 (36%)	NS
APGAR score at 5 minutes	5 (4, 6)	8 (5, 9)	<0.01
Male gender	16 (64%)	9 (36%)	NS
Surfactant use	29 (91%)	13 (62%)	0.02
SNAP II score	41 (32, 53)	14 (10, 21)	<0.01
Use of High frequency ventilation	32 (100%)	12 (60%)	<0.01
Highest mean airway pressure (cmH_2O)	13.1 (2.9)	11.8 (3.4)	NS
Chest tube insertion	12 (38%)	3 (14%)	NS
Inotrope use	8 (26%)	2 (10%)	NS
Mortality prior to discharge	10 (31%)	3 (14%)	NS
Overall mortality during first 2 years	10 (31%)	5 (24%)	NS
In survivors only n=40			
Invasive ventilation (days)	7 (5, 21)	2 (1, 14)	0.03
Non-invasive ventilation (days)	38 (24, 53)	43 (14, 62)	NS
Length of hospital stay (days)	64 (38, 115)	60 (47, 100)	NS
Disability at 18-24 months*	3/18 (17%)	2/12 (17%)	NS

Results presented as mean (SD), number (percentage) or median (IQR) as appropriate. Disability defined as a composite of the following at 18-24 months of age: 1. Score of < 70 in any domain (Motor, Cognitive or Language) on Bayley Scale of Infant and Toddler Development, Third Edition; 2. Cerebral palsy (CP) with Gross Motor Function Classification System score ≥ 3; 3. Need for bilateral hearing implants; 4. Uncorrectable vision loss in at least one eye. *Missing follow up data for 4 infants in each group.

Table 2: Results of logistic regression analysis

2A: Outcome: Development of HRF (n=55)		
Variable	**Adjusted odds Ratio (95% Confidence interval)**	**P value**
Gestational age at birth (weeks)	1.03 (0.80 - 1.33)	0.82
Female sex	0.87 (0.24 - 3.20)	0.83
Lower gestational age at ROM (weeks)	1.45 (1.11 – 1.88)	<0.01
Chorioamnionitis	2.50 (0.60 - 10)	0.21
C-section vs. vaginal birth	1.17 (0.29 - 4.66)	0.82
2B: Outcome: Survival (n=53)		
Gestational age at birth	1.76 (1.05 - 2.95)	0.03
Female sex	6.53 (0.88 – 48.17)	0.07
Higher SNAP II score	0.91 (0.84 – 0.99)	0.03
C-section vs. vaginal birth	17.70 (1.25 – 250.9)	0.03
No rHRF vs. rHRF treated with HFV+iNO	0.16 (0.01 – 2.25)	0.17

Poster 064

CARDIORESPIRATORY AND THERMAL STABILITY AND FEEDING TOLERANCE OF INFANTS TRANSPORTED FROM LEVEL III TO LEVEL II NICUS: A LARGE PROSPECTIVE COHORT STUDY

Katie Chaput, University of Calgary; **Claire Connors**, University of Calgary; **Rajni Parmar**, University of Calgary; **Liza Espinoza**, Alberta Health Services; **Sumesh Thomas**, Alberta Health Services; **Deborah Clark**, Alberta Health Services; **Rina Ferraccioli**, Alberta Health Services; **Doreen Williams**, Alberta Health Services; **Shabih U. Hasan**, University of Calgary

Background:

An *in-utero* transport of very low birth weight infants and delivery at a tertiary care perinatal center results in lower infant mortality and morbidities. The benefits of delivering such infants at tertiary care centers has contributed to the Level III NICUs often being at maximum and/or over capacity thus limiting spaces for sicker infants thus necessitating the transfer of stable infants to Level II NICUs. Studies performed to date are retrospective and consist of very small numbers.

Objective:

The primary objective of this prospective study was to investigate in a large study population if the transport of convalescing preterm infants [≤37 weeks Post-menstrual Age (PMA) at birth], from level III to level II NICUs adversely affects their cardiorespiratory and thermal stability, and feeding tolerance.

Methods:

Infants who underwent transports from Foothills Medical Center (FMC) III NICU to one of the level II NICUs within the city of Calgary from June 2014-July 2015 and born <37 weeks PMA were included. Total of 1139 infants were admitted to the FMC NICU. After excluding for various reasons, the current study comprised 372 infants. Logistic regression modelling was conducted to identify any variables that were associated significantly with the outcomes of interest (predictors).

Results:

Table 1 illustrates the detailed demographic, cardiorespiratory stability and feeding tolerance data. Mild ≥1 adverse event occurred in 79 infants (21%) within 48 h of arrival at the level II NICUs. Lower PMA at birth and being in an incubator prior to transfer were significant predictors of post-transfer respiratory complications, regardless of whether the baby had apneas or O_2 desaturations requiring intervention in the pre-transfer 24h period or not.

Conclusions:

This large and the first prospective study demonstrates that it is safe to transfer infants to a level II NICU thus making room for sicker and smaller infants at regional Level III perinatal centers.

Table. * Data as mean (SD); # Data as n (%)

Maternal and Infant Characteristics	
Total number	372
Birth weight* (g)	1710 ± 59
Weight at transfer* (g)	1851 ± 51
Gestational age at birth* (post-menstrual age in weeks)	31.6 ± 3
Gestational age at transfer* (post-menstrual age in weeks)	33.7 ± 2
Postnatal age at transfer* (days)	15 ± 21
Neonate Status Prior to Transport (At Level III site)	
Respiratory Variables	
- Apneas#	176 (47)
- Desaturation events#	155 (42)
- Caffeine therapy#	137 (37)
- CPAP	18 (5)
- Nasal flow (<2 LPM)	69 (18)
21% FiO_2 (%)	61 (16)
23% – 99% FiO_2 (%)	5 (1)
100% FiO_2 (%)	3 (0.8)
Room air (no respiratory support or supplemental oxygen)	285 (77)
Fluids & Nutrition	
- Gavage	163 (44)
- Full oral feeds	32 (9)
- Gavage and oral feeds	175 (47)
- Missing values	2 (0.5)
- Total fluid Intake* (mL/kg/day)	121 ± 29
Neonatal Status at Level II Receiving Site (First 48 h)	
Respiratory Setbacks#	
- Grunting	0 (0)
- Apneas	7 (2)
- Desaturations requiring an increase in FiO2	26 (7)
- Increased respiratory distress (intercostal and subcostal indrawing)	11 (3)
- Low flow oxygen	13 (4)
- nCPAP	2 (0.5)
- Mechanical ventilation	0 (0)
Feeding Setbacks#	10 (3)
- Vomiting	5 (1)
- Abdominal distension	0 (0)
- Feed residuals	1 (0.3)
- Change in feed schedule	0 (0)
Transfer back to level III NICU	0 (0)

Poster 068

CLINICAL PRESENTATION AND MATERNAL-FETAL OUTCOMES OF MIRROR SYNDROME: A CASE SERIES

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Background:

Mirror syndrome, also known as Ballantyne's syndrome, is a rare diagnosis with only 113 cases described in the literature. It is mainly characterised by maternal symptoms similar to preeclampsia in the setting of fetal hydrops. An edematous state of the mother, fetus and placenta simultaneously is characteristic of this condition.

Objective:

We hypothesize that specific abnormal biochemical findings can be early diagnostic markers for Mirror syndrome and could potentially avoid maternal morbidity. We identified 10 cases and provide a review of the maternal presentation, biochemical findings and fetal/neonatal outcomes.

Methods:

We performed a retrospective chart review of all cases of fetal hydrops from two tertiary centres in Winnipeg, Manitoba between 2000 and 2016. There were 276 cases of fetal hydrops during this period, of which 10 cases satisfied the criteria for Mirror syndrome.

Results:

The majority (80%) of women were multiparous. The mean gestational age at diagnosis was 23 weeks 4 days +/- 4 days and the mean gestational age at delivery was 25 weeks +/- 5 days. The most common clinical findings included hypertension, edema and placentomegaly. The most common laboratory findings included hypoalbuminemia (mean 20 ± 7 gm/L), elevated uric acid level (mean 375 µmol/L) and anemia (mean hemoglobin 10g/dL). Half of the fetuses were stillborn and 40% of pregnancies resulted in neonatal deaths. Congenital anomalies were diagnosed in half of the pregnancies. Maternal symptoms resolved 5 days +/- 3 days postpartum.

Conclusions:

Mirror syndrome is likely under-diagnosed. Acute hemodilution, hypoalbuminemia and hyperuricemia might be early indicators for its diagnosis. Delivery is the treatment of choice and maternal symptoms usually resolve within several days after delivery. Fetal outcome is poor but early recognition may potentially avoid maternal morbidity.

Poster 071

PRENATAL RISK ASSESSMENT ACROSS CANADA: WHAT FACTORS ARE BEING CONSIDERED?

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Background:

Risk assessment that includes medical, psychosocial, and lifestyle factors is an essential component to quality, individualized, and responsive prenatal care. In Canada, each province and territory independently develops a unique prenatal record that serves as a clinical documentation tool for guiding the delivery of routine pregnancy care. However, as there is no national oversight of the content of these forms, little is known about the breadth and nature of risk factors that are considered when caring for pregnant women across Canada.

Objective:

To explore the differences and similarities in risk factors listed within provincial prenatal records across Canada.

Methods:

Prenatal records from each province and territory were obtained through health authority websites and contact with perinatal health professionals. Records were assessed for a section focused on risk assessment, which subsequently underwent inductive content analysis to determine the type, frequency, and categorization of listed risk factors.

Results:

Nine out of twelve prenatal records had formal risk assessment sections with a mean of 35 risk factors (range=23–50). One hundred prenatal risk factors were identified and categorized as either medical (74%), lifestyle (11%), psychosocial (11%), or personal (5%). Approximately one third of risk factors (36%) were listed on only one record. The most frequently listed risk factors were multiple pregnancy (n=9 records), advanced maternal age (n=8), cigarette use (n=8), pre-existing diabetes (n=8), alcohol use (n=7), other medical disorders (n=7), past preterm birth (n=7), maternal underweight (n=7), and young maternal age (n=7). The inclusion of psychosocial risk factors, such as depression (n=3), domestic violence (n=2), and food insecurity (n=2), was minimal.

Conclusions:

Prenatal records differ substantially in the inclusion and content of risk assessment, which may be contributing to provincial differences in quality of care. Working towards a national, evidence- and consensus-based standard for prenatal risk assessment may be a valuable future goal.

Poster 072

MATERNAL ENDOTOXIN ACTIVITY IN PREGNANCIES COMPLICATED BY PRETERM PREMATURE RUPTURE OF MEMBRANES: A CASE-CONTROL STUDY

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Background:

Predicting the latency to delivery in pPROM is vital to optimize the antenatal management these pregnancies.

Objective:

To compare maternal peripheral blood endotoxin activity (EA) in women with pPROM at admission with gestational age matched controls; to serially evaluate EA from admission to birth in pPROM and determine its correlation with latency to delivery and chorioamnionitis.

Methods:

Singleton pregnancies (23^{+1}-35^{+6} weeks) from admission with pPROM until birth were selected. Acute chorioamnionitis, preeclampsia, IUGR, elevated BMI, substance abuse and chronic maternal disease were excluded. Uncomplicated, GA-matched pregnancies without pPROM served as controls. Maternal demographics, birth and neonatal outcomes were collected. EA (*EAA™, Spectral medical inc., CA*) was assessed in the pPROM group (within 48 hours from pPROM and weekly until birth), and in controls at study entry. EA levels were compared using Student's t-test, p value <0.05 was considered significant.

Results:

We recruited 20 cases of pPROM and 20 controls. Maternal demographics were similar between groups. The mean GA of pPROM was 29.0±2.2 weeks and median latency was 7.5 (IQ 6.8-20.9) weeks. EA at admission was high in the pPROM group (Fig 1a) and significantly elevated over controls (0.444±0.14 vs. 0.344±0.11, $p<0.01$). The positive correlation between EA and GA observed in controls ($y=0.023x-0.31$; $R^2$0.2; $p<0.05$), was not seen in the pPROM group. For all cases of pPROM, there was no difference in EA at admission and in labour (0.44±0.14 vs 0.38±0.2, p=0.2) and no correlation between EA at admission and latency or acute chorioamnionitis. However, on comparing cases with time-to-delivery ≤7 days (n=10) vs. >7 days (n=10), there was a significant drop in EA in the latter group (values, $p<0.02$) and these low levels were maintained until birth (Fig 1b).

Conclusions:

Maternal EA, an novel biomarker that might have the potential to predict the clinical evolution of pPROM, is elevated in women with pPROM.

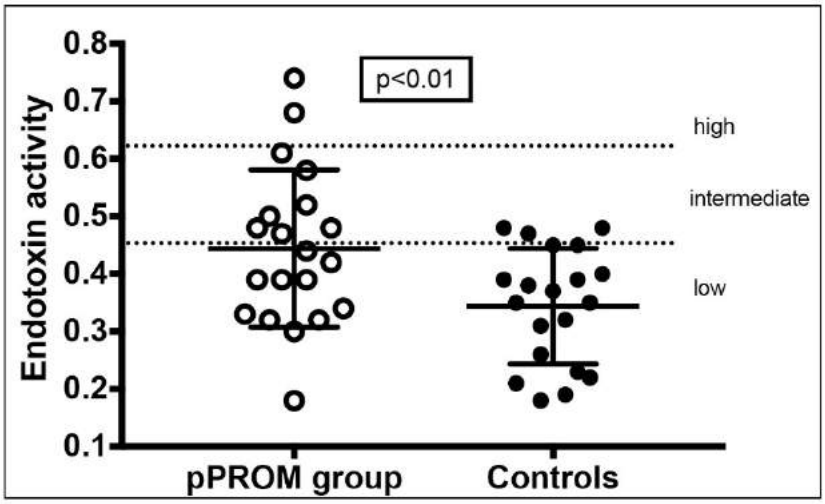

Figure 1a: Mean maternal blood endotoxin activity in pPROM group at admission compared with matched gestational age controls

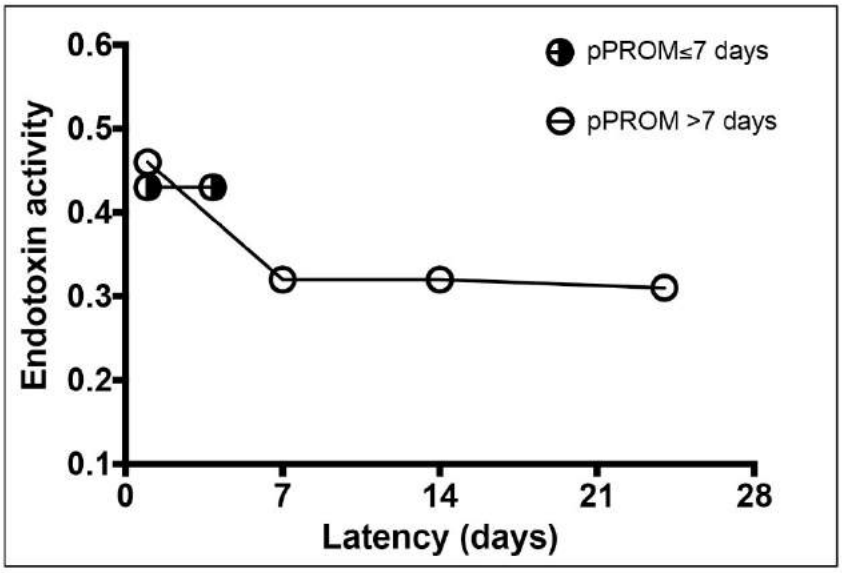

Figure 1b: Mean longitudinal maternal blood endotoxin activity in pPROM subgroups according to latency

Poster 073

CYTOKINE CHANGES IN MATERNAL PERIPHERAL BLOOD CORRELATE WITH TIME-TO-DELIVERY IN PREGNANCIES COMPLICATED BY PRETERM PREMATURE RUPTURE OF THE MEMBRANES

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Background:

Our study longitudinally assessed plasma cytokine profiles of women whose pregnancies were complicated by preterm premature rupture of the membranes (pPROM).

Objective:

We aimed to investigate the value of cytokines as predictive biomarkers of the latency period between pPROM and delivery. We hypothesized that women with higher systemic inflammation at the time of pPROM admission would have shorter latency periods until delivery.

Methods:

Peripheral blood samples were collected from 20 singleton pregnant women who presented with pPROM at Mount Sinai Hospital, Toronto, between 24+1 and 35+6 weeks gestational age. The first sample was drawn within 48 hours from admission, followed by weekly blood draws until delivery. Pregnancies complicated with acute chorioamnionitis, preeclampsia, intrauterine growth restriction, body mass index >30, history of substance abuse and chronic maternal disease were excluded. 20 uncomplicated, GA-matched pregnancies were used as controls. The concentration of 39 cytokines in maternal plasma was measured using Luminex assays (BioRad). Cytokine concentrations were compared using Mann-Whitney U-test, and Wilcoxon P-test and $p<0.05$ was considered significant.

Results:

At admission, women with pPROM exhibited significantly lower plasma concentrations of pro-inflammatory mediators IL5, IP-10/CXCL10, MIP1a/CCL3, PDGFbb and CTACK/CCL27 than controls. In the pPROM group, IL1RA, IL4, IL8, IFNg, TNFa, MCP-1/CCL2 and MIP1a were significantly elevated in maternal plasma at delivery compared to admission. Women with pPROM that subsequently delivered within 7 days had significantly lower plasma concentration of anti-inflammatory cytokine IL1RA than those with latency periods >7 days.

Conclusions:

Higher levels of anti-inflammatory cytokines in women with pPROM were associated with increased latency to delivery, probably from counter-balancing pro-inflammatory load. When used in conjunction with other predictive characteristics of time until delivery, cytokines may further assist clinical decision-making and optimize pregnancy outcomes in women with pPROM.

Poster 074

TIMING OF DELIVERY IN WOMEN WITH PRE-EXISTING DIABETES

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Background:

In pregnant women with pre-existing diabetes mellitus (PDM), it is unclear whether routine induction of labor (IOL) at 38 weeks gestation is advantageous for mothers and their infants.

Objective:

To compare maternal and neonatal outcomes in women with PDM who underwent IOL at 38 weeks versus those expectantly managed

Methods:

Data from the Better Outcomes Registry & Network (BORN), a registry of hospital births in the Ontario, was used to compare maternal and neonatal outcomes in women with PDM who underwent "non-medically" indicated IOL between 38+0 and 38+6 weeks of gestation (38-IOL group; n= 692), with women who were managed expectantly and delivered at >39+0 weeks (Expectant-group; n= 963) between 2012-2016. Multivariate analysis was conducted, controlling for parity, maternal age, pre-pregnancy BMI, insulin treatment, and type I diabetes, to calculate relative risks (RR) with 95% confidence intervals (CI) for all outcomes (Table 1).

Results:

Of the 462,607 women who gave birth at ≥38 + 0 weeks, 3,381 (0.73%) had PDM. After excluding high risk pregnancies and non-candidates for vaginal birth, 1,655 women were included in our cohorts. Compared to the Expectant-group, the 38-IOL group had higher BMI (28.3 vs 27.0 [p<0.001]), were more likely to have Type 1 diabetes (35.0% vs 27% [p<0.001]) and to be on insulin if they had Type 2 diabetes (75.3% vs 45.4% [p<0.001]). The rate of cesarean section (29.6% vs 27.0% [p=0.24]), instrumental delivery (11.0% vs 9.4% [p=0.31]) or shoulder dystocia (6.1% vs 4.4% [p=0.12]) did not differ between the 38-IOL and Expectant-group, respectively. The 38-IOL group had higher rates of NICU admission (42.2% vs 27% [p<0.001]), jaundice requiring phototherapy (11.7% vs 5.3% [p<0.001]) and hypoglycemia (14.6% vs 6.7% [p<0.001]).

Conclusions:

In pregnant women with PDM, elective IOL at 38 weeks does not increase the rate of cesarean delivery, but is associated with an increase in adverse neonatal outcomes.

Table 1: Association of labor induction (vs expectant management) with adverse maternal and neonatal outcomes: multivariable analysis

Outcome	*Induction vs. Expectant management* (N = 692, IOL; N = 963, Exp.)	
	Crude RR (95%, CI)	*Adjusted Rr[a] (95% CI)*
Maternal		
Caesarean Delivery	1.1 (0.94-1.28)	1.03 (0.89-1.19)
Instrumental Delivery	1.16 (0.87-1.55)	1.21 (0.89-1.65)
Shoulder dystocia	1.39 (0.92-2.11)	1.4 (0.9-2.17)
Neonatal		
Composite Neonatal Morbidity[b]	1.56 (1.36-1.79)	1.54 (1.33-1.78)
NICU Admission	1.59 (1.32-1.9)	1.65 (1.36-2.01)
Jaundice requiring phototherapy	2.21 (1.58-3.09)	2.17 (1.52-3.11)
Hypoglycemia	2.16 (1.61-2.91)	1.89 (1.38-2.59)
Respiratory Morbidity[c]	1.5 (1.08-2.08)	1.36 (0.96-1.93)

[a] Adjusted for the following confounders: maternal age, pre-pregnancy BMI, nulliparity, and Type 1 diabetes

[b] Neonatal composite morbidity is defined as the presence of any of the following: perinatal mortality (stillbirth or neonatal death), 5-minute Apgar score <7, admission to the neonatal intensive care unit (NICU), hypoglycemia, jaundice requiring phototherapy, or neonatal respiratory morbidity

[c] Refers to respiratory distress syndrome, transient tachypnea of the newborn infant, or need for respiratory support

Poster 077

A SYSTEMATIC REVIEW OF DATABASE VALIDATION STUDIES AMONG FERTILITY POPULATIONS

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Background:

Due to the increased risk of adverse outcomes in assisted reproductive technology (ART) pregnancies compared naturally conceived pregnancies, it is essential we can accurately monitor these outcomes. Clinicians and researchers often rely on routinely-collected data from large databases and registries to conduct these reports and studies. However, these data are subject to misclassification bias due to misdiagnosis or errors in data entry, and therefore need to be validated prior to utilization for clinical or research purposes.

Objective:

The objective of this study was to assess whether routinely-collected data from fertility populations are adequately validated.

Methods:

We conducted a systematic review by searching Medline, Embase and CINAHL from inception to October 6, 2016. Webpages of international ART centres were also searched. Keywords and MeSH terms were adapted from previous systematic reviews. Only full-text studies in English were included. Studies were excluded if they did not validate a fertility database or registry. Quality of studies was determined based on adherence to the RECORD reporting guidelines.

Results:

Nineteen studies were included in this review. Two studies validated a fertility database using medical records; seven studies used an ART registry to validate vital records or maternal questionnaires and two studies failed to adequately describe their reference. Seven studies reported the pre-test prevalence of the variable validated; however, only four studies had post-test prevalence estimates within a 2% range of the pre-test estimate.

Conclusions:

There is a paucity in the literature on validation of routinely-collected data from ART populations. Furthermore, the prevalence of the markers validated are not being presented, which can lead to biased estimates. Stakeholders rely on these data for outcomes of treatments, therefore it is essential to ascertain the accuracy of these databases. Future validation studies need to be conducted for greater transparency in accuracy of research.

Poster 079

INDUCTION OF LABOUR (IOL), MATERNAL AGE AND CAESAREAN SECTION (CS) IN AN ALBERTA TERM BIRTH COHORT: 2005-2014

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Background:

In Canada, caesarean section (CS) is the most frequent inpatient surgery. Women aged 35 years or over are at a higher risk of delivery by emergency CS. However, there are conflicting findings on the role of induction of labour (IOL), the rates of which have been increasing over time, on emergency CS risk.

Objective:

To examine the association between IOL and emergency CS risk in a large population-based cohort of women giving birth in Alberta.

Methods:

The patient population included all women with live births in Alberta from 2005 to 2014. The birth cohort was derived from linking multiple administrative health databases. The overall CS and IOL rates were calculated. The study excluded women with medical conditions e.g. gestational diabetes, gestational hypertension, pre-eclampsia, eclampsia, premature rupture of membrane, which are potential medical indications for IOL. Multiple logistic regression analysis was used to examine the association between the IOL and emergency CS rate.

Results:

During the study period, there were 138,549 low-risk nulliparous women. Between 2005 to 2014, rates of IOL increased from 24.8 % to 30.4 % in nulliparous women. Of note, 50.4% of IOL in nulliparous women was performed before 41 weeks. After adjustment for confounding factors, IOL was associated with a 50% higher odds (aOR 1.49, 1.45 – 1.53) of emergency CS in the nulliparous cohort. In addition, there was a dose-response effect between maternal age and delivery by emergency CS in the nulliparous group.

Conclusions:

Our findings indicated that IOL has increased over time and is strongly associated with increased odds of emergency CS in nulliparous women, although residual confounding factors may exist.

Poster 080

TIMING OF DELIVERY IN WOMEN WITH PREEXISTING HYPERTENSION

Maya Ram, Sunnybrook Health Sciences Centre; **Howard Berger**, St. Michael's Hospital; **Joel G. Ray**, St. Michael's Hospital; **Michael Geary**, St. Michael's Hospital; **Sarah McDonald**, McMaster University; **Beth Murray Davis**, McMaster University; **Riddell Catherine**, Better Outcomes Registry & Network (BORN) Ontario, Children's Hospital of Eastern Ontario (CHEO); **Haroon Hasan**, Better Outcomes Registry & Network (BORN) Ontario, Children's Hospital of Eastern Ontario (CHEO); **Jon Barrett**, Sunnybrook Health Sciences Centre; **Nir Melamed**, Sunnybrook Health Sciences Centre

Background:

In women with preexisting hypertension (PHTN), it is not clear if routine induction of labor (IOL) before 40 weeks of gestation confers benefit to mother and newborn

Objective:

Compare pregnancy outcomes between women with PHTN who had IOL at either 38 or 39 weeks and those who were managed expectantly during the corresponding weeks

Methods:

The study group included all women with PHTN who had a singleton birth at ≥38 weeks gestation in Ontario, Canada from April 2012-March 2016. Data were obtained from the Better Outcomes Registry & Network (BORN) Ontario, BORN Information System (BIS) database. Women who underwent IOL at 38+0 to 38+6 weeks for PHTN (38-IOL group, N=225) were compared to those who remained undelivered at 39+0 weeks (38-Exp group, N=1,365). Separately, women who underwent IOL at 39+0 to 39+6 weeks for PHTN (39-IOL group, N=213) were compared to women who remained undelivered at 40+0 weeks (39-Exp group, N=669).

Results:

Out of 462,334 women who delivered during the study period, 2,075 (64.6%) met the inclusion criteria. Women in the 39-IOL group were less likely to have Cesarean delivery (17.8% vs. 26.3%, p=0.01, aOR 0.59, 95%-CI 0.38-0.93) but had a higher rate of neonatal jaundice requiring phototherapy (5.6% vs. 2.1%, p=0.02, aOR 2.68, 95%-CI 1.13-6.37) compared with women in the 39-Exp group. These differences were not observed for the 38-IOL group. There were no other differences in neonatal outcomes between the IOL and expectant management groups at either 38 or 39 weeks (Table). The rate of superimposed preeclampsia in women who were managed expectantly at 38 and 39 weeks was 23.1% and 23.2%, respectively.

Conclusions:

In women with PHTN, routine IOL at 39 weeks is associated with a lower risk of CS and can prevent subsequent superimposed preeclampsia, but is associated with a small increase in the risk of neonatal jaundice requiring phototherapy.

Table. Risk of adverse outcomes in relation to timing of induction of labour (IOL) among singleton women with preexisting hypertension.

Adverse outcome	Adjusted odds ratio (95% CI)	
	IOL at 38 weeks (n =225) vs. Expectant management at 38 weeks (n = 1,365)	**IOL at 39 weeks (n = 213) vs. Expectant management at 39 weeks (n = 669)**
Caesarean section	0.67 (0.44 to 1.01)	0.59 (0.38 to 0.93)
Composite neonatal morbidity*	1.24 (0.82 to 1.85)	0.99 (0.62 to 1.59)
NICU admission	0.95 (0.56 to 1.61)	0.87 (0.49 to 1.56)
Jaundice requiring phototherapy	1.43 (0.65-3.14)	2.68 (1.13-6.37)

Odds ratios were generated from separate models comparing IOL at 38 weeks vs. expectant management at 38 weeks (referent), and IOL at 39 weeks vs. expectant management at 39 weeks (referent), adjusted for maternal age, nulliparity and maternal pre-pregnancy BMI. Neonatal outcomes are adjusted for neonatal sex as well.

*Composite morbidity defined as any of the following: perinatal mortality, 5-min Apgar score<7, admission to the neonatal intensive care unit, hypoglycemia, jaundice requiring phototherapy, or neonatal respiratory morbidity

Poster 081

THE EFFECT OF THE TYPE OF INFERTILITY ON PLACENTAL-MEDIATED ADVERSE OUTCOMES FOR PATIENTS THAT USED IVF IN ONTARIO

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Background:

The number of patients seeking fertility treatment has increased globally and babies that were conceived through fertility treatment may have increased ante and postpartum complications, which often require greater medical attention.

Objective:

The objective of this study was to investigate any association between type of infertility and placental-mediated adverse outcomes (PMAO) among women that used in vitro fertilization (IVF) to conceive compared to women who conceived spontaneously, in order to explore whether it is the fertility treatment or the underlying conditions that lead to the increased associations with adverse outcomes.

Methods:

This was a population-based cohort study that used data from BORN Ontario, CARTR Plus and CIHI. This cohort contained all births in Ontario from May 31, 2013 through October 28, 2014 (200,473 births). Descriptive statistics and logistic regression models using generalized estimating equations were performed to compare the exposed group of pregnant women that used IVF to conceive and a control group of pregnant women that conceived spontaneously with PMAO and preterm birth.

Results:

There were significant differences observed for maternal age, neighbourhood income level, parity, smoking at time of admission, hospital level of care, type of birth, type of caesarean section and maternal health conditions among the infertility groups and the spontaneous conception group. Only female factor infertility relative to spontaneous conception, was associated with a higher risk of placental abruption in the unadjusted model (RR: 2.39 95% CI: 1.19-4.76). IVF was significantly associated with a higher risk of preterm birth (<37 weeks) and very preterm birth (<32 weeks), relative to spontaneous conception, adjusted RRs, 1.64 (95% CI: 1.40-1.93) and 1.75 (95% CI: 1.19-2.57), respectively.

Conclusions:

No statistically significant differences were observed among the adjusted models for the PMAO. However, type of conception in association with preterm birth at less than 37 weeks' gestation was statistically significant.

Poster 082

A COMPARISON OF MATERNITY CARE PROVIDERS' ATTITUDES AND MOTIVATIONAL FACTORS REGARDING COUNSELLING OF ELIGIBLE WOMEN ABOUT A TRIAL OF LABOUR VERSUS A REPEAT CAESAREAN SECTION

Christine Kurtz Landy, York University; **Wendy Sword**, University of Ottawa; **Charles Cunningham**, McMaster University; **Bailey Stewart**, McMaster University; **Heather Rimus**, McMaster University; **Birth Methods Research Team Team**, York University

Background:

Elective repeat Caesarean section (CS) contributes to high Canadian CS rates. Although maternity care providers are well situated to counsel eligible women to consider a trial of labour (TOL), little is known about provider attitudes or motivational factors that influence counselling of these women.

Objective:

We compared obstetricians, family physicians and midwives attitudes about TOL versus CS. In addition, motivational factors that likely influence providers' counsel of women were examined.

Methods:

480 care providers completed a questionnaire based on the Theory of Planned Behavior. This 34 item Likert scale measured the Benefits of TOL, Barriers to TOL, social influences on the decision to counsel women regarding TOL (Subjective Norms), Self Efficacy (confidence in the ability to counsel regarding TOL), and the Intent to counsel women regarding a TOL. Attitudes were measured using 8 bidirectional items. Data were analyzed using one-way ANOVA and posthoc testing with Dunnett's C.

Results:

All provider groups had a positive attitude and were motivated to counsel eligible women about TOL. There were however significant differences in their views. Midwives had significantly higher positive attitudes toward TOL (M=10.59, SD=6.01), than obstetricians (M=4.48,SD=5.6) and family physicians (M=5.65,SD =5.97) ($p<.05$). No difference in attitudes were found between obstetricians and family physicians. Obstetricians and family physicians reported fewer benefits of TOL and more barriers to TOL than, midwives ($p<0.05$). Family physicians and midwives were more likely than obstetrician to be influenced by social and organizational norms ($p<.05$). Midwives reported the highest intent to counsel women regarding TOL (M=5.71,SD=0.67), followed by family physicians (M=5.27,SD=0.69) and then obstetricians (M=4.83,SD=0.83) ($p<.05$).

Conclusions:

Knowledge about the attitudes and motivation of providers to counsel women on TOL provides needed information to develop strategies to decrease non-medically indicated CS.

Poster 083

THE RELATIONSHIP BETWEEN MATERNAL BODY MASS INDEX AND PREGNANCY OUTCOMES IN TWIN PREGNANCIES

Maya Ram, Sunnybrook Health Sciences Centre; **Howard Berger**, St. Michael's Hospital; **Joel G. Ray**, St. Michael's Hospital; **Lipworth Hayley**, Sunnybrook Health Sciences Centre; **Sarah McDonald**, McMaster University; **Beth Murray Davis**, McMaster University; **Riddell Catherine**, Better Outcomes Registry & Network (BORN) Ontario, Children's Hospital of Eastern Ontario (CHEO); **Haroon Hasan**, Better Outcomes Registry & Network (BORN) Ontario, Children's Hospital of Eastern Ontario (CHEO); **Jon Barrett**, Sunnybrook Health Sciences Centre; **Nir Melamed**, Sunnybrook Health Sciences Centre,

Background:

High maternal body mass index (BMI) is associated with pregnancy complications in singleton pregnancies including preeclampsia, gestational diabetes, preterm birth (PTB), and caesarean section. The effects of maternal BMI on pregnancy outcomes in women with twins, who are a priori at an increased risk for these complications, are unclear. Given the increased nutritional demands in twin pregnancies, the adverse effects of low maternal BMI may be greater in twins.

Objective:

To assess the associations between maternal BMI and adverse outcomes in twin pregnancies and to compare them to those observed in singletons.

Methods:

The study group included all women with twin or singleton pregnancy that gave birth in Ontario, Canada between 2012-2016. Data were obtained from the Better Outcomes Registry & Network (BORN) Ontario database. The associations between BMI group and pregnancy complications were compared between twin and singleton pregnancies.

Results:

1)Out of 492,151 women who met the study inclusion criteria, 484,184 (98.4%) had a singleton pregnancy and 7,937 (1.6%) had twins. 2)The adjusted relative risk of preeclampsia and gestational diabetes increased with BMI in both twins and singletons, although these associations were stronger in singletons than twins (Figure 1). 3)The associations between BMI and birth weight >90% or <10th% for gestational age were similar in both twins and singletons (Figure 1). 4)While the risk of PTB in singletons increased with BMI, the risk of PTB in twins was highest for underweight women, and was not affected by high BMI (Figure 2). 5)The risk of NICU admission and low Apgar score in singletons increased with BMI, but such an association was not observed in twins.

Conclusions:

The association between maternal BMI and adverse pregnancy complications differ between twin and singleton pregnancies. Care providers should be aware of the increased risk of PTB in underweight women with a twin pregnancy.

Figure 1: Association between maternal BMI and preeclampsia, gestational diabetes, birth weight >90th% and birth weight <10th%.

Values (expressed as relative risk [95%-confidence interval]) reflect the results of GEE to account for the correlation within twin pairs and are adjusted for maternal age and parity. For neonatal outcomes in women with twin gestations the outcomes refer to either twin.

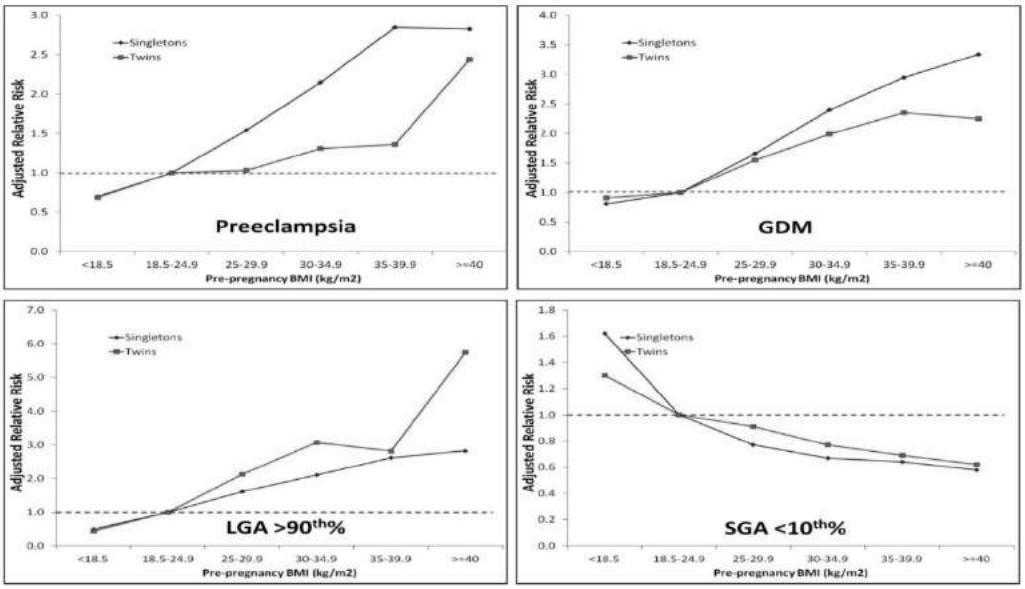
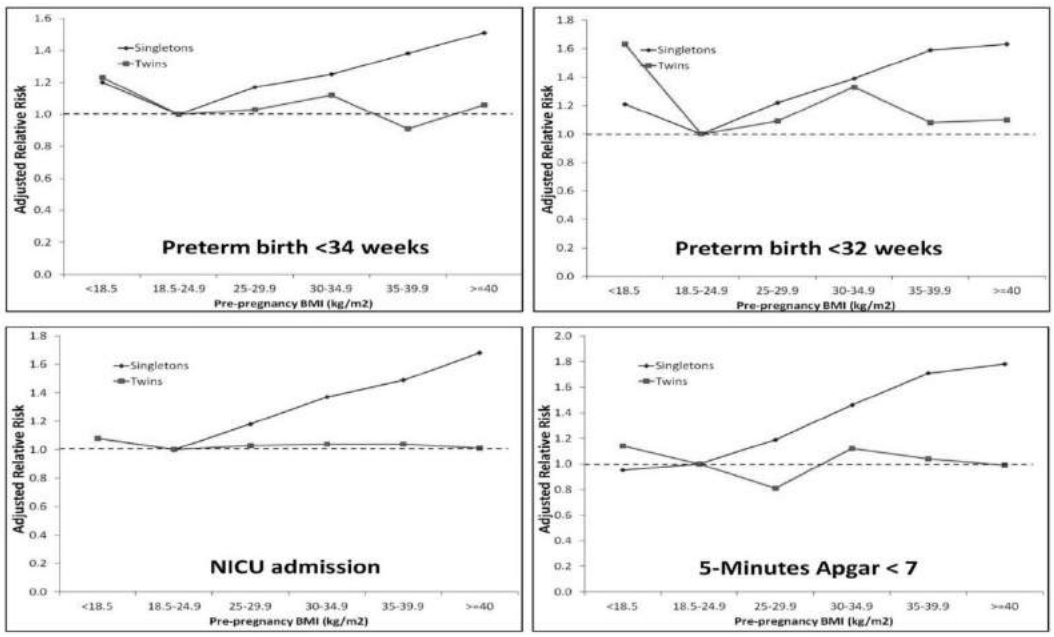


Figure 2: Association between maternal BMI and preterm birth <34 weeks, preterm birth <32 weeks, admission to neonatal intensive care unit, and low 5-minutes Apgar score.

Values (expressed as relative risk [95%-confidence interval]) reflect the results of GEE to account for the correlation within twin pairs and are adjusted for maternal age and parity. For neonatal outcomes in women with twin gestations the outcomes refer to either twin.



Poster 086

PLACENTAL ABNORMALITIES DIFFER IN GESTATIONAL DIABETES BETWEEN TWIN AND SINGLETON PREGNANCIES

Amir Aviram, Sunnybrook Health Sciences Centre; **Scott Oliver**, Sunnybrook Health Sciences Centre; **Nir Melamed**, Sunnybrook Health Sciences Centre; **Michael Kahn**, Sunnybrook Health Sciences Centre; **Christopher Sherman**, Sunnybrook Health Sciences Centre; **Arthur Zaltz**, Sunnybrook Health Sciences Centre; **Jon Barrett**, Sunnybrook Health Sciences Centre

Background:

Gestational diabetes mellitus (GDM) has been associated with abnormal placental pathology in singletons, yet scarcity of data exist concerning placental findings in twin gestations complicated by GDM.

Objective:

We hypothesized that there is difference in the pathological representation of GDM among twins vs singleton gestations.

Methods:

Retrospective cohort study of all women with singleton and DCDA twin pregnancies complicated by GDM in a single tertiary referral center between 2002-2016. Placental findings were compared between twins and singletons and were classified into 4 types of lesions: maternal vascular malperfusion, fetal vascular malperfusion, placental hemorrhage and other findings. Primary analysis compared twins gestations with singleton gestations, and subsequent analysis compared twin A and Twin B separately to singletons.

Results:

Overall, 101 twin pregnancies (199 neonates) were compared to 498 singleton pregnancies. Twin pregnancies were characterized by a higher rate of preterm birth (68.3% vs. 40.8%, $p<0.001$) and by a higher rate of cesarean deliveries (81.2% vs. 58.0, $p<0.001$), and by a lower median birth weight (2,191 grams vs. 3,038 grams, $p<0.001$). Comparing twins to singletons placental, the twins placentas were less likely to be associated with hypercoiled umbilical cord, placental weight<10^{th} percentile, and maternal vascular malperfusion lesions. Comparing each twin to singletons, placentas of both twins A and twins B were less likely to be associated with maternal malperfusion lesions, placentas of twins A were less likely associated with placental weight<10^{th} percentile, and placentas of twins B were less likely associated with hypercoiled umbilical cord.

Conclusions:

In gestations complicated by gestational diabetes mellitus, placentas of twins exhibit different pathological features than those of singletons. This may reflect a difference in the mechanisms responsible for GDM in twins versus singletons gestations.

Table: Association of plurality with placental pathology in GDM pregnancies

Placental pathology	Association of GDM in twins (using GDM in singletons as reference) with placental pathology Adjusted OR (95%-CI)		
	Any twin	**Twin A**	**Twin B**
Any placental pathologic diagnosis	1.37 (0.79-2.37)	1.23 (0.64-2.39)	1.48 (0.71-3.10)
Single umbilical artery	0.28 (0.04-2.04)	NA	0.58 (0.07-5.10)
Marginal or velamentous cord insertion	0.68 (0.40-2.36)	0.72 (0.41-1.26)	0.71 (0.40 -1.26)
Hypercoiled cord	**0.53 (0.29-0.98)**	0.56 (0.29-1.08)	**0.45 (0.22-0.93)**
Placental weight <10th centile	**0.35 (0.20-0.61)**	**0.11 (0.05-0.25)**	0.66 (0.38 - 1.16)
Any maternal vascular malperfusion pathology	**0.27 (0.17-0.42)**	**0.15 (0.08-0.27)**	**0.42 (0.25-0.68)**
Two or more maternal vascular malperfusion lesions pathologies	**0.17 (0.06-0.44)**	**0.06 (0.01-0.26)**	**0.27 (0.11-0.66)**
Fetal vascular malperfusion pathology	1.34 (0.73-2.47)	1.26 (0.65-2.44)	0.48 (0.65-2.48)
Hemorrhage	0.83 (0.28-2.42)	0.65 (0.18-2.40)	1.02 (0.31-3.34)
Chronic villitis	0.47 (0.16-1.41)	0.58 (0.19-1.79)	0.29 (0.06-1.28)

N/A, non-applicable; OR, odds ratio; CI, confidence interval.

Poster 089

OPTIMAL GESTATIONAL WEIGHT GAIN IN TWIN PREGNANCIES

Maya Ram, Sunnybrook Health Sciences Centre; **Howard Berger**, St. Michael's Hospital; **Joel G. Ray**, St. Michael's Hospital; **Lipworth Hayley**, Sunnybrook Health Sciences Centre; **Sarah McDonald**, McMaster University; **Beth Murray Davis**, McMaster University; **Riddell Catherine**, Better Outcomes Registry & Network (BORN) Ontario, Children's Hospital of Eastern Ontario (CHEO); **Haroon Hasan**, Better Outcomes Registry & Network (BORN) Ontario, Children's Hospital of Eastern Ontario (CHEO); **Jon Barrett**, Sunnybrook Health Sciences Centre; **Nir Melamed**, Sunnybrook Health Sciences Centre

Background:

Given the increased metabolic demands in twin pregnancies, it is reasonable to assume that the optimal gestational weight gain (GWG) for twin pregnancies will be greater than for singletons. While recommendations for GWG in singleton pregnancies exist, similar data for twins remain scarce.

Objective:

To characterize the normal GWG in uncomplicated twin pregnancies and assess the association between insufficient or excessive GWG with adverse pregnancy outcomes in twins.

Methods:

We included all women with twin pregnancy that delivered at a single tertiary referral center between 2000-2014. Monochorionic twin pregnancies and pregnancies complicated by reduction or demise of one or both twins were excluded. Medical charts were reviewed for maternal height, pre-pregnancy and serial weight measurements throughout pregnancy. GWG was compared between women with normal outcome, and those with pregnancy complicated by SGA, preeclampsia, or GDM. Results were stratified by pre-pregnancy BMI.

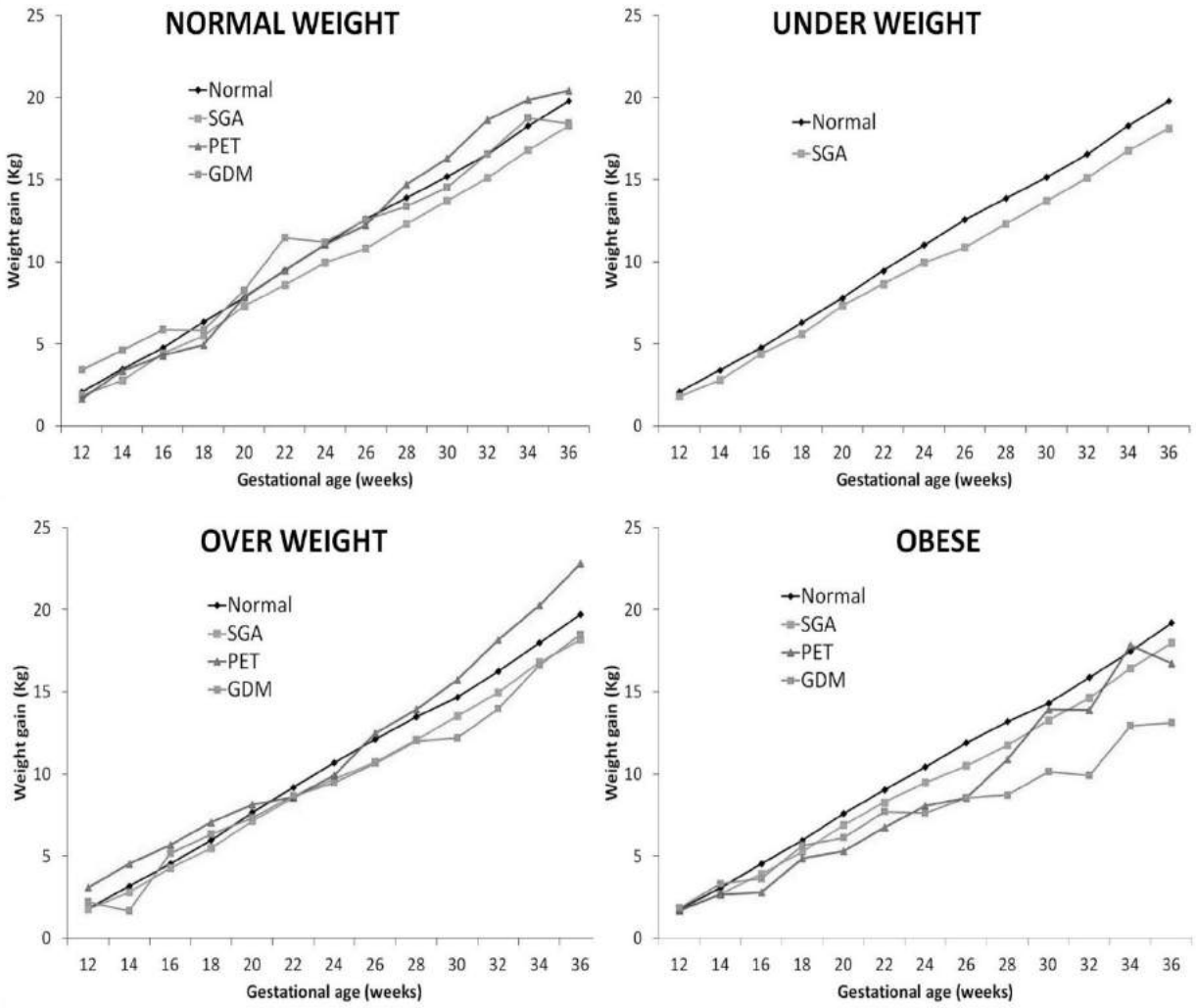
Results:

1)Out of 1,331 women who were eligible for the analysis, 47 (3.5%) were underweight, 803 (60.3%) were normal weight, 293 (22.0%) were overweight, and 187 (14.0%) were obese. 2)Overall rates of SGA (any twin), preeclampsia and GDM were 36.0%, 8.0% and 7.9%, respectively. 3)Normal GWG along pregnancy followed a linear pattern. 4)Women with SGA newborn were characterized by lower GWG starting at 20-22 weeks irrespective of pre-pregnancy BMI. 5)Women with preeclampsia were associated with increased GWG during the 3rd trimester in normal weight and overweight women, but with lower than normal GWG in obese women. 6)Women with GDM experienced lower than normal GWG during the 3rd trimester, possibly reflecting dietary changes; there was no clear relationship between GWG in the first and second trimester and the risk of GDM.

Conclusions:

Suboptimal GWG in twin pregnancies is associated with an increased risk of SGA newborn irrespective of maternal BMI. There was no clear relationship between GWG and other pregnancy complications.

Figure 1: Relationship between gestational weight gain by gestational age and pregnancy complications in twin pregnancies, stratified by maternal pre-pregnancy BMI.



Poster 090

ROLE OF SILDENAFIL IN REPAIRING NEONATAL HYPOXIC-ISCHEMIC INJURY IN THE RETINA

Palig Balian, Montreal Children's Hospital; **Armin Yazdani**, Montreal Children's Hospital; **Annie Wing Hoi Poon**, Montreal Children's Hospital; **Virginie Bleau**, Montreal Children's Hospital; **Zehra Khoja**, Montreal Children's Hospital; **Pia Wintermark**, Montreal Children's Hospital

Background:

Hypoxic-ischemic injuries following birth asphyxia often lead to long-term neurological sequelae, including visual impairments, due to cortical and retinal injuries in affected neonates. Although treatment with sildenafil has been shown to ameliorate retinal function in an animal model of term neonatal asphyxia, the underlying mechanisms explaining this amelioration remain unknown.

Objective:

Our goal is to determine the impact of sildenafil on retinal structure and inflammation following hypoxia-ischemia (HI).

Methods:

Neonatal HI was induced in rat pups at P10 by left common carotid ligation followed by 2-hour exposure to 8% oxygen. 12 hours following HI, animals were randomly administered a vehicle solution or 50 mg/kg of sildenafil for 7 consecutive days. At P12, ELISA analysis was performed to measure inflammatory cytokine IL1B levels. At P30, immunohistochemistry was performed to examine retinal ganglion cells (Brn3a), bipolar cells (Chx10), astrocytes (GFAP), as well as activated (Nestin) and non-activated (GS) Muller cells, in order to assess the neuronal count and the inflammatory response.

Results:

At P12, IL1B levels were increased with HI (0.043±0.038) compared to sham (0.0012±0.00084), but decreased with sildenafil administration (0.022±0.018) *($p = 0.05$)*. At P30, HI caused a decrease in the number of retinal ganglion cells (1.67±2.89 cells/mm) and bipolar cells (190.30±98.99 cells/mm), as well as persistent inflammation marked by an increase in the number of astrocytes (94.33±6.86 cells/mm) and an increase in the ratio of activated to non-activated Muller cells (0.67±3.76) *($p < 0.05$)*. Sildenafil treatment restored the number of retinal ganglion cells (71.58±20.98 cells/mm) and bipolar cells (569.90±71.09 cells/mm) and reduced inflammation by decreasing the number of astrocytes (54.58±6.25 cells/mm) and the number of activated Muller cells (0.00±0.00) *($p < 0.05$)*.

Conclusions:

Sildenafil seems to improve retinal injuries by reestablishing retinal neuron numbers back to sham levels and modulating inflammation following HI.

Poster 094

TRIMESTER-SPECIFIC INTUITIVE EATING SCORES ASSESSED BY THE INTUITIVE EATING SCALE-2 IN ASSOCIATION WITH GESTATIONAL WEIGHT GAIN IN PREGNANT WOMEN - PRELIMINARY RESULTS

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Background:

Most pregnant women do not gain weight according to recommendations. Intuitive eating is an eating behaviour based on the reliance of physical hunger and fullness. How this behaviour is associated with gestational weight gain (GWG) throughout pregnancy has not been evaluated yet.

Objective:

The aim was to examine the associations between intuitive eating and GWG with pre-pregnancy BMI.

Methods:

Preliminary results include 77 pregnant women recruited in the first trimester (9.3 ± 0.7 weeks) who completed, at each trimester, the Intuitive Eating Scale 2. With a weight gain curve including body weight values obtained through medical records (9,0±2,0; 5–12), trimester-specific GWG were calculated using interpolated weights and then compared to the Institute of Medicine recommendations. Total GWG was calculated as the difference between maternal weight before delivery (≥37 weeks) and pre-pregnancy self-reported weight.

Results:

Participants were aged 32.2 ± 3.7 years and had an average pre-pregnancy BMI of 25.6 ± 5.8 kg/m^2. Total GWG was 15.4 ± 4.9 kg and 53.8% of participants were above the recommendations. In the first trimester, GWG was 3.4 ± 2.7 kg and 74.6% of women exceeded the recommendations. A large proportion also exceeded the recommendations in the second (55.6%) and third (48.3%) trimester. In the first trimester, women within GWG recommendations had a higher total intuitive eating score compared to women below or above (4.1 ± 0.4 vs. 3.5 ± 0.5 and 3.6 ± 0.6, respectively; p=0.04). For each trimester, intuitive eating scores decreased as pre-pregnancy BMI increased from underweight to obesity category (p=0.03; 0.01; 0.01).

Conclusions:

Pregnant women with GWG within the recommendations in the first trimester eat more intuitively than women who are below or above. Pre-pregnancy BMI also influences intuitive eating throughout pregnancy. Intuitive eating should be further studied as a promising approach to promote healthy GWG among pregnant women.

Poster 098

eHEALTH INTERVENTIONS TO MANAGE PERINATAL ANXIETY: A SYSTEMATIC REVIEW

Hamideh Bayrampour, University of British Columbia; **Thayanthini Tharmaratnam**, University of British Columbia

Background:

Anxiety is the most common mental health problem during the perinatal period, affecting one fifth of women. Addressing mental health needs in maternity care settings has been challenging due to various barriers such as treatment cost and access. Recently, more research has been focused on eHealth interventions as more accessible and cost-effective approaches to manage maternal mental health issues. Few reviews have been conducted to examine the impact of these interventions in improving perinatal depression. No review to our knowledge has specifically focused on anxiety.

Objective:

The aim of this systematic review is to examine the effectiveness of eHealth interventions in management of perinatal anxiety.

Methods:

To identify relevant evidence, the following databases were searched, beginning with the date that the electronic databases were available through August 2017: MEDLINE, CINAHL, EMBASE, and PsycINFO. Studies that examined the impact of an eHealth intervention on anxiety symptoms or disorders, as a primary or secondary outcome, during pregnancy or postpartum period and assessed anxiety levels at pre and post intervention were included.

Results:

Eight studies met the inclusion criteria and were included in this review. The interventions in seven studies included cognitive behavioural therapy (CBT) (online/computer-based) and one study used an internet-based cognitive behavioural stress management (IB-CBSM) therapy. Only in one study anxiety was examined as a primary outcome. Five studies reported interventions among pregnant women and three studies were conducted during the postpartum period. None of the included studies determined anxiety using a clinical diagnostic interview. Various scales were used to measure symptoms of anxiety or generalized anxiety disorders. Six studies reported reduced levels of anxiety symptoms/disorders post interventions.

Conclusions:

The evidence is amounting that eHealth interventions might be promising approaches for management of perinatal anxiety. More studies are needed to examine the effectiveness of eHealth interventions on reducing clinical anxiety during the perinatal period.

Poster 099

IMPROVING SYSTEM READINESS, STAFF PREPAREDNESS AND PATIENT SAFETY IN A NEW SINGLE FAMILY ROOM NICU THROUGH IN SITU SIMULATION.

Ahmed Moussa, CHU Sainte-Justine; **Audrey Larone-Juneau**, CHU Sainte-Justine; **Laura Fazilleau**, CHU Sainte-Justine; **Marie-Eve Rochon**, CHU Sainte-Justine; **Justine Giroux**, CHU Sainte-Justine; **Marianne Lapinte**, CHU Sainte-Justine; **Émilie St-Pierre**, CHU Sainte-Justine; **Beverley Robin**, Rush University Medical Center; **Jesse Bender**, Mission Health System

Background:

Transitions to new environments threaten patient safety. Immersive in-situ simulation (ISS) conducted in newly constructed Neonatal Intensive Care Units (NICUs) prior to occupancy, has been shown to be effective in testing new environments and identifying latent safety threats (LSTs).

Objective:

We aimed to demonstrate that ISS prior to transitionning to a new NICU improves: systems readiness, staff preparedness, patient safety, staff comfort with simulation, and staff attitude towards culture change.

Methods:

Healthcare providers (HCP) and parents of former NICU patients participated in ISS conducted in the new NICU. 1/8 of the NICU was outfitted with equipment and staff performed in their native roles. Multidisciplinary debriefings were conducted after simulations to identify LSTs. Debriefings were documented and transcribed and LSTs classified using qualitative methods. To assess systems readiness and staff preparedness for transition into the new NICU, HCPs completed surveys prior to transition, post-simulation and post-transition. Systems readiness and staff preparedness were rated on a 5-point Likert scale. Average survey responses were analyzed using dependent samples t-tests and repeated measures ANOVAs.

Results:

108 HCPs and 24 parents participated in 6 half-day simulation sessions. 89 LSTs were identified. Main themes included: communication, recruitment, supplies & equipment, and facilities design. Prior to transitionning to the new NICU, 76% of LSTs were resolved. Survey response rate was 31%, 16%, 7% for baseline, post-simulation and post-move surveys, respectively. System readiness at baseline was 1.3/5, increased to 3.5/5 ($p = 0.0001$) post-simulation and 3.9/5 ($p = 0.02$) post-transition. Staff preparedness at baseline was 1.4/5 increased to 3.3/5 ($p = 0.006$) post-simulation and 3.9/5 ($p = 0.03$) post-transition.

Conclusions:

ISS is a feasible and effective methodology for identifying LSTs, improving systems readiness and staff preparedness. Coordinating large-scale simulations is worth the time and cost investment necessary to optimize systems and ensure patient safety prior to transition to a new NICU.

Poster 101

POSTNATAL CATCH-UP GROWTH IN LOW PROTEIN IUGR OFFSPRING LEADS TO INCREASED EXPRESSION OF HEPATIC MICRORNA-140: MECHANISM OF PREMATURE SENESCENCE?

Shelby L Oke, Western University; **Daniel B Hardy**, Western University

Background:

Placental insufficiency in humans often leads to protein (and amino acid) deficiencies in the fetus, which can lead to intrauterine growth restriction (IUGR). Previous studies suggest that low protein IUGR offspring exhibit hepatic dysmetabolism and decreased longevity; however, the underlying role of microRNAs (miRs) remains elusive. MiR-140 has been demonstrated to target genes involved in regulation of the cell cycle and metabolism (e.g., SIRT1, HDAC4 and PIN1), therefore we hypothesize that MPR-induced alterations in hepatic miR-140 expression will negatively impact liver growth, function and longevity.

Objective:

The objective of our study is to assess the role of miR-140 in fetal liver growth and development in a model of MPR-induced IUGR.

Methods:

Pregnant rat dams were fed a control (20%) or a low (8%) protein diet throughout gestation. Pups born to control mothers were fed a control diet, while pups born to low protein mothers were assigned to one of three dietary regimes: (1) low protein throughout life (LP1), (2) low protein during lactation only (LP2), or (3) normal protein throughout life (LP3). Hepatic miR-140 and target gene expression were assessed in MPR offspring at 21 and 130 days.

Results:

LP2 and LP3 offspring exclusively exhibit catch-up growth by postnatal day (PND) 130, concomitant with increased miR-140 expression. At PND 21, only LP3 offspring demonstrated increased miR-140. QRT-PCR revealed that levels of *sirt1* and *hdac4* were not significantly altered in MPR offspring, but *pin1* mRNA and protein levels were significantly decreased in LP3 offspring at PND 130 and not at PND 21.

Conclusions:

Hepatic miR-140 is upregulated exclusively in offspring with postnatal catch-up growth concomitant with decreased expression of *pin1*, underlying increased cellular senescence. Overall, our data suggests that timing of nutritional restoration for IUGR offspring in postnatal life could influence long-term hepatic function via modulation of miRs.

Poster 104

POWER AND KNOWLEDGE: UNDERSTANDING HOW MIGRANT WOMEN AND CANADIAN-BORN WOMEN PARTICIPATE IN OBSTETRICAL DECISION-MAKING

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Background:

Research in Canada indicates migrant women to have higher rates of caesarean sections (C-sections) compared to Canadian-born women. Communication barriers including lack of ability to negotiate have been cited as potential contributing factors. However, the complexities of patient participation in decision-making have not been well explored in migrants, especially in the context of labour and delivery.

Objective:

The present study aims to understand migrant women's ability to make decisions during labour and delivery including C-section decisions. The research questions were: (i) to what extent do migrant women participate in making decisions during the labour and delivery period and do they differ from the experiences of Canadian-born women; (ii) what are the barriers which limit participation; (iii) are women able to overcome these barriers, and if so how?

Methods:

A qualitative study using a focused ethnographic approach was conducted at a teaching hospital in Edmonton over a ten-month period. Migrant (N=64) and Canadian-born women (N=27) who had a higher risk of undergoing a C-section were included. Data were collected through observation of prenatal appointments, labour and delivery observations and postpartum in-depth interviews. Written informed consent was obtained from all participants and ethics approval was received from the University of Alberta.

Results:

Participation experiences, including the barriers faced, were found to be similar between both migrant and Canadian-born women. Power imbalances prevented both groups from participating in decision-making. These included: authority of providers, lack of opportunity to participate, limited sharing of information and communication barriers specific to migrant women. However, a group of migrant and Canadian-born women overcame these power imbalances due to privileged knowledge about patient rights, and obstetrical interventions available.

Conclusions:

These findings suggest that participation differs due to the exclusivity of information on patient rights and available care. These inequities may be due to socioeconomic status differences, leading to inequities in marginalized populations.

Poster 105

MYELINATION IMPAIRMENTS IN TERM ASPHYXIATED NEWBORNS

Bianca Olivieri, Montreal Children's Hospital; **Guillaume Gilbert**, Philips; **Pia Wintermark**, Montreal Children's Hospital

Background:

Approximately 25% of newborn deaths worldwide are due to birth asphyxia. In surviving newborns, brain injury may develop, leading to long-term neurodevelopmental impairments. Currently, the impact of such injury on brain maturation (i.e. myelination) is unknown.

Objective:

To assess myelination over the first month of life in term asphyxiated newborns treated with hypothermia.

Methods:

Term asphyxiated newborns admitted to the neonatal intensive care unit between 2014 to 2017 and treated with hypothermia were studied. Brain magnetic resonance imaging (MRI) was performed around day of life (DOL) 2, 10, and 30. Myelination was measured using T2*-weighted imaging in various brain regions: i.e., posterior limb of the internal capsule (PLIC), genu and splenium of the corpus callosum, thalamus, and lentiform nucleus. Myelination levels were then compared between asphyxiated newborns with brain injury (BI), those without brain injury (NBI), and according to corrected gestational age (cGA) at the time of MRI.

Results:

Myelination was significantly decreased in the PLIC on DOL10 ($p = 0.023$) and DOL30 ($p = 0.03$) in the BI group, compared to the NBI group. Similarly, significantly less myelination was found in the genu and splenium of the corpus callosum on DOL10 (both $p = 0.009$). No significant differences in myelination were found in the thalamus and lentiform nucleus across all timepoints. When accounting for cGA at the time of MRI scan, myelination significantly increased over time in the thalamus in the NBI ($p=0.01$) and BI groups ($p=0.0006$). Myelination significantly increased in the PLIC (p=0.002) and lentiform nucleus (p=0.006) for the BI groups. No significant correlations were found in the corpus callosum.

Conclusions:

Birth asphyxia and subsequent brain injury disturbed myelination in term asphyxiated newborns treated with hypothermia, suggesting that birth asphyxia impairs normal brain development. Future research should investigate if these changes are temporary or persistent.

Poster 106

CHARACTERIZING THE EFFECTS OF VALPROIC ACID EXPOSURE ON FETAL MOUSE AND PLACENTAL DEVELOPMENT

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Background:

Valproic acid (VPA) is an effective anti-epileptic drug used to treat seizures, bipolar disorders and neuropathic pain. VPA is a teratogenic drug and induces cell death in the developing fetus, interferes with the placental barrier and causes morphological changes in the placenta. Pregnancy outcome following *in utero* VPA exposure depends on the effects of VPA on placental and fetal morphology. Fetal valproate syndrome includes developmental delay and neural tube, ocular, cardiac, genitourinary, respiratory tract and renal anomalies.

Objective:

The objectives of this study were to characterize the effects of VPA on fetal growth and placental morphology throughout mouse pregnancy. We hypothesized that VPA restricts fetal growth as a result of reduced placental growth.

Methods:

CD-1 pregnant dams were exposed to VPA via subcutaneous injection on gestational day (GD) 9 and fetuses were collected on GD 10, 13, 15, 17 and 19. Resorptions and external deformities were noted and fetal crown-rump length (CRL), fetal weight and placental weight were measured.

Results:

VPA exposure during development led to a significant increase in the incidence of external defects compared to controls. The external deformities observed were exencephaly, open eye defect, limb deformities and underdevelopment of tail/somites. Exencephaly was present in 37.7%, 45% and 50% of fetuses at GD 10, 13 and 15 respectively. Fetal weight, placental weight and placental diameter were all lower in VPA exposed animals compared to controls ($p<0.05$).

Conclusions:

The results support the hypothesis and indicate that VPA adversely effects the placenta and fetus in a similar manner. Fetal growth restriction seems to be the result of reduced placental function. The fetal malformations involve neural tube defects, unilateral and bilateral eye defects and musculoskeletal development. This study for the first time characterized the effects of VPA throughout mouse development over the gestational period of GD10 to GD19.

Poster 108

THE INFLUENCE OF PRENATAL EXPOSURE TO 2009 PANDEMIC H1N1 INFLUENZA VACCINATION AND INFLUENZA INFECTION DURING PREGNANCY ON THE DEVELOPMENT OF ASTHMA DURING EARLY CHILDHOOD

Laura K Walsh, University of Ottawa; **Steven Hawken**, University of Ottawa; **Kumanan Wilson**, University of Ottawa; **Deshayne Fell**, University of Ottawa

Background:

During the 2009 H1N1 pandemic, fewer than half of pregnant women in Ontario received the recommended H1N1 influenza vaccine. Commonly-cited reasons for low vaccine uptake include misconceptions regarding the possible impact of maternal influenza disease, as well as concerns regarding vaccine safety. Providing data on previously understudied long-term pediatric outcomes may help to increase maternal vaccination rates.

Objective:

The objectives of this study are to evaluate the association between exposure to 2009 pandemic H1N1 vaccination and influenza infection during pregnancy and later development of asthma during early childhood.

Methods:

We will utilize a retrospective cohort study using a province-wide perinatal database from Ontario containing data on maternal influenza vaccination for the 2009 H1N1 pandemic influenza season. The perinatal database has been individually linked with provincial health administrative databases to ascertain information on the secondary exposure (maternal influenza infection) and primary study outcomes over 5 years of follow-up. Diagnoses of asthma have been identified from the Ontario Asthma Specific Cohort. We will use Cox proportional hazards models to estimate unadjusted and adjusted hazard ratios for pediatric asthma following exposure to maternal influenza vaccination and illness. Inverse probability of treatment propensity score weighting will be used to adjust for potential confounding bias.

Results:

The study cohort includes 117,759 infants, 35,566 of whom (30%) were born to H1N1-vaccinated women, while 2,763 infants (2.3%) were born to H1N1-infected women. Overall, 16,788 children developed asthma during follow-up. Rates of asthma in vaccine exposed and unexposed were 35 per 1000 person-years and 33 per 1000 person-years, respectively.

Conclusions:

Our future analyses will compare rates of asthma between vaccine-exposed and unexposed, and influenza-exposed and unexposed infants, using adjusted survival models. Our study will generate new evidence on long-term safety of influenza vaccination during pregnancy, which is currently lacking.

Poster 109

VITAMIN D STATUS AMONG NEWBORNS OF MOTHERS WITH AND WITHOUT GESTATIONAL DIABETES MELLITUS (GDM): A NESTED CASE-CONTROL STUDY.

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Background:

The relationship between GDM and neonatal vitamin D status is unclear.

Objective:

To compare vitamin D status between infants born to mothers with GDM and healthy controls.

Methods:

Mother-infant pairs with GDM (n=14) and controls (n=28) were recruited from the Lakeshore General Hospital, Pointe Claire, QC. Cases and controls were matched for pre-gravid body mass index (BMI) (± 5 kg/m^2), infant birth weight (± 500 g) and sex. Maternal demographic and anthropometric data and infant blood samples were taken after delivery. Infant serum 25-hydroxyvitamin D [25(OH)D] was measured using (LIAISON, DiaSorin Inc.). At 1-4 wk postpartum, a subgroup of cases (n=3) and controls (n=6) had body composition assessed using dual-energy x-ray absorptiometry; maternal and infant serum 25(OH)D measured; and dietary intake and supplement use captured using food frequency questionnaire and 24-h dietary recall. T-tests and correlations were performed (SAS, v9.4).

Results:

All infants were of healthy weights for gestational age at birth. Serum 25(OH)D was not different among infant cases and controls, 42.8±18.6 and 39.2±22.0 nmo/L, respectively (p=0.574). Vitamin D deficiency (< 30 nmol/L) was higher in case-infants (21%) than in control-infants (4%). Infant birth weight-for-age Z score was lower in cases 0.17±0.98 than controls 1.38±1.03 (p=0.028). For the subgroup, maternal vitamin D was lower in cases 54.7±5.2 than controls 62.1± 33.2 (p=0.048). No differences were observed in maternal energy intake between the two groups during pregnancy (p=0.351) or vitamin D intake (p=0.691). No observed differences in maternal and infant body composition at the postpartum visit.

Conclusions:

Vitamin D deficiency was more common among infants of GDM cases compared to controls, suggesting targeted interventions in GDM are warranted.

Poster 110

SWITCHING TWINS ORDER LABELING AT THE TIME OF CESAREAN DELIVERY: HOW LIKELY IS THE NON-PRESENTING TWIN TO BE DELIVERED FIRST?

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Background:

In studies on the outcome of twins in relation to the intrauterine labeling (presenting vs. non-presenting), it is presumed that the presenting twin is delivered first, which would result in concordance in the antenatal and postnatal labeling. Data on the likelihood of a switch in twins order labeling at the time of birth (the non-presenting twin delivered first) are scarce.

Objective:

To address this question by using a cohort of opposite-sex twin pregnancies for whom the intrauterine order was well documented in ultrasound prior to delivery.

Methods:

Retrospective cohort study of all opposite-sex dichorionic twin pregnancies between 2002-2015. The reports of the ultrasound exams performed <2 weeks prior to delivery were reviewed for information on twins order. Intrauterine twins order was then compared to the labeling of twins order at the time of birth. Multivariable regression analysis was performed to identify factors associated with switching of twins order labeling at birth.

Results:

Of 1,746 women with twin pregnancies, 942 (53.9%) had opposite-sex twins, and 617 had recent (<2 weeks) data on sonographic twins order. In 456 (73.9%) pregnancies, both twins were delivered by cesarean delivery and in 161 pairs (26.1%), one/both twins were delivered vaginally. The rate of switching of twins order labeling was 6.8% (31/456) in the cesarean group, while, there were no cases of switching of twins order labeling in the vaginal group. Independent factors associated with switching of twins order labeling were: placenta previa (aOR=13.9), classical uterine incision (aOR=6.2), non-vertex presentation of the presenting twin (aOR=2.9), and gestational age <32 weeks (aOR= 2.8).

Conclusions:

The rate of switching of twins order labeling at the time of cesarean delivery is 6.8%. Clinicians and researchers should be aware of this phenomenon and should try to confirm twin order at the time of birth when this may have implications for neonatal-care and long-term outcome.

Table 1 – Predictors for switching twins order labeling at the time of cesarean delivery- Univariate analysis

	Twins delivered at "correct" order n=425	Twins delivered at "reverse" order n=31	p-value
Maternal and pregnancy characteristics			
Age (years)	35.3 ± 5.1	33.6 ± 5.3	0.082
Parity	0.4 ± 0.7	0.5 ± 1.0	0.382
Gestational age at delivery	34.4 ± 3.4	32.6 ± 4.3	**0.030**
Gestational age ≤ 32 weeks	86 (20.2)	15 (48.4)	**<0.001***
Diabetes mellitus	41 (9.6)	3 (9.7)	1.000
Previous cesarean delivery	36 (8.5)	5 (16.1)	0.182
Preeclampsia	32 (7.5)	3 (9.7)	0.722
Delivery characteristics			
Emergent cesarean delivery	73 (17.2)	6 (19.4)	0.757
Classical uterine incision	4 (0.9)	4 (12.9)	**0.001***
Birth weight of the presenting twin (grams)	2225 ± 677	1946 ± 742	**0.028**
Birth weight of the non-presenting twin (grams)	2173 ± 675	1752 ± 725	**0.001**
Ultra-sonographic characteristics			
Presenting twin non-vertex	153 (36.0)	20 (64.5)	**0.002***
Non-presenting twin non-vertex	235 (55.3)	21 (67.7)	0.178
Oligohydramnious of the presenting twin	36 (8.5)	3 (9.7)	0.740
Polyhydramnious of the presenting twin	3 (0.7)	0	1.000
Oligohydramnious of the non-presenting twin	18 (4.3)	1 (3.2)	1.000
Polyhydramnious of the non-presenting twin	4 (0.9)	1 (3.2)	0.299
Placenta previa	6 (1.4)	7 (22.6)	**<0.001***

Data are presented as mean ± SD, or n (%). Values in bold are statistically significant

*These factors remained associated with twin-order switching in multivariate analysis

Poster 111

MATERNAL URINARY ARSENIC CONCENTRATIONS AND GESTATIONAL DIABETES: THE MIREC STUDY

Jillian Ashley-Martin, Dalhousie University; **Linda Dodds**, Dalhousie University; **Tye E Arbuckle**, Health Canada; **Maryse Bouchard**, University of Montreal; **Gabriel D Shapiro**, McGill University; **Mandy Fisher**, Health Canada; **Patricia Monnier**, McGill University; **Anne-Sophie Morisset**, Laval University; **Adrienne S Ettinger**, University of Michigan

Background:

Epidemiological and toxicological evidence suggest that maternal arsenic (As) is associated with elevated gestational diabetes (GDM) risk. This limited body of literature has primarily focused on measuring total arsenic (As) levels. Uncertainty remains regarding the relationships between specific arsenic species, comprised of both organic (e.g., fish) and inorganic (e.g., emissions, water) arsenic, and GDM.

Objective:

We evaluated the associations between 1st trimester maternal urinary speciated As [(inorganic (trivalent, pentavalent), methylated arsenic metabolites (monomethylarsinic acid (MMA), dimethylarsinic acid (DMA)), and organic (arsenobetaine)] concentrations and GDM in the Maternal-Infant Research on Environmental Chemicals (MIREC) Study.

Methods:

GDM cases were identified using results of prenatal glucose challenge and tolerance tests in accordance with national guidelines. Multivariate logistic regression, adjusted for specific gravity and maternal characteristics, was used to estimate associations between speciated As tertiles and GDM. As in previous research, we accounted for the potential influence of organic As concentrations on inorganic As model estimates by adjusting for arsenobetaine.

Results:

Among women with live, singleton births and no previous history of diabetes, 1,243 women had complete arsenic and glucose tolerance data; 4% were classified as having GDM. Due to the degree of samples below the limit of detection, our analysis focused on DMA and arsenobetaine as these were the subtypes with detectable concentrations in at least 40% of samples. Compared to women in the lowest tertile (< 1.49 µg/l), women with DMA concentrations exceeding 3.52 µg/l (3rd tertile) were at increased risk of GDM (aOR=4.2; 95% CI: 1.3,13.6) (p-value for trend=0.02). When adjusted for arsenobetaine, these results were attenuated (aOR=3.3; 95% CI: 0.9,11.7) (p-value test for trend=0.10).

Conclusions:

In this sample of Canadian women, DMA was positively associated with GDM. These results contribute to knowledge of modifiable GDM risk factors. The attenuation due to arsenobetaine motivates further investigation regarding sources of As species exposure and corresponding risks.

Poster 112

A CLINICAL CARE PATHWAY FOR OBESE PREGNANT WOMEN: A PRAGMATIC PILOT CLUSTER RANDOMIZED CONTROLLED TRIAL

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Background:

Obese women are at increased risks for maternal, fetal, birth and infant complications. Clinical management for obese pregnant women involves challenges.

Objective:

We conducted a pragmatic pilot cluster randomized controlled trial (RCT) to determine the feasibility of implementing and testing a clinical care pathway for obese pregnant women versus standard care.

Methods:

We randomly allocated clinics to the care pathway or standard care for obese pregnant women. Eligible women had a pre-pregnancy body mass index of >30 kg/m^2 and a viable singleton <20 weeks. Our primary outcomes were the feasibility of conducting a full-scale cluster RCT (defined as >80%: randomization of clinics, use of the care path, and completeness of follow-up) and of the intervention (defined as >80%: compliance with each step in the care pathway, and clinicians would recommend the care pathway to a colleague). We calculated risk ratios (RR) and 95% confidence intervals (95% CI).

Results:

Eight approached clinics agreed to participate and were randomized. Half of the intervention clinics used the care pathway, resulting in <80% uptake of eligible women. High follow-up (99.5%) was achieved, in 188 of 189 women. The care pathway was feasible (used in >80%) for numerous guideline-directed recommendations for screening, but less so for counselling topics. All clinicians who used the care pathway in the majority of women, most of whom were midwives, reported they would recommend it to a colleague. The intervention group had significantly higher overall adherence to the guideline recommendations compared to control (RR 1.71, 95% CI 1.57-1.87).

Conclusions:

In this pragmatic pilot cluster RCT, a guideline-directed clinical care pathway improved some aspects of care of obese pregnant women and was recommended by clinicians, particularly midwives. A cluster RCT may not be feasible in a mix of obstetrician- and midwifery-led clinics, but may be feasible in midwifery-led clinics.

Table 1. Outcome rates in pilot cluster randomized controlled trial of a care pathway for obese pregnant women

Steps offered to eligible women		Intervention Number (%)[a]	Control Number (%)	RR (95% CI)
1st trimester	Early screen for undiagnosed pre-pregnancy diabetes	17 (94.4)	10 (6.5)	14.54 (7.90-26.76)
	Nuchal translucency ultrasound	13 (100)	64 (92.8)	1.08 (1.01-1.15)
	Body mass index calculation from pre-pregnancy height and weight	19 (100)	150 (88.8)	1.13 (1.07-1.19)
	Counselled about exercise	11 (57.9)	52 (30.8)	1.88 (1.21-2.94)
	Counselled about weight gain	10 (52.6)	24 (14.2)	3.71 (2.11-6.52)
	Counselled about nutrition/food choices	12 (63.2)	26 (15.4)	4.11 (2.51-6.72)
	Advised about cardiac/pulmonary disease	4 (21.1)	0 (0.0)	--
	Advised about gestational hypertension	9 (47.4)	14 (8.3)	5.72 (2.87-11.40)
	Advised about gestational diabetes mellitus	18 (94.7)	158 (93.5)	1.01 (0.90-1.13)
	Obstructive sleep apnea screen	15 (79.0)	0 (0.0)	--
	Maternal-fetal medicine specialist referral if history of bariatric surgery[b]	--	--	--
2nd trimester	Maternal serum alpha-fetoprotein screen	18 (100)	107 (78.7)	1.27 (1.16-1.39)
	Anatomy ultrasound	19 (100)	166 (98.8)	1.01 (1.00-1.03)
	Screen for diagnosis of gestational diabetes mellitus	14 (93.3)	149 (93.1)	1.00 (0.87-1.15)
3rd trimester	Obstetrician consult	9 (60.0)	9 (33.3)	1.80 (0.92-3.53)
	Anaesthesiology consult	11 (57.9)	23 (13.6)	4.25 (2.48-7.30)
	Ultrasound for growth & wellbeing	17 (89.5)	151 (89.4)	1.0 (0.85-1.18)
	Counselled about shoulder dystocia	5 (26.3)	10 (5.9)	4.45 (1.70-11.65)
	Counselled about risk of caesarean section	7 (36.8)	44 (26.0)	1.42 (0.75-2.69)
	Counselled about operative risk associated with caesarean section	4 (21.0)	11 (6.5)	3.23 (1.14-9.16)
	Counselled about risks of high body mass index	2 (10.5)	0 (0.0)	--
	Discussed breastfeeding	7 (36.8)	26 (15.4)	2.39 (1.21-4.76)
Total Compliance		241 (62.9)	1194 (36.8)	1.71 (1.57-1.87)
Steps received in eligible women				
Early screen for undiagnosed pre-pregnancy diabetes		10 (58.8)	6 (60.0)	0.98 (0.52-1.87)
Nuchal translucency ultrasound		8 (61.5)	34 (53.1)	1.16 (0.71-1.89)
Obstructive sleep apnea screen		8 (53.3)	0 (0.0)	--
Maternal-fetal medicine specialist referral if history of bariatric surgery		--	--	--
Maternal serum alpha-fetoprotein screen		10 (55.6)	44 (41.1)	1.35 (0.84-2.16)
Anatomy ultrasound		19 (100)	164 (98.8)	1.01 (1.00-1.03)
Screen for diagnosis of gestational diabetes mellitus		12 (85.7)	127 (85.2)	1.01 (0.80-1.26)
Anaesthesiology consult		6 (54.6)	20 (87.0)	0.63 (0.36-1.10)
Ultrasound for growth and wellbeing		16 (94.1)	140 (92.7)	1.02 (0.89-1.15)
Clinical outcomes detected in eligible women tested				
Maternal				
	Pre-pregnancy diabetes mellitus	3 (30.0)	1 (16.7)	1.80 (0.24-13.63)
	Obstructive sleep apnea	1 (12.5)	0 (0.0)	--
	Gestational diabetes mellitus	3 (25.0)	11 (9.0)	2.77 (0.90-8.59)
Fetal				
	Cardiac defect	0 (0.0)	0 (0.0)	--
	Neural tube defect	0 (0.0)	0 (0.0)	--

Note: Proportions not always out of total number per group due to some women being ineligible for the screen, test, or consult
RR: relative risk; 95% CI: 95% confidence interval; "--": not applicable
[a]Guideline-directed step in the clinical care pathway is considered feasible if >80% rate of offer; [b]None of the women had a history of bariatric surgery

Poster 114

SOCIAL DETERMINANTS OF HEALTH AND ADVERSE MATERNAL AND BIRTH OUTCOMES IN ADOLESCENT PREGNANCIES: A SYSTEMATIC REVIEW

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Background:

Adverse outcomes in teen pregnancies have been attributed to both biological immaturity and social determinants of health (SDOH).There has been no systematic review to date examining the role of SDOH in adverse pregnancy outcomes in adolescents.

Objective:

Evaluate evidence on the association between SDOH and adverse maternal and birth outcomes in adolescent mothers (PROSPERO#42017068749).

Methods:

Comprehensive searches in four electronic databases were conducted up to August 2017. Observational studies were included in the review if they evaluated the relationship between SDOHs (place of residence, race, religion, education, socioeconomic status [SES], and social capital from the PROGRESS-PLUS framework) and pregnancy outcomes in adolescents. Two independent reviewers assessed the methodological quality of studies with the Newcastle-Ottawa Scale. Data was analyzed descriptively. Pooled odds ratios (pOR) were calculated in the absence of heterogeneity.

Results:

Thirty-one studies met the inclusion criteria. The three most frequently evaluated SDOH were race, SES, and education while the three most commonly reported outcomes were preterm birth (PTB), low birth weight (LBW), and caesarean section. Overall, the methodological quality of primary studies was poor. Findings from three cross sectional studies reported inconsistent association between rural residence and risk of LBW (unadjusted ORs between 0.45-1.17). Evidence from two cross-sectional studies showed a positive association between low SES, low educational attainment and increased risk of caesarean section. Meta-analyses of 4 retrospective cohort studies showed that, compared to white teens, black teens had a 67% increased odds of PTB (pOR 1.67; 95% confidence interval [CI] 1.59, 1.75), 53% increased odds of LBW (pOR 1.53; 95% CI 1.45-1.62) and 23% increase in odds of caesarean section (pOR 1.23; 95% CI 0.80-1.89).

Conclusions:

SDOH are strongly linked with adverse outcomes in adolescent pregnancy. Black adolescent mothers are at a high risk of PTB, LBW and caesarean section. These findings have implications for perinatal service providers and program developers.

Poster 116

ASSOCIATION OF BMI AND TWO QUANTITATIVE BODY FAT MEASURES WITH CARDIOMETABOLIC PROFILES IN EARLY PREGNANCY

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Background:

Disruptions in maternal cardiometabolic status in pregnancy may arise related to pregravid overweight/obesity, excess gestational weight gain, dietary deficiency/excess, or sedentary behaviours. Abnormal maternal cardiometabolic status in early pregnancy may contribute to programming of offspring adiposity and metabolic dysfunction.

Objective:

This study examined the comparative effect of pre-pregnancy BMI (pBMI) and quantitative body fat (BF) measures on the cardiometabolic profile of pregnant women adjusting for the potential confounding effect of demographic, dietary and physical activity variables.

Methods:

The Be Healthy in Pregnancy Study (NCT01689961) recruited healthy pregnant women in Hamilton, Burlington and London, Ontario, between 12-17 weeks gestation. Plasma glucose and lipid profiles were analyzed by photometric assay, and cytokines and adipokines (CRP, leptin, adiponectin) by ELISA. Maternal adiposity (percent body fat, %BF) was measured by bioelectric impedance analysis (Tanita BF-350) and sum of 4-site - triceps, biceps, sub-scapular, iliac crest - skinfold thickness (SFT, Harpenden calipers). Linear regression was used to assess the association of body adiposity with cardiometabolic profile with and without adjustment of confounding variables.

Results:

The 160 women (mean±SD age 31.2±4.0 years and gestation of 13 2/7 weeks) were predominantly Caucasion. Compared to normal pBMI (18.5-24.99 kg/m^2), women with a high pBMI (>30 kg/m^2) had significantly higher blood glucose (5.1±0.4 vs. 4.7±0.5 mmol/L, P<0.01), triglycerides (1.52±0.80 vs. 1.10±0.42 mmol/L, P<0.0001) and insulin (8.5±9.5 vs. 4.2±2.9 µIU/L, P<0.0001). In a subset of 91 women, %BF as assessed by SFT and BIA had comparable strength of associations for cardiometabolic status (blood glucose, triglycerides, insulin, leptin, adiponectin) in early pregnancy (Table 1).

Conclusions:

In early pregnancy, greater adiposity as %BF was associated with significantly elevated lipid profiles, glucose and adipokines, although mean values were within the normal range. Quantitative measures of body fat may be clinically advantageous in screening for abnormal cardiometabolic status. (*Funded by CIHR*)

Poster 121

IMMEDIATE SKIN-TO-SKIN FOLLOWING CAESAREAN DELIVERY: A SYSTEMATIC REVIEW

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Background:

Immediate skin-to-skin care (S2S) involves placing the naked newborn on the mother's chest within 5 minutes of birth. Despite evidence of its benefits, and widespread use in vaginal delivery, it is seldom performed in the operating room following caesarean.

Objective:

To review the literature on immediate S2S following caesarean section (CS).

Methods:

A search was performed using MEDLINE, Embase, Cochrane Central Register of Controlled Trials and Cochrane Database of Systematic Reviews through July 2017. English-language articles including immediate S2S following CS were retrieved, irrespective of methodology. Two reviewers independently conducted a title and abstract screen to include articles in the full-text review. The reviewers discussed disagreements until they reached a consensus. The reviewers independently conducted a full-text review and discussed disagreements until a consensus was met. An assessment for risk of bias was done for each article.

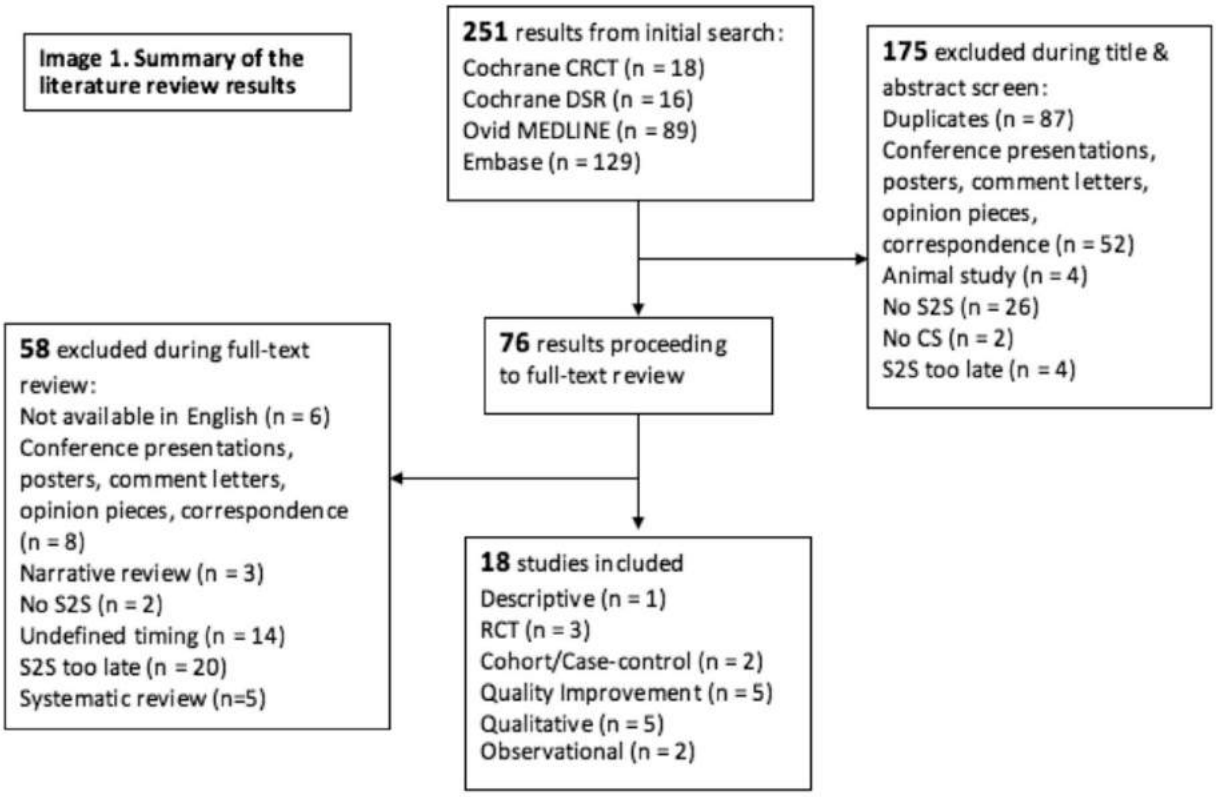
Results:

251 articles were identified. 175 articles were excluded from the title and abstract screen and 58 from the full-text review. See summary of the literature review results. In total, 18 studies were included. Studies comparing maternal and newborn outcomes showed improved outcomes such as improved breastfeeding rates and birth satisfaction, shorter maternal recovery time and hospital stays, and decreased NICU transfers and maternal stress. No negative outcomes were reported. Qualitative studies reporting on the perception of S2S highlighted barriers to implementing S2S in the operating room, such as competing priorities, maternal pain or sedation, and fear of change. Some found that implementation is possible with adjustments to current practices. Quality Improvement interventions found that immediate S2S is on the rise and is associated with positive neonatal outcomes, such as decreased formula supplementation.

Conclusions:

This review found that immediate S2S may improve maternal and neonatal outcomes and may be implemented with changes to current practices. More research is needed to demonstrate improved outcomes and feasibility of implementation.

Image 1. Summary of the literature review results



Poster 123

THE CANADIAN DOHAD COHORT REGISTRY: A FAR-REACHING MAELSTROM RESEARCH INITIATIVE TOWARD FACILITATING COLLABORATIVE RESEARCH

Rachel Massicotte, Research Institute of the McGill University Health Centre (RI-MUHC); **Isabel Fortier**, Research Institute of the McGill University Health Centre (RI-MUHC); **Vincent Ferretti**, Ontario Institute for Cancer Research (OICR); **Alan Bocking**, University of Toronto (UofT); **William Fraser**, Université de Sherbrooke (UdeS); **Stephanie Atkinson**, McMaster University

Background:

Major investments in population-based studies worldwide have supported innovative research that has produced advanced understanding of the relation between various environmental and lifestyle exposures and health and disease outcomes. To optimize the value of such scientifically rich databases there is a need to establish cross-study collaborations and develop tools to support data discovery and co-analysis.

Objective:

With this goal in mind, Maelstrom Research launched the Research Advancement through Cohort Cataloguing and Harmonization (ReACH) project.

Methods:

ReACH builds on the close collaboration with 26 longitudinal studies that directly address the DOHaD theme representing 53,300 mother-child dyads and 17,800 fathers totaling 125,000 participants. ReACH resources includes a metadata catalogue and data harmonization platform to leverage the use of data and biological samples collected by Canadian pregnancy and birth cohorts. ReACH mandate is also to provide support and training to the users of its resources and when foreseen, assist investigators in the realization of their research projects involving multiple studies.

Results:

The ReACH catalogue offers a web-based access to descriptions of study as well as a complete list of variables collected. The catalogue already covers detailed descriptions for almost all the studies and complete information of the data and biological samples collected for several of them. The studies either followed their participants from pregnancy or have collected pregnancy-related information retrospectively. The number of participants recruited by individual studies range from 200 to more than 10,000, the duration of follow-up range between 2 and 22 years with 17 of the studies still ongoing. A search interface allows investigators to identify studies of interest and data items available to answer specific research questions.

Conclusions:

Ultimately, ReACH aims to enhance the potential for collaborative and cross-disciplinary research, expand research perspectives, improve quality of research practices, and foster the development of innovative evidence-based research on DOHaD.

Poster 125

GESTATIONAL DIABETES MELLITUS (GDM) EXPOSURE AND POSTNATAL DIET INFLUENCE PANCREATIC ISLET FUNCTION OF THE RAT OFFSPRING

Taylor Simone Morriseau, University of Manitoba; **Navdeep Brar**, University of Manitoba; **Prasoon Agarwal**, University of Manitoba; **Mario A Fonseca**, University of Manitoba; **Stephanie M Kereliuk**, University of Manitoba; **Laura K Cole**, University of Manitoba; **Bo Xiang**, University of Manitoba; **Nivedita Seshadri**, University of Manitoba; **Christine A Doucette**, University of Manitoba; **Vernon W Dolinsky**, University of Manitoba

Background:

As rates of obesity surge to epidemic proportions, GDM has emerged as the most common complication of pregnancy. GDM exposure and obesity are strong risk factors for type 2 diabetes (T2D) development in the offspring; however, connections between GDM exposure, postnatal diet and islet dysfunction in offspring metabolic health remain unclear. We hypothesize that GDM exposure drives changes in islet gene expression, structure and size, and impairs insulin secretion, which is worsened by a postnatal high-fat and sucrose (HFS; 45% kcal% fat) diet.

Objective:

To define GDM and/or diet-induced changes in gene expression that contribute to deficiencies in beta-cell mass or function, or both.

Methods:

GDM was induced in female rats using a HFS diet. Litters of LEAN or GDM dams were divided and pups were weaned onto a low-fat (LF; 10% kcal% fat) or HFS diet for 12 weeks. Pancreata and islets were isolated from 15-week-old offspring to analyze pancreas islet structure, gene expression (RNA-seq), and glucose-stimulated insulin secretion (GSIS).

Results:

A postnatal HFS-diet reduced GSIS (39% reduction) but increased islet numbers (1.6-fold) and mean islet area (1.8-fold). Despite the consumption of a LF-diet, exposure to GDM alone reduced GSIS by 62%, that was unchanged with the consumption of a HFS-diet (59% reduction). GDM exposure further attenuated adaptive responses in islet number and area. Islets from GDM-exposed offspring revealed significant upregulation in 156 genes (including *Sod2*, *Ccl2*, *Il1b*) and 13 downregulated genes (*Vdr*, *Igfbp5*). With the addition of a HFS-diet, 384 genes were significantly upregulated and 17 genes were downregulated.

Conclusions:

Despite the increase in islet area, the functional capacity of islets was reduced upon exposure to a postnatal HFS-diet. GDM exposure attenuated these adaptive increases and exacerbated impairments in GSIS. GDM-induced alterations in gene expression, potentially mediated by epigenetic mechanisms, may worsen metabolic health outcomes in the offspring.

Poster 126

DO WOMEN MEET THE CANADIAN EXERCISE GUIDELINES IN EARLY PREGNANCY?

Madison Beatty, McMaster University; **Stephanie Atkinson**, McMaster University; **Caroline Moore**, McMaster University; **Michelle Mottola**, Western University; **Stuart Phillips**, McMaster University; **BHIP Study Team**, McMaster University

Background:

Exercise during pregnancy is associated with maternal and fetal health benefits, and is recommended for women without contraindications. In Canada, the 2003 SOGC/CSEP guidelines recommend that pregnant women begin with 15 minutes of aerobic and strength-conditioning exercises three times per week, gradually increasing to 30 minutes four times per week.

Objective:

To determine the percentage of women meeting Canadian exercise guidelines in early pregnancy and to identify the preferred types of exercise.

Methods:

Data were collected from 235 women at baseline (12-17 weeks gestation) from the Be Healthy in Pregnancy (BHIP) randomized controlled trial (NCT01693510). All participants completed a PARmed-X for pregnancy form that contains self-reported information on current exercise habits. Participants also wore an accelerometer (Sensewear^{TM} Armband, BodyMedia) for 3 days as an objective measure of physical activity. Women that reported exercising ≥ 4 times/week for ≥ 30 minutes on the PARmed-X form were classified as meeting the SOGC/CSEP Clinical Practice Guidelines for Exercise in Pregnancy.

Results:

Complete PARmed-X data and accelerometer data with a wear time > 10hr per day were analyzed for 192 participants in early pregnancy (age 31±3.9 years; BMI 25.4±4.7kg/m^2; weeks gestation 13±1.6, (mean±SD)). Based on the PARmed-X data, 80.2% of women reported that they were presently exercising. Of these women, only 20.8% were found to meet the SOGC/CSEP guidelines. Many women reported engaging in the recommended aerobic and strength-conditioning exercises (table 1). Based on the accelerometer data, one-third (33.9%) of women achieved ≥ 30 minutes of physical activity per day at a moderate intensity (3 - <6 METs) for three consecutive days.

Conclusions:

Despite a large percentage of women exercising in early pregnancy, only 20.8% of women met the SOGC/CSEP recommendations. Increased promotion of the guidelines in a clinical setting and improved knowledge translation of the benefits of exercise during pregnancy are necessary. (*Funded by CIHR)*

Poster 127

MATERNAL DEPRESSIVE SYMPTOMS ACROSS THE POSTNATAL AND EARLY CHILDHOOD PERIOD, AND EMOTIONAL-BEHAVIORAL FUNCTIONING OF CHILDREN AT AGE 10 YEARS: FINDINGS FROM A PROSPECTIVE AUSTRALIAN PREGNANCY COHORT

Muhammad Kashif Mughal, University of Calgary; **Rebecca Giallo**, Murdoch Childrens Research Institute, Australia; **Abdul Wajid**, University of Calgary; **Katherine Bright**, University of Calgary; **Karly Jarema**, University of Calgary; **Mireille Lecharrois**, University of Calgary; **Lydia Vermyden**, University of Calgary; **Dawn Kingston**, University of Calgary

Background:

Maternal depression is one of the most common morbidities during the perinatal period. Children exposed to maternal depression are at increased risk of social, emotional and behavioral development. While several studies have explored the influence of perinatal depression on child development, little research has explored the impact of chronicity and severity of maternal depression on children emotional-behavioral functioning.

Objective:

This study examined association between the maternal depressive symptoms across ten years from the first year postpartum and children emotional-behavioral difficulties at 10 years of age.

Methods:

Data were drawn from 3582 mother-child dyads participating in a large prospective pregnancy cohort in Australia. Longitudinal latent class analyses was conducted to identify trajectories of maternal depressive symptoms across six time points (3-6 months, 1-2 years, 3-4 years, 5-6 years, 7-8 years and 9-10 years). Bivariate and multivariate models were conducted to evaluate the relationships between the preceding trajectories and child emotional-behavioral difficulties. The covariates in the study included maternal, child and family characteristics.

Results:

Five distinct trajectories of maternal depressive symptoms were identified: minimal symptoms (68.1%), subclinical symptoms (22.4%), early symptoms (3.1%), persistent symptoms (3.5%) and increasing symptoms (2.9%). The proportion of children with SDQ scores in the “at risk” and “clinical” ranges for each of the trajectories was: 44.5% for minimal symptoms, 30.8% for subclinical symptoms, 6.7% for early symptoms, 9.8% for persistent symptoms, and 8.2% for increasing symptoms. Multivariate model showed that compared to children of mothers with minimal depressive symptoms, children exposed to subclinical, early, persistent and increasing maternal depressive symptoms were at increased risk (AOR ranged from 1.95-3.42) of emotional-behavioral difficulties at age 10 years.

Conclusions:

The study findings provide evidence the need to undertake routine mental health screening and interventions for women across early childhood and school age period, to improve both maternal and child outcomes in the early years.

Poster 129

THE RELATIONSHIP BETWEEN SLEEP AND PAIN AMONG CHILDREN WITH PERINATAL STROKE

Lisa Smithson, University of Calgary; **Eliza Li**, University of Alberta; **Adam Kirton**, University of Calgary; **Jacqueline Pei**, University of Alberta; **John Andersen**, Glenrose Rehabilitation Hospital; **Jerome Yager**, University of Alberta; **Brian Brooks**, University of Calgary; **Kathleen O'Grady**, Glenrose Rehabilitation Hospital; **Carmen Rasmussen**, University of Alberta

Background:

Perinatal stroke is a focal vascular brain injury that occurs between viability and 28 days of life and affects 10000 Canadian children and families. Hemiparetic cerebral palsy (CP) accounts for one third of all (CP) and is usually caused by perinatal stroke. Pain is a common comorbidity among children with CP, affecting ~55%, but has not been studied in perinatal stroke. One modifiable factor that may influence pain among children is Sleep Disordered Breathing (SDB). SDB, from habitual snoring to obstructive sleep apnea, is present in 5-10% of children and associated with pediatric pain, but remains unexplored in children with perinatal stroke.

Objective:

Identify the prevalence of both SDB and pain among children with perinatal stroke and their potential association with each other.

Methods:

The Alberta Perinatal Stroke Project (APSP) is the largest population-based perinatal stroke research cohort in the world. Participants to date include 8 APSP children and 7 healthy control participants (aged 6-15 years). Caregivers completed the PEDS-QL Pain and Hurt subscale to assess pain, and the Pediatric Sleep Questionnaire (PSQ) to assess sleep disturbances.

Results:

In the control group, the mean PSQ ratio was 0.12 (SD = 0.11) compared to 0.29 (SE = 0.16) among participants with perinatal stroke ($p=0.048$). In the control group, the mean Pain and Hurt measure was 0.00 (SE = 0.00) among controls and 3.75 (SD=3.69) among children with perinatal stroke. The PSQ ratio and the Pain and Hurt subscale appeared to be correlated among stroke participants ($r=0.79$, $p= 0.02$). Data collection is ongoing.

Conclusions:

This research is the first to indicate that 1) children with perinatal stroke are at increased risk for both pain and SDB, and 2) greater SDB symptomatology may be associated with more pain among children with perinatal stroke. Future research is required to assess the utility of SDB treatments for pain reduction.

Poster 130

FATHERS OF LATE PRETERM INFANTS AND THEIR EXPERIENCE WITH COMMUNITY-BASED CARE

Shahirose Sadrudin Premji, University of Calgary; **Aliyah Dosani**, Mount Royal University; **Sandra Reilly**, University of Calgary; **Genevieve Currie**, Mount Royal University; **Lynnette May Oliver**, University of Calgary; **Abhay Lodha**, Univeristy of Calgary and Alberta Health Services; **Marilyn Young**, Alberta Health Services; **Marc Hall**, University of Calgary; **Tyler Williamson**, University of Calgary

Background:

In Alberta public health nurses (PHNs) provide community-based post-natal care, in the first 2 months of life, to mothers and infants. During this time, because of the additional health complications often experienced by late preterm infants (LPIs), there may be additional burden on the parents of these infants during this period of transition.

Objective:

We explored fathers' experience of caring for their LPIs, in the first 2 months of life, and care provided by PHNs as there is no literature in this area.

Methods:

A mixed-methods exploratory sequential design gathering: (a) quantitative data, from a convenience sample of father (n=53), using a descriptive survey about fathers' levels of stress (Parenting Stress Index), anxiety (Speilberger State Trait Anxiety), and depression (EPDS) at 6 to 8 weeks following the birth of their infant, and (b) qualitative data from semi-structured interviews (n=5) with fathers.

Results:

Fathers discovered through experience what it meant for their baby to be born "early". Our sample (n=31; response rate 58%) of fathers had low life stress (mean=10; 95% CI=7.5, 12.5) but seem affected by the demands of their infant, which appeared as stress in the child (mean=51.3; 95% CI=49.0, 53.6) and parent (mean=46.6; 95% CI=44.4, 48.8) domains, and anxiety (mean=31.6; 95% CI=22.2, 34.0). We found one-unit increase in parent domain stress was associated with a mean increase in state-anxiety of 0.11 units (p = 0.039; 95% CI=0.006, 0.22). Themes from the interviews suggest high demands on the father: exhausting and painful work, hyper-vigilance required, and surviving the edge. The unscientific advice from PHNs was confusing for fathers who felt that "mothers are better informed". One father experienced depressive symptoms.

Conclusions:

Fathers' level of stress and anxiety were associated with infants' characteristics, and their narratives suggest various situational factors that impact parenting role including dissatisfaction with health care services.

Poster 134

EVALUATION OF THE USE OF SHARED DECISION MAKING DURING ANTENATAL COUNSELLING FOR ANTICIPATED EXTREMELY PRETERM BIRTH

Sharon Ding, University of Ottawa; **Vid Bijelic**, Children's Hospital of Eastern Ontario Research Institute; **Thierry Daboval**, Children's Hospital of Eastern Ontario; **Brigitte Lemyre**, Children's Hospital of Eastern Ontario; **Sandra Dunn**, BORN Ontario; **Gregory P Moore**, Children's Hospital of Eastern Ontario

Background:

Pediatric organizations advocate the use of shared decision making (SDM) during counselling with families facing the birth of an extremely preterm infant. A local guideline was implemented in 2015 to promote SDM.

Objective:

To determine the percentage of consultations where SDM was used.

Methods:

Single-center prospective cohort study from September 2015 to June 2017 with data collected on all women presenting to obstetrical triage at 22+0 to 25+6 wks GA. Decision coaching (determined from the written consultation) during consultations served as a surrogate marker for use of SDM. Fisher's exact test was used to compare proportions; logistic regression was used to examine trend over time.

Results:

130 women presented. A neonatology consultation occurred in 92 cases. SDM was used at initial consultation in 85% (78/92) of cases: 84% (16/19) at 22 wks; 88% (22/25) at 23 wks; 96% (27/28) at 24 wks; 65% (13/20) at 25 wks. Secondary analyses indicate use of SDM declined over time (p=0.03) and parental ability to come to a decision was not significantly different between SDM and 'non-SDM' consults (89% in SDM vs 92% in non-SDM; p=0.7). At 22 wks, 89% (17/19) made a decision; at 23 wks, 80% (20/25); at 24 wks, 86% (24/28); at 25 wks, 85% (17/20) (p=0.84). Infant survival to NICU discharge, using denominator 'infants who received resuscitation', was 67% (2/3) at 22 wks; 33% (3/9) at 23 wks; 87% (13/15) at 24 wks; 89% (17/19) at 25 wks.

Conclusions:

Implementation of an SDM framework is feasible with a resulting high percentage of consultations appearing to use SDM. The possible waning use of SDM and lower use at 25 wks GA requires further investigation. Recordings of consultations and parental perspectives to directly assess the use of SDM would provide greater insight into the applicability of SDM in this clinical setting.

Poster 135

EFFECT OF CORM-A1 ADMINISTRATION ON PLACENTAL HYPOXIA IN CD-1 MICE

Megan A Dickson, Queen's University; **Karalyn E McRae**, Queen's University; **Nichole Peterson**, Queen's University; **Jessica Pudwell**, Queen's University; **Graeme N Smith**, Queen's University

Background:

Preeclampsia (PE) is a hypertensive disorder that complicates 5-7% of pregnancies. Research suggests that the vasodilatory and angiogenic properties of low dose carbon monoxide (CO) may protect against PE. However, CO is known to cause hypoxia at high concentrations.

Objective:

The objective is to identify if CO releasing molecule (CORM-A1) results in mouse placental hypoxia.

Methods:

On gestational day (GD) 10.5, pregnant CD-1 mice (Charles River, USA) were dosed with either saline, inactive CORM-A1 (iCORM-A1, 10 mg/kg) or CORM-A1 (5, 8, or 10 mg/kg) intraperitoneally (IP). Blood was collected 15 minutes post-injection to quantify carboxyhemoglobin levels (%COHb) using a head-space gas chromatograph CO analyzer (Peak Laboratories, USA). Pimonidazole hydrochloride (Hypoxyprobe™) was administered IP on GD 11.5 before euthanasia, enabling detection of hypoxia using immunohistochemistry. %COHb by group was compared with the Kruskal-Wallis Test and Dunn's Multiple Comparisons. Resorption rate was calculated (# resorptions / # implantation sites per group) with 95% confidence limits (Fishers Exact).

Results:

Blood %COHb in saline and iCORM-A1 controls were 0.62%±0.04% (n=3) and 0.64%±0.09% (n=3), respectively. CORM-A1 treatment raised the %COHb to 3.76%±0.54% (n=3), 6.01%±0.50% (n=6), and 4.68%±1.91% (n=8), at doses of 5, 8, 10 mg/kg respectively (comparison to saline; p-values >0.05, <0.05, >0.05). No association between CORM-A1 exposure and resorption rate was observed. There were no observable differences in hypoxia when comparing placentas from all treatment groups, based on visualization using fluorescence and light microscopy.

Conclusions:

Preliminary data suggests that placental hypoxia did not increase following administration of CORM-A1. Future work is needed to prove the safety and efficacy of CO as a therapeutic for PE.

Poster 136

ALTERATIONS IN BLOOD PRESSURE OF PREGNANT CD-1 MICE USING CARBON MONOXIDE RELEASING MOLECULES

Karalyn E McRae, Queen's University; **Nichole Peterson**, Queen's University; **Megan A Dickson**, Queen's University; **Graeme N Smith**, Queen's University

Background:

Pre-eclampsia (PE) is characterized by hypertension and maternal vascular dysfunction; a result of impaired arterial remodeling and inadequate placental perfusion. Carbon monoxide (CO) 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 increased carboxy-hemoglobin (%COHb), and has potential therapeutic value in the treatment of PE.

Objective:

This study aims to determine the effects of CORM-A1 on systolic blood pressure (SBP) in normotensive and hypertensive pregnant mice.

Methods:

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±SEM. Analyses were performed by 2-way ANOVA and Mann-Whitney test, with significance of $p<0.05$.

Results:

CORM-A1 increases %COHb from 0.66±0.05% at baseline (n=4) to 3.34±0.27% at 15 min post-injection (n=6). On GD13.5, SBP was significantly reduced from baseline (-17.67±3.24mmHg) in dams receiving CORM-A1 (n=4). SBP and HR were unaffected in dams receiving iCORM (n=3). Both treatment groups showed no effects on pregnancy outcomes, placental or fetal weight in normotensive mice.

Conclusions:

Preliminary data indicates that administration of CORM-A1 reduces SBP in normotensive dams, however this effect may be transient. A more thorough understanding of how CO alters placental vasculature and SBP is needed before CORM-A1 can be used as a therapeutic.

Poster 138

A RANDOMIZED CONTROLLED TRIAL: SUPRAPUBIC ASPIRATION VERSUS URINARY CATHETERIZATION IN THE NEONATAL INTENSIVE CARE UNIT

Gregory P Moore, Children's Hospital of Eastern Ontario; **Franco Momoli**, University of Ottawa; **Amisha Agarwal**, Children's Hospital of Eastern Ontario Research Institute; **Rula Agarushi**, Royal Alexandra Hospital; **Jason Brophy**, Children's Hospital of Eastern Ontario; **Erika Bariciak**, Children's Hospital of Eastern Ontario

Background:

Urinary tract infection (UTI) is a common infection in infants. Urinary catheterization (UC) and supra-pubic aspiration (SPA) allow for sterile collection of urine. Some studies suggest SPA has a lower contamination rate than UC; the optimal method of urine collection for culture remains unclear.

Objective:

To determine if there is: 1) a lower contamination rate in urine obtained by SPA assisted by bladder ultrasound versus UC in infants in NICU; 2) a difference between procedures in success rates for obtaining urine, and short-term complication rates.

Methods:

A multicentre, unblinded RCT from 04/2013 to 05/2016. All infants greater than 72 hours of age investigated for UTI were eligible for randomization. Crossover to the other procedure could occur after two hours or two failed attempts. Target sample size was 165. Contamination was defined as growth of ≥2 microorganisms (SPA, UC) or growth $<10^4$ CFU/ml (UC). Primary analysis was by intention-to-treat.

Results:

Enrolment was stopped for futility. 906 families were approached with 151 providing consent. 47 infants were randomized (SPA n=23, UC n=24). UTI incidence was 13% for SPA, 8% for UC (p=0.67). Crossover rates were high: 56% for SPA; 21% for UC. No urine sample was obtained in two participants per group despite attempts. There was no significant difference between the two groups in contamination rates (14% SPA, 18% UC, p=1.00). No short-term complications were reported. Prior to crossover, there was a difference in rate of success per procedure (44% SPA, 75% UC, p=0.04).

Conclusions:

This trial found no difference in contamination rates between SPA and UC, while noting the low enrolment and high crossover rate. More procedural training (particularly for SPA) may ensure greater procedural confidence and success. Post-procedural consent could improve enrolment given that equipoise on the optimal urine collection method still exists.

Poster 139

A DISTRIBUTED LEARNING STRATEGY IMPROVES PERFORMANCE AND RETENTION OF SKILLS IN NEONATAL RESUSCITATION. A SIMULATION-BASED RANDOMIZED CONTROLLED PILOT STUDY

Pratheeban Nambyiah, University of Ottawa; **Sylvain Boet**, University of Ottawa; **Gregory P Moore**, Children's Hospital of Eastern Ontario; **Riley Boyle**, University of Alberta; **Deborah Aylward**, Champlain Maternal Newborn Regional Program; **Andre Jakubow**, Northern Ontario School of Medicine; **Sandy Lam**, University of Ottawa; **Karim Abdulla**, University of Ottawa; **M D Bould**, University of Ottawa

Background:

Skill retention after neonatal resuscitation training is poor. Psychology studies on learning factual information have established that a refresher course after initial training – a booster – can improve knowledge retention, and that the optimal time to schedule a booster (known as the inter-study interval) is at 10-30% of the time between initial training and retention test (known as the retention interval).

Objective:

We investigated whether this principle holds true for complex procedural skills in neonatal resuscitation.

Methods:

Residents from anaesthesia, emergency medicine, and family medicine were recruited. Participants underwent a pre-test, followed by standardized neonatal resuscitation training and an immediate post-test. Each test included simulated neonatal resuscitation scenario and written knowledge. Participants were randomized to either an early booster at 3 weeks (intervention) or a late booster at 2 months (control). All underwent a retention post-test at 4 months. Performance was assessed using the Neonatal Resuscitation Program (NRP) checklist and the validated Ottawa Global Rating Scale (GRS).

Results:

Seventeen participants completed all tests; seven were randomized to the early booster group and ten to the late booster group. There was no difference between groups at pre-test or immediate post-test. The early booster group demonstrated significantly improved NRP checklist scores (score out of 30) in the retention post-test compared to the late booster group (mean(SD) 22.4 (1.7) vs 18.2(4.0), p=0.02). Ottawa GRS scores (score out of 42) also showed improved retention in the early booster group (31.0 (1.2) vs 25.6(5.0), p=0.03). No difference was seen with written knowledge scores (26.7(1.5) v 26.5(2.4), p=0.92) (score out of 30).

Conclusions:

Our findings suggest resuscitation training can benefit from an early booster strategy compared to a later booster, but session timings are critical. This has implications for the structure of training programs, and can help prioritize resource allocation.

Poster 140

ASSOCIATION OF NEWBORN SCREENING ANALYTES WITH TYPE OF DELIVERY AMONG TERM BIRTHS

Jessica Yau, University of Ottawa; **Steven Hawken**, University of Ottawa; **Deshayne Fell**, University of Ottawa; **Beth Potter**, University of Ottawa; **Thierry Lacaze**, Alberta Health Services; **Mark Walker**, Better Outcomes Registry and Network Ontario; **Pranesh Chakraborty**, Newborn Screening Ontario; **Kumanan Wilson**, University of Ottawa

Background:

The Newborn Screening Ontario program receives blood spot samples from newborns shortly after birth and screens each infant for rare conditions using a panel of newborn screening (NBS) analytes. Clinical and environmental factors including gestational age and birth weight have been observed to influence the value of these analytes. While these factors are adjusted for in the interpretation of NBS analytes, there are many influences, such as mode of delivery that could also impact NBS profiles. However, there has been a paucity of research on this to date.

Objective:

The objective of this study is to examine the association between mode of delivery and the values of NBS analytes among low-risk infants born at term gestation.

Methods:

We will conduct a retrospective cohort study using a province-wide NBS registry linked to the provincial birth registry. The cohort will include all term births in Ontario between 2006 and 2012 with completed NBS data. Mode of delivery will be characterized as: vaginal birth (following spontaneous onset of labour) and planned cesarean delivery (cesarean with no labour due to breech presentation or repeat cesarean delivery). Descriptive statistical analyses will be conducted and correlation heat maps will be generated. Clustering and dimension reduction techniques will be applied to understand the correlations between analytes and other covariates. Logistic regression modelling will be used to examine the association between mode of delivery and NBS analytes and ratio combinations. Modern internal validation approaches such as bootstrap cross-validation will be used to avoid overfitting and provide optimism-corrected model performance statistics.

Results:

The datasets held by the Institute for Clinical Evaluative Sciences have been linked but will not be available for analysis until early November.

Conclusions:

By understanding the association between delivery parameters and the values of NBS analytes, our interpretation and utilization of NBS data for clinical diagnostic medicine may be improved.

Poster 141

RESPIRATORY DEVELOPMENT AND PULMONARY IMMUNOLOGY AFTER MATERNAL EXPOSURE TO IONIZING RADIATION

James Hugh McEvoy, Flinders University; **Devon Jones**, McMaster University; **Lisa Stoa**, McMaster University; **Antony M Hooker**, Environmental Protection Agency; **Douglas R Boreham**, Northern Ontario School of Medicine; **TC Tai**, Northern Ontario School of Medicine; **Dani-Louise Dixon**, Flinders University; **Joanna Y Wilson**, McMaster University

Background:

Fetal programming has been studied extensive through many methods of induction; one such method is ionizing radiation. This is of particular interest in the case of a pregnant mother requiring diagnostic radiation, where there is a tradeoff between improved diagnoses and the risk to the patient. In the case of fetal programming, the potential risk is not only to the mother but also to the fetus. It is therefore important to understand if the diagnostic benefit outweighs the risk to the fetus.

Objective:

To observe if low dose ionising radiation alters fetal programming, and thereby the development of the respiratory system and pulmonary immunology.

Methods:

Pregnant C57/Bl6 mice were irradiated at gestational day 15 with a gamma emitting source at 0 mGy (sham), 50 mGy, 300 mGy, or 1000 mGy. Male and female pups were euthanized by cardiac exsanguination at 17-18wks postnatal age. Immediately following, the trachea was cannulated and the lungs excised. A bronchoalveolar lavage (BAL) was performed for total cell count and differential. The left lung lobe was resected for wet:dry weight analysis.

Results:

Males at lower doses of radiation had increased growth rates and females at higher doses had reduced growth rates however, there was no difference in body weight at time of euthanasia compared to sham control for either sex. Wet or dry lung weights were not different between radiation groups and control. Similarly, alveolar leukocyte counts were not significantly different when compared to controls for either sex however, exposures of 50 mGy increased the alveolar leukocyte prevalence compared to 1000 mGy in males.

Conclusions:

Alveolar leukocyte cell counts showed variations between irradiation groups but neither deviated from the sham control counts. However, the fetal programming, induced by exposure to ionizing radiation, does not appear to significantly alter the development of the lung or the prevalence of pulmonary immune cells.

Poster 146

CORD BLOOD BIOMARKERS, INSULIN SENSITIVITY, ß-CELL FUNCTION AND SKINFOLD THICKNESS IN INFANTS

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Background:

The vulnerability to metabolic syndrome related disorders may originate from perinatal life. There is a lack of knowledge on whether any perinatal biomarkers are predictive of metabolic health in later life.

Objective:

To assess whether cord blood insulin, IGF-I, IGF-II, leptin, adiponectin, ghrelin are predictive of metabolic health indicators in infancy.

Methods:

In a prospective singleton birth cohort, we assessed cord blood insulin, IGF-I, IGF-II, leptin, adiponectin and ghrelin concentrations in relation to homeostasis model assessment of insulin resistance (HOMA-IR), β-cell function (HOMA-β), fasting proinsulin-to-insulin ratio (higher values indicate worse β-cell function), BMI z score and the sum of triceps and subscapular skinfold thickness (a surrogate adiposity measure) in infants at age 1-year (n=185).

Results:

Adjusting for maternal and infant characteristics, one standard deviation (SD) increase in cord blood adiponectin was associated with an 11.1% (95% CI: 1.8-19.5%) decrease in HOMA-β (p=0.02) and a 13.6% (1.8-26.8%) increase in proinsulin-to-insulin ratio (p=0.02) in infants at age 1-year, respectively. One SD increase in cord blood insulin was associated with a 0.5 (0.1-1.0) mm increase in skinfold thickness (p=0.01). One SD increase in cord blood ghrelin was associated with a 0.2 (0.02-0.3) decrease in BMI z score (p=0.02), and a 0.5 (0.01-0.9) mm decrease (p=0.02) in skinfold thickness.

Conclusions:

Cord blood adiponectin, an adipokine richly expressed in fat and vascular cells in fetal life, appears to be a negative predictor of β-cell function for infants at age 1-y. Cord blood insulin may be a positive, and ghrelin a negative predictor of adiposity in infancy.

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ALTERTED HEPATIC FATTY ACID AND MITOCHONDRIAL METABOLISM CONTRIBUTES TO DEVELOPMENT OF GESTATIONAL DIABETES MELLITUS IN PREGNANT ADIPONECTIN-DEFICIENT MICE

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Background:

Gestational diabetes mellitus (GDM) is a common pregnancy-related condition with implications for both maternal and neonatal health. Genetics and lifestyle both contribute to development of GDM, but evidence suggests that low levels of adiponectin increases the risk for GDM. Adiponectin is a fat derived hormone that improves insulin sensitivity.

Objective:

We hypothesize that adiponectin deficiency causes fatty liver during pregnancy, contributing to the development of GDM.

Methods:

We compared the glucose and insulin tolerance of pregnant (3rd trimester) adiponectin knockout (KO) (strain B6;129-*Adipoq*^{tm1Chan}/J) and wild-type mice, and assessed parameters of hepatic metabolism, mitochondrial function and fatty acid metabolism. Impact of adiponectin supplementation was measured by administering adenovirus mediated full length adiponectin at the end of the second trimester and comparing to control containing GFP.

Results:

In the third trimester, pregnant adiponectin KO mice exhibited fasting hyperglycemia regardless of diet (9.2mmol/L vs. 7.7mmol/L in controls, $p<0.05$) as well as impaired glucose and insulin tolerance relative to wild-type controls. Pregnant adiponectin-/- mice develop hepatic steatosis, including a 3-fold elevation in hepatic triglycerides ($p<0.05$). Altered hepatic lipid metabolism, including a 2.5 fold increase in fatty acid synthase expression ($p<0.05$) was associated with elevated circulating lipids. Nearly 2-fold reduction ($p<0.05$) in maximal mitochondrial respiration was measured in hepatocytes of pregnant adiponectin KO mice. These cells show reduced respiratory capacity when using fatty acids, and elevated synthesis and secretion of triglycerides and cholesterol. Gestational weight gain and food consumption were similar in knockout and wild-type mice. Adiponectin supplementation to pregnant adiponectin KO mice improved glucose tolerance, prevented fasting hyperglycemia, and attenuated fatty liver development.

Conclusions:

Adiponectin deficiency is associated with altered hepatic lipid metabolism and hepatic steatosis during pregnancy. Consequently, adiponectin deficiency contributes to insulin resistance and hyperglycemia characteristic of GDM. Adiponectin supplementation rescues the effects of adiponectin deficiency on insulin sensitivity and hepatic lipid metabolism.

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DELAYED CORD CLAMPING (DCC) DOES NOT AFFECT UMBILICAL CORD PH IN PRETERM INFANTS

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Background:

Current standards for cord blood gas values and cut offs were derived from samples obtained after immediate cord clamping. In the last decade deferring umbilical cord clamping after birth became a standard of care, and impact of this practice on cord blood gas is not studied; especially in preterm infants

Objective:

To determine if there is equivalence (difference < |0.03|) in umbilical cord pH in preterm infants 26 – 32 weeks gestational age (GA) who received DCC for ≥ 45 seconds (s) and those who didn't.

Methods:

Retrospective study of inborn preterm infants 26 – 32 weeks GA before (January 2012-June 2013) and after (May 2014-October 2015) implementation of DCC guidelines in our centre. Monochorionic twins, higher order multiples, infants with birth weight < 3rd percentile, and recipients of palliative care were excluded. Prenatal and birth characteristics were extracted from Alberta Perinatal Health Program and our local databases. Cord pH was obtained from electronic medical records

Results:

732 inborn infants were eligible and cord pH was available in 584. In addition, 81 infants were excluded as described above. Among 259 of 503 infants in the post DCC period, 167 received DCC for ≥ 45 s. The table shows a comparison between the groups. In a post hoc analysis, we compared cord pH of infants who received DCC for ≥ 45 s to those in the pre DCC period. No statistically significant difference was found; mean difference -0.002 and 95% CI (-0.024 to 0.021).

Conclusions:

DCC is known to improve hemodynamic stability, lessen need for blood transfusion, and decrease risk of intraventricular hemorrhage. The impact of DCC on umbilical cord pH is controversial. Our study showed that DCC for ≥ 45 seconds was not associated with lower umbilical cord pH, despite higher prevalence of male sex and less use of antenatal steroids.

	Pre DCC N = 244	Post DCC N = 259
GA (weeks), mean (SD)	29.6 (1.8)	29.6 (1.8)
BW (g), mean (SD)	1371 (390)	1367 (400)
Male sex, n (%)*	146 (60)	132 (51)
Maternal Gestational diabetes or diabetes, n (%)*	26 (11)	47 (18)
Maternal Hypertension, n (%)	55 (23)	53 (21)
Antepartum Hemorrhage, n (%)	77 (32)	73 (28)
Antenatal Steroids, n (%)**	233 (96)	219 (85)
Antenatal Magnesium Sulphate, n (%)**	6 (3)	67 (26)
Chorioamnionitis, n (%)	20 (8)	17 (7)
Caesarean Birth, n (%)	144 (59)	138 (53)
Apgar Score at 1 min, median (IQR)	6 (4-7)	6 (4-7)
Apgar Score at 5 min	8 (7-9)	8 (7-9)
Cord pH, mean (SD)	7.25 (0.09)	7.24 (0.09)

* P < 0.05, ** P < 0.001

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MATERNAL ADVERSE CHILDHOOD EXPERIENCES (ACES) AND ANTEPARTUM RISKS: THE ROLE OF SOCIAL SUPPORT

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Background:

Research has shown that social support moderates the impact of prenatal stress on the development of postpartum depression, however no research to date has investigated the influence of maternal social support on the association between ACEs and antepartum health outcomes in women.

Objective:

The aim of the current study was to examine maternal adverse childhood experiences as an antecedent risk of antepartum complications. It was hypothesized that ACEs would be associated with higher antepartum health risks and that social support in the prenatal period would buffer mothers from the deleterious consequences of ACEs.

Methods:

Data from 1,994 women (mean age= 30.87yrs) and their infant were collected from a prospective longitudinal cohort. Pregnant women completed questionnaires related to social support, adverse experiences prior to the age of 18, and a health care professional assessed the mother's antepartum health risk. Adverse childhood experiences included physical, emotional, and sexual abuse, exposure to domestic violence, as well as exposure to household dysfunction such as parental substance use, mental illness, or incarceration.

Results:

Regression analyses demonstrated a positive association between ACEs and antepartum health risks. There was a significant interaction between maternal ACEs and social support. For mothers with low levels of social support, having high levels of maternal ACEs predicted higher antepartum health risk scores in pregnancy (b =.17, p<.001), whereas for mothers with high levels of social support, having high levels of maternal ACEs was not related to the antepartum risk score (b = -.04, p = .37).

Conclusions:

A history of ACEs can place mothers at risk of antepartum health complications. A resiliency effect was observed, where women with a history of ACEs were buffered from experiencing antepartum health risks if they reported high levels of social support in their pregnancy.

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TISSUE-SPECIFIC ADAPTATIONS ASSOCIATED WITH AN ALTERED ADULT METABOLISM IN A MOUSE MODEL OF INTRAUTERINE GROWTH RESTRICTION (IUGR).

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Background:

IUGR is a pregnancy condition where the fetus fails to grow to his/her full potential, resulting in an increased perinatal and neonatal morbidity and mortality; and as adults an increased risk for type II diabetes. Our laboratory has established a maternal nutrient-restriction mouse model of IUGR, in which 20% of the 6-month male offspring develops glucose intolerance.

Objective:

We hypothesize that the altered glucose metabolism is caused by epigenetic modifications established *in utero* in liver, adipose tissue or skeletal muscle in response to fetal nutrient restriction, resulting in gene expression changes that persists into adulthood.

Methods:

Mated female CD-1 mice were randomly assigned to control or nutrient-restricted (MNR) groups. MNR females received 70% of calories consumed by an average *ad libitum* fed dam from E6.5 to 18.5. All offspring were cross-fostered to *ad libitum* fed moms. To identify tissues most impacted by MNR, a pyruvate challenge and hepatic portal vein insulin challenge was performed; and serum peptide markers for obesity and diabetes were assayed. Genes candidates for epigenetic modifications were screened using RNA*seq* in six-month tissues.

Results:

Liver and adipose tissue pAkt-to-Akt ratio in response to insulin was 3 and 3.6 folds lower, respectively, in MNR offspring (p-value = 0.008) indicating insulin resistance in these tissues. MNR offspring also had higher serum PAI-1 at one (p-value = 0.04) and six months (p-value = 0.04), and resistin at 6 months (p-value = 0.04). Although metabolic assessments suggested fetal undernutrition impacted liver and adipose tissue of MNR offspring, gene expression data at six months did not indicate candidate genes that would be underlying these metabolic disturbances.

Conclusions:

These results suggest that metabolic changes in male nutrient-restricted offspring are not mediated by persistent gene expression changes. Further analysis of the metabolome may indicate gene candidates for epigenetic changes *in utero.*

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CARDIOVASCULAR RISK ASSESSMENT AND FOLLOW UP OF WOMEN AFTER HYPERTENSIVE DISORDERS OF PREGNANCY

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Background:

Hypertensive disorders of pregnancy are associated with an increased risk of cardiovascular disease (CVD) in women and serve as some of the earliest clinical indicators of CVD risk.

Objective:

This study examines the utility of CVD risk models proposed in the 2016 Canadian Cardiovascular Society (CCS) Dyslipidemia Guidelines in identifying women eligible for further assessment and treatment following hypertensive disorders of pregnancy (HDP).

Methods:

All patients who deliver at Kingston General Hospital (KGH) and experience a HDP are considered for referral to the Maternal Health Clinic (MHC) for CVD risk assessment. The Preeclampsia New Emerging Team (PE-NET) is a prospective cohort study that recruited women who either experienced preeclampsia or who had an uncomplicated pregnancy with no history of HDP. Using data collected from the MHC and PE-NET, we evaluated the CCS Guidelines' ability to identify CVD risk and need for further treatment in women following pregnancy complicated by a HDP.

Results:

CVD risk for the HDP group significantly differed from the PE-NET control group using the following risk scoring systems: 10-Year Modified Framingham Risk Score (FRS) ($p<0.01$), 30-Year ($p<0.0001$), and Lifetime ($p<0.0001$). Using the 10-Year Modified FRS, all participants were classified by the CCS Guidelines as Low Risk, requiring no further follow-up. Applying the 30-Year risk score resulted in a significant reclassification of risk between the PE-NET Control and the HDP groups ($p<0.001$). Similarly, the Lifetime risk score resulted in significantly different risk classification between the PE-NET Control and the HDP groups ($p<0.0001$), with 47.6% of HDP participants classified as High Risk, thus warranting further follow-up.

Conclusions:

The recommendations for risk classification using the Modified FRS significantly underestimated lifelong CVD risk in the HDP group compared to Control. Early primary prevention initiatives among women with high 30-Year or high Lifetime CVD risk would improve long-term health outcomes.

Table 1: Eligibility for further follow up based on the 2016 Canadian Cardiovascular Society Dyslipidemia Guidelines

Risk Score	Cohort	Eligible, n (%)	P Value
10-Year Modified FRS	Control (n=119)	-	NS
	HDP (n=320)	4 (1.3)	
30-Year	Control (n=119)	2 (1.7)	<0.001
	HDP (n=320)	39 (12.2)	
Lifetime Risk	Control (n=119)	17 (14.3)	<0.0001
	HDP (n=319)	157 (49.2)	

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INCREASING RESEARCH VALUE IN PERINATAL CLINICAL TRIALS BY DEVELOPING AND IMPLEMENTING AN EVIDENCE-BASED OUTCOME REPORTING STANDARD

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Background:

Randomized clinical trials provide gold-standard evidence on the efficacy of health care interventions. Perinatal trials are critical to evaluate treatments in a population that has historically been neglected from evidence-based medicine approaches. While complete and transparent reporting of perinatal trials is necessary to enable clinicians, researchers, and policy-makers to accurately assess trial findings and facilitate systematic reviews, reporting of trial outcomes is often poorly reported, limiting research impact and contributing to research waste.

Objective:

The objective of this study was to develop a new reporting standard that contains essential items for describing clinical trial outcome selection, measurement, and analyses.

Methods:

We developed the Instrument for reporting Planned Endpoints in Clinical Trials (InsPECT) using the framework for creating health research reporting guidelines from the Enhancing Quality and Transparency of Health Research (EQUATOR) Network, encompassing evidence and consensus-based development and implementation strategies, and an integrated knowledge translation strategy. For the first iteration of InsPECT, we synthesized existing recommendations on outcome reporting from regulatory and academic publications, and consulted with methodologists and knowledge users such as clinicians, guideline developers, and trialists.

Results:

A 43-item draft of InsPECT was developed. Evaluation and refinement of these items by applying this preliminary checklist to published clinical trials in neonatal respiratory distress syndrome and other disease areas in preparation for obtaining expert consensus with key stakeholders on the minimal set of reporting items is ongoing.

Conclusions:

The development and implementation of InsPECT will increase the completeness of outcome reporting in perinatal clinical trials to better inform clinical, policy, and regulatory decision-making by maximizing interpretability and usability of clinical trials and helping to reduce research waste.

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RELATIONSHIPS BETWEEN STRESS AND HEALTH BEHAVIORS AMONG CANADIAN ADULTS: SOCIOCULTURAL DIFFERENCES AND VARIATIONS DURING PREGNANCY AND BREASTFEEDING

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Background:

Sociocultural differences in psychosocial health have been observed among Canadian adults. For example, symptoms of stress and depression tend to be lower among immigrants, higher among aboriginal groups, and higher among individuals with lower income. Stress also predicts health behaviors such as sedentarity and nutrition in the general population. However, we have less information about patterns among pregnant and breastfeeding women.

Objective:

To clarify relationships between psychosocial health and health behaviors 1) in the general population; 2) during pregnancy and breastfeeding; and 3) among women from vulnerable groups specifically.

Methods:

We analyzed data on stress, depressive symptoms, sedentarity, nutrition, and smoking among 217,000 adults from the 2011-2014 "Canadian Community Health Survey".

Results:

In the general population, stress was higher among those with lower socioeconomic status ($p<0.001$), and among women compared to men ($p<0.001$). Greater stress predicted key health behaviors, including fruit and vegetable consumption ($r=-0.071$, $p<0.001$), sedentarity ($r=0.132$, $p<0.001$), smoking ($r=0.149$, $p<0.001$), and alcohol consumption ($r=0.115$, $p<0.001$). Patterns varied based on pregnancy status. For example, relationships between stress and fruit and vegetable consumption were strongest among breastfeeding women ($r=-0,108$, $p<0,001$) whereas relationships between stress and occasional tobacco use were strongest among pregnant women ($r=0,222$, $p<0,001$). Analyses focused on immigrant, aboriginal, and low-income women showed variations among groups and based on pregnancy status. For example, in general, stress was lower among women who were pregnant or breastfeeding, whereas among women with low income, depressive symptoms were higher during breastfeeding. Current analyses are focused on clarifying relationships between these patterns and health behaviors.

Conclusions:

Pregnancy and breastfeeding have important implications for psychosocial health and health behaviors. Relationships between stress and health behaviors among the general population cannot be generalized to pregnant and breastfeeding women. Detailed assessments of relationships between stress and health behaviors might guide more comprehensive interventions to improve maternal health.

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MATERNAL AND NEONATAL OUTCOMES FOLLOWING IMMEDIATE INTRA-OPERATIVE SKIN-TO-SKIN CONTACT AT LOWER SEGMENT CAESAREAN SECTION (LSCS)

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Background:

Immediate skin-to-skin care (SSC) involves placing the naked infant in a chest-to-chest position on the mother at birth. SSC benefits both mother and baby by regulating the newborn's temperature, respiration, heart rate, and glucose, and promoting breastfeeding. While it is the norm during vaginal delivery, SSC is uncommon after caesarean (CS).

Objective:

We aim to review the short-term outcomes of a series of skin-to-skin CS.

Methods:

Patients undergoing skin-to-skin CS at 2 institutions between Dec 2013 and Jun 2017 were reviewed. In this procedure, the sterile drape is lifted and the newborn is passed under it for immediate SSC. Outcomes collected included intraoperative physiologic stability, post-operative complications, and breastfeeding.

Results:

63 skin-to-skin CS were performed. 97% of CS were elective, most commonly for repeat CS (71%) and breech presentation (13%). The procedure length was 44.2 (± 14) mins. At 30-days, there were no surgical site infections at the first site, and no readmissions or ER visits at the second. The average birth weight was 3368(± 571) g. APGAR scores were 9 and 9 at 1 and 5 minutes. 5 neonates required CPAP (7.3%) and 4 were admitted to NICU (5.8%). These rates are lower than national averages (10% and 13.3% respectively). 1 infant required phototherapy for hyperbilirubinemia. The average umbilical artery pH was 7.26 (± 0.07), and there were no cases of pH < 7.0. There were 5 cases of transient neonatal hypothermia (< 36.5°C) which resolved with intraoperative warming measures, with no adverse consequences. There were no cases of neonatal bradycardia (HR < 100) or tachypnea (RR > 60) within 6 hours. Mothers began breastfeeding within 49.4 minutes and 63% were breastfeeding exclusively at discharge.

Conclusions:

This study shows that skin-to-skin CS is a safe alternative to conventional CS for healthy, term infants with respect to maternal and neonatal outcomes.

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A SYSTEMATIC REVIEW OF THE MEASUREMENT PROPERTIES OF INDICES OF PRENATAL CARE ADEQUACY

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Background:

Prenatal care has long been recommended for healthy pregnancies. Accurate assessment of adequacy of prenatal care (APC) is critical to inform the relationship between prenatal care and pregnancy outcomes. Multiple indices of APC have been developed, each employing different algorithms based on the time of initiation and frequency of prenatal care.

Objective:

This systematic review (SR) evaluated the use, measurement properties, and quality of the evidence of APC indices.

Methods:

A comprehensive search was conducted up to June 2017 in four electronic databases. Studies were included if they used at least one APC index. SR outcomes were: frequency and purpose of use, and evaluation of reliability, validity, and responsiveness of the indices. Study quality was appraised using COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN).

Results:

From 2,582 studies initially screened, 220 used at least one APC index and 13 evaluated their measurement properties. The most frequently used were the Kotelchuk/Adequacy of Prenatal Care Utilization Index (APNCUI) (57.2%), the Kessner Index (40.4%) and the Revised-Graduated Prenatal Care Utilization Index (6.3%). The majority of indices were used for descriptive/ discriminative purposes (88.6%), predictive (35.9%) and evaluative purposes (18.6%). Construct validity was the most frequently evaluated property (n = 12) while reliability (n = 2) was seldom assessed. Indices' responsiveness to change was not evaluated. The quality of the evidence on the measurement properties of all APC indices was poor.

Conclusions:

Limited and low-quality evidence currently informs the selection of indices of APC for research and practice. Lack of good evidence about which index is the best to measure APC has important implications for tracking health care utilization and for formulating prenatal care recommendations.

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AMNIOTIC FLUID VOLUME AT ADMISSION IN PREGNANCIES COMPLICATED BY PRETERM PREMATURE RUPTURE OF MEMBRANES IS PREDICTIVE OF NEONATAL RESPIRATORY OUTCOME

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Background:

Amniotic fluid volume (AFV) plays an important role in early fetal lung development.

Objective:

We aimed to evaluate the role of AFV assessment at admission in pregnancies complicated by early preterm premature rupture of membranes (PPROM) in predicting neonatal respiratory outcome.

Methods:

Retrospective study of all women with a singleton pregnancy admitted to a single tertiary referral center following PPROM between 20 and 28 6/7 weeks of gestation during 2004– 2014 and underwent expectant management. Pregnancies complicated by delivery at <23 weeks or major fetal anomalies were excluded. AFV at admission was classified according to the maximal vertical pocket (MVP) as either normal (MVP>=2cm), oligohydramnios (MVP<2cm), severe oligohydramnios (MVP<1cm) or anhydramnios (no measurable AFV). Composite respiratory outcome was defined as ≥1 of the followings: bronchopulmonary dysplasia, pulmonary hypoplasia, or respiratory distress syndrome.

Results:

Of the 748 PPROM pregnancies assessed, 549 women were eligible for the study. Mean gestational age at PPROM was 25.2 ± 1.9 weeks and the mean latency to delivery was 11.2 ± 13.1 days. AFV as presentation was classified as either normal (58.8%), oligohydramnios (41.5%), severe oligohydramnios (16.2%), and anhydramnios (11.4%). The overall rate of composite respiratory outcome was 285/549 (51.9%). Composite respiratory morbidity was more common in the presence of low AFV using any of the 3 cutoffs: oligohydramnios (57.9% vs. 47.7%, p=0.018), severe oligohydramnios (70.8% vs. 48.3%, p<0.001), and anhydramnios (74.6% vs. 49%, p<0.001). In an adjusted analysis (table and image), the following factors were independently associated with composite respiratory outcome: gestational age at delivery, neonatal birth weight, cesarean delivery, chorioamnionitis, severe oligohydramnios, and anhydramnios, but not oligohydramnios.

Conclusions:

The presence of severe oligohydramnios (MVP<1cm) at the time of presentation with PPROM is predictive of neonatal adverse respiratory outcome.

Table – Predictors of composite respiratory outcome* in pregnancies complicated by PPROM at 20-28 6/7 gestational weeks

Variable	aOR**	95% CI	p- value
Gestational age at delivery (weeks)	0.77	0.68-0.87	**<0.001**
Chorioamnionitis ***	2.50	1.51-4.17	**<0.001**
Neonatal weight (50 grams intervals)	0.92	0.90-0.95	**<0.001**
Cesarean delivery	2.1	1.36-2.98	**<0.001**
Oligohydramnios (MVP <2 cm)	1.47	0.99-2.17	0.051
Severe oligohydramnios (MVP <1 cm)	2.5	1.4-4.3	**<0.001**
Anhydramnios (no measured AFV)	2.8	1.5-5.5	**0.002**

* A composite of bronchopulmonary dysplasia (defined as the requirement for oxygen at postmenstrual age of 36 weeks or at the time of transfer to a level II facility), pulmonary hypoplasia, or respiratory distress syndrome.

** Variables in the model: different AFV measurements, GA at delivery, latency between rupture and delivery, neonatal weight, cesarean delivery, chorioamnionitis

***Maternal fever (> 38.0°C) with no evidence of an extrauterine cause accompanied by at least two of the following: fetal tachycardia, maternal tachycardia, leukocytosis, uterine tenderness, or new onset of foul-smelling vaginal discharge.

Values in bold are statistically significant

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FREQUENCY AND PREDICTORS OF ABORTION AMONG WOMEN WITH SCHIZOPHRENIA: A POPULATION-BASED STUDY

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Background:

Schizophrenia is a psychotic disorder diagnosed in early adulthood. With improved access to community-based care and the introduction of fertility-sparing antipsychotics, fertility rates among women with schizophrenia are increasing. Yet, little is known about their reproductive health, and healthcare providers frequently neglect issues of sexuality and reproduction in their discussions with patients with schizophrenia. Abortion rates are an indicator of contraception access and pregnancy intendedness.

Objective:

Our objective was to describe abortion rates and ratios among women with schizophrenia and to compare these to women without schizophrenia. We also examined risk factors for abortion among women with schizophrenia.

Methods:

We conducted a population-based study of Ontario women with (n=11,203) and without schizophrenia (n=3,163,661) aged 15-44 years in 2012. The numbers of induced abortions per 1,000 women (abortion rate) and per 1,000 livebirths (abortion ratio) in women with schizophrenia were compared to those in women without schizophrenia using rate ratios (RR) and 95% confidence intervals (CI). Among women with schizophrenia, we used modified Poisson regression to assess adjusted relative risks (aRR) for abortion associated with age, parity, income, region of residence, chronic medical conditions, comorbid mental illness, and substance use.

Results:

Women with schizophrenia, compared to those without, had a higher abortion rate (17.6 vs. 13.4 per 1,000 women; RR 1.31, 95% CI 1.14-1.51) and abortion ratio (732.3 vs. 325.4 per 1,000 livebirths; RR 2.25, 95% CI 1.96-2.59). Among women with schizophrenia, young age (aRR 1.62, 95% CI 1.31-2.01), multiparity (aRR 1.47, 95% CI 1.21-1.79), comorbid mental illness (aRR 1.97, 95% CI 1.38-2.82), and substance use (aRR 2.06, 95% CI 1.69-2.51) were associated with increased risk for abortion (Table 1).

Conclusions:

Higher abortion rates among women with schizophrenia suggest the need for improved reproductive care in this population, particularly among those experiencing greater marginalization, as indicated by young age and comorbidity.

Table 1. Risk factors for induced abortion among women with schizophrenia.

Risk factor	N (%) with abortion	Unadjusted RR (95% CI)	Adjusted RR (95% CI)
Age			
15-24 years	166 (6.8)	1.62 (1.31-2.01)	2.08 (1.65-2.61)
25-34 years	158 (4.2)	Referent (1.00)	Referent (1.00)
35-44 years	75 (1.5)	0.35 (0.27-0.46)	0.33 (0.25-0.44)
Parity			
Multiparous	177 (4.4)	1.47 (1.21-1.79)	2.50 (2.01-3.11)
Primiparous	222 (3.0)	Referent (1.00)	Referent (1.00)
Neighbourhood income quintile (Q)			
Q1 (lowest)	124 (3.5)	1.00 (0.73-1.36)	0.95 (0.69-1.31)
Q2	92 (3.6)	1.04 (0.75-1.44)	1.02 (0.74-1.41)
Q3	78 (4.0)	1.14 (0.81-1.60)	1.14 (0.82-1.60)
Q4	49 (2.8)	0.80 (0.55-1.16)	0.81 (0.55-1.17)
Q5 (highest)	55 (3.5)	Referent (1.00)	Referent (1.00)
Residence			
Rural	28 (3.3)	0.93 (0.64-1.35)	0.79 (0.54-1.15)
Urban	370 (3.5)	Referent (1.00)	Referent (1.00)
Stable chronic medical condition *			
Present	134 (2.9)	0.74 (0.60-0.91)	0.92 (0.74-0.95)
Absent	265 (3.9)	Referent (1.00)	Referent (1.00)
Unstable chronic medical condition *			
Present	69 (2.7)	0.72 (0.56-0.93)	0.73 (0.56-0.95)
Absent	330 (3.7)	Referent (1.00)	Referent (1.00)
Comorbid mental illness **			
Present	367 (3.8)	1.97 (1.38-2.82)	1.58 (1.11-2.25)
Absent	32 (1.9)	Referent (1.00)	Referent (1.00)
Substance use disorder			
Present	157 (5.7)	2.06 (1.69-2.51)	1.69 (1.38-2.06)
Absent	242 (2.8)	Referent (1.00)	Referent (1.00)

* Stable and unstable chronic medical conditions derived from the Johns Hopkins Clinical Groups System collapsed ambulatory diagnostic groups.

** Comorbid mental illness includes depression, bipolar disorder, anxiety disorders, personality disorders, adjustment disorders, and disorders of conduct and impulsivity.

Poster 165

PERICALLOSAL LIPOMAS MAY ESCAPE DETECTION DURING A SECOND TRIMESTER SCAN

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Background:

Pericallosal lipomas (PCL) are congenital hamartomas appearing adjacent to the corpus callosum (CC). Most lipomas, if described prenatally, are diagnosed during the third trimester.

Objective:

The purpose of this study was to identify 2nd trimester ultrasound findings that may hint to a later diagnosis of PCL.

Methods:

A multicenter series of all fetuses diagnosed during the 3rd trimester with a PCL in 7 fetal ultrasound units between 2001-2017. We reevaluated the ultrasound and MRI images starting from the referral examination and until the time of diagnosis, searching for clues that could have prompted an earlier diagnosis. Parents were contacted at the end of the study period to obtain information regarding development and neurological evaluation.

Results:

Fifteen patients with PCL were diagnosed during the study period; 14 had second trimester scans. A 2nd trimester diagnosis was established in only 3 (21.4%). Anomalies of the CC were evident in 9 of the patients during the second trimester scan and included: short length (n=4), increased thickness (n=1), distortion by a suspected small mass (n=1), complete agenesis (n=2) and partial agenesis (n=1). Third trimester ultrasound scans were diagnostic of PCL in all 11 remaining cases, 9[U1] [Office2] of whom were considered isolated findings. Postnatal neurological evaluation in the isolated cases revealed normal development in all children. One child was diagnosed with attention deficit disorder. [postnatal evaluation.

Conclusions:

Non visualization of a PCL during the 2nd trimester is common, and should not be considered a diagnostic error. Abnormalities of the CC during this time should raise the differential diagnosis of an underlying PCL, necessitating further follow up into the 3rd trimester.

Poster 170

EVALUATING VARIABILITY IN LUNG-TO-HEAD RATIO (LHR) MEASUREMENTS IN FETAL DIAPHRAGMATIC HERNIA ACROSS THE NORTH AMERICAN FETAL THERAPY NETWORK (NAFTNET) FETAL ENDOSCOPIC TRACHEAL OCCLUSION (FETO) CONSORTIUM*

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Background:

Prognostication and selection of fetuses with congenital diaphragmatic hernia (CDH) for fetal therapy rely on ultrasound (US) estimation of pulmonary hypoplasia by measuring contralateral lung area.

Objective:

Our objective was to evaluate inter-observer reliability for lung area (LA) & head circumference (HC) measurements on de-identified US clips of fetal left CDH and to determine the method with highest inter-observer reliability: (i) amongst 9 North American Fetal Therapy Network (NAFTNet) FETO centers, and (ii) in comparison to an external "expert" reviewer (ER) from an experienced European fetal medicine centre.

Methods:

Participants included 19 NAFTNet reviewers and a pair of external reviewers (ER) from an experienced European fetal medicine center. On 16 anonymized US clips of head and chest from foetuses with isolated left congenital diaphragmatic hernia (CDH), reviewers were asked to rate quality of images and obtain head circumference (HC) and lung area measurements from a selected static plane. Lung area was determined by trace (T), longest (L) and anterior-posterior diameter (AP) methods. Inter-rater reliability/agreement among NAFTNet reviewers was analyzed by intra-class correlation coefficient (ICC) test. Bland – Altman analysis was used to compare measurement agreement and bias between NAFTNet reviewers and ER.

Results:

Among NAFTNet reviewers, ICC for HC and lung-AP, -L and -T measurements were 0.99, 0.82, 0.88, and 0.93 respectively. When comparing the NAFTNet reviewers with the ER, the mean difference (bias) was lowest for trace and highest for longest diameter method (lung-AP bias: 22.7 ± 49.7 mm^2, -L bias: 54.2 ± 59.7 mm^2 and -T bias: 13.9 ± 38 mm$^{2)}$.

Conclusions:

Good inter-operator reliability for lung and head measurements was noted among NAFTNet FETO centers. Agreement was highest using trace method among NAFTNet reviewers and in comparison to ER for lung area estimation. This information may be useful to improve standardization of antenatal prognostication in CDH across fetal medicine centers.

Poster 171

PERINATAL OUTCOME IN FETUSES WITH DISLODGED PLEURO-AMNIOTIC SHUNTS (PAS)

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Background:

Rapid enlargement of fetal pleural effusions or macrocystic congenital cystic adenomatoid malformations (CCAM) are an indication for pleuro-amniotic shunting (PAS) to allow normal lung development.

Objective:

The objective of this study was to evaluate perinatal and long-term outcomes in fetuses with large primary pleural effusions or macrocystic CCAMs with PAS, which dislodged in-utero.

Methods:

This is a retrospective review of fetal PAS inserted for primary pleural effusions and macrocystic CCAMs at a tertiary fetal medicine center (1991-2017). PAS were inserted in absence of major anomalies in hydropic fetuses where pleural effusions or CCAMs were suspected to be primary underlying etiology or in fetuses with isolated large, rapidly expanding pleural effusions occupying >50% of thoracic cavity, with marked mediastinal deviation. Antenatal history, procedural factors, neonatal and long-term outcomes were reviewed in fetuses with dislodged shunts.

Results:

227 fetuses with PAS inserted between 17+1 to 38+0 weeks gestational age (GA), 204 were inserted for pleural effusions and 23 for macrocystic CCAM. 16 shunts (7%) dislodged and all were inserted for pleural effusions. Fetuses were hydropic in 11/16, effusions were bilateral in 9/16(56%), and 7/16 required rotation during shunt insertion. Extra- and intrathoracic dislodgement occurred in 6/16 and 10/16 fetuses respectively. Hydrops resolved in 8/11 (72%) and re-shunting was required in 4 fetuses. GA at delivery was between 30+6 to 40+3 weeks. Ventilatory support at birth was required in 6/16 neonates and one neonatal chest tube was inserted. Thoracoscopic-assisted removal of one shunt was required for suspected mediastinal involvement. On follow-up of 10 infants with intra-thoracic shunts, none have had shunt-related complications.

Conclusions:

Fetal PAS were dislodged antenatally in 7%. Shunts remain intrathoracic in 10 infants at an average of 10.5 years of age (1 month-19.6 years), without any related complications. Internally displaced shunts appear to be well tolerated and do not require surgical removal.

Poster 172

THE ROLE OF SERIAL AMNIOTIC FLUID VOLUME MEASUREMENTS IN PREGNANCIES COMPLICATED BY PRETERM PREMATURE RUPTURE OF MEMBRANES IN PREDICTING NEONATAL RESPIRATORY OUTCOME

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Background:

Early fetal lung development is dependent on sufficient amount of amniotic fluid.

Objective:

To evaluate the role of serial AFV assessments in pregnancies complicated by early preterm premature rupture of membranes (PPROM) in predicting neonatal respiratory outcome.

Methods:

Retrospective study of all women with a singleton pregnancy admitted to a single tertiary center with PPROM between 20 and 28 6/7 weeks of gestation during 2004– 2014 and underwent expectant management. Each patient underwent an AFV assessment at presentation followed by biweekly assessment of AFV until delivery. We included only patients that underwent ≥ 4 serial AFV measurements. Pregnancies complicated by delivery <23 weeks or major anomalies were excluded. We compared pregnancy and neonatal outcome between four groups based on the proportion of sonographic exams documenting oligohydramnios (maximal vertical pocket <2cm): 0-25%(group A), 26-50%(group B), 51-75%(group C) and 76-100% of studies (group D). Composite respiratory outcome was defined as any of the followings: bronchopulmonary dysplasia, pulmonary hypoplasia, or respiratory distress syndrome.

Results:

A total of 268 women who underwent 1512 AFV studies were included. Mean gestational age at PPROM was 25.8±1.7 weeks and the mean latency was 19.6±11.4 days. The proportion of women classified as groups A-D were 74 (27.6%), 77(28.7%), 35 (13.1%), and 82 (30.6%) respectively. The overall rate of composite respiratory outcome was 133/268 (49.6%). The rate of composite respiratory outcome did not differ between the 4 groups (40.5%, 48.1%, 54.3%, 57.3% for groups A-D, respectively, all non-significant). In an adjusted analysis, various factors, but not the AFV group, were associated with the risk of composite neonatal respiratory outcome (Table).

Conclusions:

We did not find evidence that the information obtained from serial AFV measurements is useful for the prediction of neonatal respiratory outcome in early PPROM. Therefore, the role of costly and time-consuming serial sonographic assessment in women with PPROM should be reevaluated.

Table – Predictors of composite respiratory outcome* in pregnancies complicated by PPROM at 20-28 6/7 gestational weeks

Variable	aOR**	95% CI	p- value
Gestational age at membrane rupture	0.81	0.69-0.87	**<0.001**
Choriomnionitis ***	2.8	1.63-3.75	**<0.001**
Neonatal weight (each 50 gram)	0.93	0.91-0.95	**<0.001**
Cesarean delivery	1.9	1.47-3.51	**<0.001**

* A composite of bronchopulmonary dysplasia (defined as the requirement for oxygen at postmenstrual age of 36 weeks or at the time of transfer to a level II facility), pulmonary hypoplasia, or respiratory distress syndrome.

** Variables in the model: different AFV measurements, GA at delivery, latency between rupture and delivery, neonatal weight, cesarean delivery, chorioamnionitis

***Maternal fever (> 38.0°C) with no evidence of an extrauterine cause accompanied by at least two of the following: fetal tachycardia, maternal tachycardia, leukocytosis, uterine tenderness, or new onset of foul-smelling vaginal discharge.

Values in bold are statistically significant

Poster 175

PATTERNS OF STRESS, ANXIETY, AND SOCIAL SUPPORT DURING PREGNANCY AMONG SOCIALLY DISADVANTAGED WOMEN IN MONTREAL

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Background:

Past research shows that stress during pregnancy predicts adverse maternal health outcomes, and highlights buffering effects of social support. However, socially disadvantaged women have been underrepresented in this research.

Objective:

We sought to characterize patterns in psychosocial stress and social support during pregnancy among socially disadvantaged women in Montreal.

Methods:

Women completed the Perceived Stress Scale, State-Trait Anxiety Inventory, and Multidimensional Scale of Perceived Social Support at 16-18, 22-24, and 32-34 weeks pregnancy. We analyzed 24-hour heart rate variability (standard deviation of the NN interval, SDNN) at every assessment. To date, data have been collected among 72 women, among whom 27% percent have household revenue <$20,000, 29% suffer food insecurity, and 71% are immigrants. We analyzed differences in stress and anxiety measures based on revenue, immigrant status, and food security status; patterns across pregnancy; and relationships with social support.

Results:

One-way ANOVA at 16-18 weeks pregnancy showed that mean SDNN was lower among immigrant than non-immigrant women ($p=0.023$). Mean state anxiety ($p=0.033$) and trait anxiety ($p=0.025$) were higher among women from food insecure compared to food secure households. In contrast, measures did not differ based on revenue. General Linear Models showed that decreases in SDNN across pregnancy were much more marked among immigrant women and those suffering food insecurity. Controlling for age, parity, immigrant status, revenue, and food insecurity, social support predicted perceived stress, explaining 27.7% of variance ($p<0.001$), with similar results for state anxiety (28.2%, $p<0.001$) and trait anxiety (41.0%, $p<0.001$).

Conclusions:

Food insecurity and immigrant status, but not revenue, were associated with stress and anxiety measures. Low social support might represent a major underlying risk factor. Analyses in early 2018 will clarify relationships between these measures and maternal health outcomes such as gestational diabetes, which could ultimately guide the development of programs to improve well-being of vulnerable women during pregnancy.

Poster 177

PRENATAL DIAGNOSIS IMPROVES THE PREOPERATIVE CONDITION OF NEONATES REQUIRING SURGICAL INTERVENTION FOR COARCTATION BUT IS ASSOCIATED WITH LONGER PREOPERATIVE STAY

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Background:

Neonates with critical coarctation of the aorta (cCoA) may present in extremis if unrecognized.

Objective:

We sought to determine whether prenatal diagnosis (PreDx) improves the preoperative condition and operative course associated with cCoA (surgery <30 days). We hypothesized that PreDx of cCoA would be associated with both improved preoperative condition and shorter hospital stay than postnatal diagnosis (PostDx).

Methods:

We retrospectively compared the clinical presentation, preoperative condition and operative course of neonates with a PreDx versus PostDx in Alberta from 2004 to 2015 with cCoA. Cases with other left heart obstructive lesions and ventricular septal defects were included, but those with more complex heart disease were excluded. Preoperative data analysed included highest lactate and lowest arterial pH, highest creatinine and urea, level of support required (use of inotropes, bicarbonate, oxygen, respiratory support), and pre and postoperative length of hospital stay (LOS).

Results:

In total, 110 cases were included: PreDx=44 and PostDx=66. Age at surgery differed between groups (PreDx: median 7[1-30days] vs PostDx:10 [1-30days] p = 0.05). Preoperatively, PreDx had less metabolic acidosis with a pH<7.29 in only 5.1% vs 31% (p=0.002) and highest lactate >3.5 mmol/Lin 5.3% vs 25.5% (p=0.009) in PreDx vs PostDx, respectively), need for support including O2 (24% vs 48%, PreDx vs PostDx, respectively, p=0.028), and bicarbonate administration (0% vs 5%, PreDx vs PostDx, p=0.001). Need for preoperative ventilation and inotropes did not differ between groups. Pre-operative LOS was significantly longer in PreDx vs PostDx (median 7 (1-22) vs 3 (0-25), respectively p<0.001). Total LOS and postoperative LOS did not differ.

Conclusions:

Prenatal diagnosis of cCoA is associated with improved preoperative condition with reduced metabolic acidosis and need for support; however, it is also associated with longer preoperative hospitalization.

Factors responsible for lengthier preoperative stay following PreDx are currently being explored to determine if modifiable.

Poster 179

LINKING MATERNAL ADVERSE CHILDHOOD EXPERIENCES TO INFANT DEVELOPMENT ACROSS GENERATIONS

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Background:

Research has shown that experiencing adversity in childhood is associated with negative health and mental health sequalae into adulthood, however less is known about the mechanisms by which maternal childhood adversity is transmitted to offspring and its impacts on child development outcomes.

Objective:

The aim of the current study was to examine prenatal and postnatal mechanisms by which maternal adverse childhood experiences (ACEs) predict the early development of their offspring, via biological (maternal health risk in pregnancy, infant health risk at birth) and psychosocial risk (maternal stress during and after pregnancy, as well as hostile behavior in early infancy).

Methods:

Data from 1,994 women (mean age = 30.87 yrs) and their infants were collected from a prospective longitudinal cohort. Pregnant women completed self-report questionnaires related to psychosocial risk and completed a questionnaire regarding hostile behavior when their infant was 4 months of age. Mothers completed the Ages and Stages Questionnaire when infants were 12-months of age. Health risk in pregnancy and infant health risk at birth were obtained from health records.

Results:

Path analysis demonstrated a positive association between maternal ACEs and infant development outcomes at 12-months of age operating through two indirect pathways: psychosocial risk (maternal psychosocial risk in pregnancy and maternal hostile behavior in, (β = -.01, p = .01, 95% CI [-.01, -.002]) and biological health risk (pregnancy health risk and infant health risk at birth, β = -.01, p = .02, 95% CI [-.01, -.001).

Conclusions:

Maternal early childhood adversity cascades across generations, conferring risk for poor offspring development. This study shows that both biological and psychosocial risks in pregnancy, as well as maternal hostile behavior in the postpartum period, link maternal childhood adversity to poor offspring development. However, prenatal interventions may alleviate biological and psychosocial risks.

Poster 180

DNA METHYLATION AS A POTENTIAL MEDIATOR OF THE ASSOCIATION BETWEEN MATERNAL CORTISOL LEVELS DURING THE FIRST EIGHT GESTATIONAL WEEKS AND STRESS AXIS PROGRAMMING IN GIRLS AND BOYS

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Background:

Pre-natal maternal stress may affect *in utero* programming of the stress or hypothalamic-pituitary-adrenal axis (HPAA) with consequences for development and subsequent disease susceptibility.

Objective:

As crucial epigenetic processes occur during the first eight gestational weeks (early post-conception, EPC), this period may represent a critical window of vulnerability. To test this hypothesis, we evaluated the relationships between mothers' EPC cortisol, a biomarker of HPAA activity, and their children's pre-pubertal cortisol and DNA methylation patterns.

Methods:

We quantified: cortisol in first-morning-urine collected every-other-day from 22 mothers during EPC and daily from their 11-year-old children for three weeks as a new school term began, a "natural" challenge; children's salivary cortisol response to an experimental stressor; and children's DNA methylation profiles.

Results:

Maternal cortisol during specific EPC weeks was associated with children's "basal" cortisol before the start of school (e.g., week 7 maternal cortisol was negatively associated, $p=0.027$) and cortisol responses to the start of school and the experimental stressor (e.g., week 5 maternal cortisol was positively associated with both, $p=0.010$ and $p=0.027$). The children's sex modulated some of these associations (e.g., week 2 maternal cortisol was positively associated with sons', $p=0.007$, but not daughters' experimental stressor responses, $p=0.710$), suggesting that the sexes may vary in sensitivity to stressors at different developmental periods. 867 children's DNA methylation sites exhibited >5% change in methylation in association with maternal EPC cortisol (e.g., one in *POU3F2*, whose protein enhances activation of genes controlled by corticotropin-releasing hormone promoters, exhibited increased methylation associated with week 4 and 8 maternal cortisol). However, this variation does not appear to mediate the observed associations between maternal EPC cortisol and children's HPAA activity.

Conclusions:

To our knowledge this is the first study to evaluate the relationship between maternal EPC cortisol and children's stress physiology. Our results suggest that EPC stress may affect HPAA ontogeny and post-natal functioning.

Poster 182

NRF2 ACTIVATION BY THE THIOREDOXIN REDUCTASE-1 INHIBITOR AURANOFIN IS SELENIUM-DEPENDENT IN LUNG EPITHELIAL CELLS

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Background:

Bronchopulmonary dysplasia (BPD) and acute lung injury (ALI) cause significant morbidity and mortality. Thioredoxin reductase-1 (TrxR1) inhibition activates nuclear factor (erythroid-derived 2)-like 2 (Nrf2) responses and decreases lung damage in murine models of BPD and ALI. TrxR1 activity is selenium (Se) dependent and Se deficiency is common in preterm infants and critically ill patients

Objective:

The present studies tested the hypothesis that Se supplementation enhances Nrf2 induction and transcriptional activation by auranofin (AFN).

Methods:

Murine transformed Club cells (mtCC) were cultured in media containing 0, 10, 25, or 100nM selenite and treated with 0.5 mM AFN or vehicle for 1h. TrxR1 activity and nuclear Nrf2 protein expression were determined. Data (mean±SEM) were analyzed by ANOVA or t-test

Results:

Se supplementation resulted in a concentration-dependent increase in TrxR1 activity (R^2=0.97, $p<0.0001$). AFN inhibited TrxR1 activity ($p<0.0001$ vs vehicle) and enhanced nuclear Nrf2 protein levels compared to vehicle-treated controls (0 nM: 2.7±0.1 vs 1.0±0.2; 10 nM: 2.6±0.1 vs 0.7±0.0; 25 nM: 5.6±0.6 vs 1.5±0.4; 100 nM: 4.6±0.4 vs 0.6±0.1; $p<0.05$). The magnitude of AFN-induced increases in nuclear Nrf2 levels was significantly greater in 25 nM (13.9±2.3) and 100 nM (13.5±1.5) when compared to 10 nM (5.8±0.2; p=0.02). Antioxidant response element (ARE)-luciferase activity was measured to assess transcriptional activation and was not different between vehicle and AFN-treated 0 nM and 10 nM supplemented mtCCs. In contrast, AFN increased ARE-luciferase activity by 2.3 times in 25 nM and 5.4 times in 100 nM supplemented mtCCs.

Conclusions:

Our findings support the hypothesis that Se supplementation enhances Nrf2 inductino and activation by AFN. We speculate that Se status modulates Nrf2 activation by TrxR1 inhibitors. Optimization of Se status may enhance the efficacy of TrxR1 inhibitors to prevent or treat BPD and/or ALI.

Poster 183

SHOULD I GO ON OR TERMINATE MY PREGNANCY? HOW DO WOMEN ENGAGE IN THE DECISION MAKING PROCESS IN CASE OF SEVERE FETAL ANOMALY?

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Background:

Approximately 5% of pregnancies are complicated by fetal malformation. In case of life-threatening fetal anomaly, women are confronted with the possibility to terminate the pregnancy or to continue the pregnancy and have their child evaluated at birth for possible palliative care, as they might be affected by sickness, disability or early death.

Objective:

Identify factors involved in women's decision-making process for pregnancies complicated by life-threatening fetal anomaly.

Methods:

Qualitative study based on in-depth interviews of women facing a diagnosis of life-threatening fetal anomaly. Women were recruited at the *Integrated prenatal diagnosis center* of CHU Ste-Justine, Université de Montréal until data saturation. Interviews were taped and verbatim. Analysis was assisted by *NVivo* software. Inductive analysis based on grounded theory was used to explore themes underlying women's decision-making process.

Results:

Ten interviews were analyzed. Three women planned active care for their child after birth, 2 opted for comfort care and 5 terminated pregnancy (two of them received lethal fetal injection). Three themes [AP1] emerged from analysis:

1. Expectations for the child's future: primarily characterized by his expected quality of life and evaluation of his best interest
2. Women as a whole: maternity process, moral and spiritual values, social and familial context
3. Perceived uncertainty: related to diagnosis, prognosis and therapeutic possibilities

Analysis demonstrate that negative evaluation of expected quality of life, early-stage of the maternity process, multiparity and uncertainty were associated with pregnancy termination.

Conclusions:

This qualitative study describe how these three themes can impact on women's decision making process when facing the diagnosis of life-threatening fetal anomaly. This knowledge could allow clinicians to offer more personalized care and better decisional guidance.

Poster 185

MATERNAL VIRTUAL INFANT NUTRITION SUPPORT CLINIC FOR THE NEONATAL INTENSIVE CARE UNIT (MAVINS-NICU) - A QUALITATIVE STUDY

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Background:

Canadian exclusive breastfeeding rates at 6 months of age are only 24.2%, and even lower for mothers of infants requiring Neonatal Intensive Care Unit (NICU) admission. An interactive website providing professional *and* peer breastfeeding support to mothers of infants requiring NICU admission was developed to improve breastfeeding rates.

Objective:

The objective of this qualitative study is to explore maternal perceptions of this online breastfeeding support website (MAVINS-NICU) in a level III setting.

Methods:

This study represents the qualitative component of the MAVINS-NICU project. Semi-structured interviews conducted with women at risk of delivering an infant requiring NICU admission (n=6) and mothers of infants admitted to the NICU (n=7), were audio-recorded and transcribed by a professional transcriptionist. Analysis occurred in an iterative fashion using open and axial coding strategies to identify major themes.

Results:

Several themes were identified: 1) women were relieved that a reliable hospital-provided resource would be available to them after birth, "…I'm very happy that I'm going to have lots of support". 2) the majority of mothers felt extremely comforted by the peer support component, "to see what other moms are going through … similar emotions and issues … to see that I'm not the only one [helps]". 4) mothers enjoyed remote access and quick online lactation consultant response times, " … [you can] get help even when there's no one around", "I was really surprised … by how quickly I got responses". 5) the majority of mothers expressed a sense of empowerment to provide breast milk with the help of MAVINS, "…being able to breastfeed … is a big deal for me… [it made me feel] like I was accomplishing something".

Conclusions:

Mothers of infants admitted to the NICU found the MAVINS website very helpful and considered it part of their success in providing breast milk for their babies.

Poster 186

WHAT IS THE SAFEST MODE OF DELIVERY FOR EXTREMELY PRETERM CEPHALIC/NON-CEPHALIC TWIN PAIRS? A SYSTEMATIC REVIEW AND META-ANALYSES.

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Background:

Twins represent a high proportion of births before 28 weeks and most often present as cephalic/non-cephalic pairs. For those, the most appropriate mode of delivery remains debated.

Objective:

Our objective was to assess the evidence regarding the safest mode of delivery for actively resuscitated extremely preterm cephalic/non-cephalic twin pairs before 28 weeks of gestation.

Methods:

We searched Cochrane CENTRAL, MEDLINE, EMBASE and ClinicalTrials.gov from January 1994 to January 2017. Two reviewers independently screened titles, abstracts and full text articles, extracted data and assessed risk of bias using a modified Newcastle Ottawa Scale (NOS). Our primary outcome was a composite of neonatal death (<28 days of life) and severe brain injury in survivors (intraventricular hemorrhage grade ≥3 or periventricular leukomalacia). We performed random-effects meta-analyses for the first and second twin separately, and for both twins together. We used the GRADE approach to assess the quality of the evidence.

Results:

Our search generated 2695 articles. After duplicate removal, we screened 2051 titles and abstracts, selected 113 articles for full-text review and contacted 36 authors. Ultimately, three observational studies met our inclusion criteria. In cephalic/non-cephalic twin pairs delivered by caesarean section compared to vaginal birth at 24^{+0}-27^{+6} weeks, the odds ratio for our composite outcome of neonatal death and severe brain injury for the cephalic first twin was 0.35 (95% CI 0.00-92.61, two studies, I^2=76%), 1.69 for the non-cephalic second twin (95% CI 0.04-72.81, two studies, I^2=55%) and 0.83 for both twins (95% CI 0.05-13.43, two studies, I^2=56%). According to the modified NOS and GRADE, individual studies were at high risk of bias and overall quality of the evidence was very low.

Conclusions:

Our systematic review on the safest mode of delivery for extremely preterm cephalic/non-cephalic twin pairs found very limited existing evidence, without significant differences in neonatal death and severe brain injury by mode of delivery.

Poster 189

INDIGENOUS MEDICINE USE FOR SEX SELECTION DURING PREGNANCY AND RISK OF CONGENITAL MALFORMATIONS AND STILLBIRTHS

Sutapa Bandyopadhyay Neogi, Indian Institute of Public Health Delhi, Public Health Foundation of India

Background:

Background A desire to beget a son compels people to resort to traditional/ modern sex-selection techniques. A practice of intake of indigenous preparations called sex selection drugs(SSDs) by pregnant women is reported from India.

Objective:

The objectives of this study were to examine its association with pregnancy outcomes (congenital malformations (CMF) and stillbirths)

Methods:

Two population-based 1:1 case-control studies were conducted in Haryana with dismal sex-ratio. To study the association with CMF, 175 infants with apparent structural deformities and for stillbirth study, 325 stillborns (beyond 24 weeks gestation) were selected as cases from the registry. Controls (175 for CMF and 325 for stillbirth) were normal live babies born consecutively at the same location as the case. Consenting mothers of every case/control were interviewed using a validated tool at their house-holds. Bivariate analysis and logistic regression models were used to study the association.

Results:

The socio demographic profile of cases and controls in were similar in both studies. SSD intake increased the likelihood of CMF [Adjusted OR3;95% CI 1.7,5.6]. The association increased in the absence of sons in the previous pregnancies [Adjusted OR3.4; 95% CI 1.7,6.9]. History of intake of SSDs [Adjusted OR2.6, 95% CI 1.5,4.5] emerged as a risk factor for stillbirths. For every 5 women who took SSDs one had stillbirth. Other risk factors for stillbirths were preterm <37 weeks (OR3.5, 95% CI 2.1,6.0), history of previous stillbirths (OR4.0, 95% CI 2.1, 7.8), and complications during labour (OR3.3, 95% CI 2.1, 5.3). Attributable Risk Proportion for SSDs were 0.60 (95%CI 0.32,0.77). Analysis of 30 SSDs showed presence of phytoestrogens in two-thirds of samples. The average dosages of phytoestrogens (daidzein 14.1mg/g, genistein 8.6mg/g, formononetin 5mg/g) were 10 times above the permissible range.

Conclusions:

Intake of SSDs during pregnancy is harmful. It has huge social and economic implications apart from health hazards.

Poster 192

TRIMESTER-SPECIFIC DIETARY INTAKES IN COMPARISON WITH CURRENT NUTRITIONAL RECOMMENDATIONS IN PREGNANT WOMEN – PRELIMINARY RESULTS.

Claudia Savard, Université Laval; **Simone Lemieux**, Université Laval; **Claudia Gagnon**, Centre de recherche du CHU de Québec - Université Laval; **Julie Robitaille**, Université Laval; **Anne-Sophie Morisset**, Université Laval

Background:

Accurate dietary assessment during pregnancy is essential to identify potential macro- and micronutrient excesses or deficiencies that could impact the mother and the child's health.

Objective:

This study aims to 1) measure changes in macronutrient intakes throughout trimesters and 2) compare macro- and micronutrients intakes with current nutritional recommendations.

Methods:

Preliminary results include 76 pregnant women recruited in their 1st trimester (9.3±0.7 weeks) who completed, at each trimester, 3 web-based 24h dietary recalls combined with a web questionnaire on dietary supplements.

Results:

Average energy intakes decreased between the 2nd and 3rd trimesters (2312.3±516.1 vs 2213.3±468.7 kcal, p=0.015) and exceeded estimated energy requirements (EER) in the 1st (2268.5±477.2 vs 2110.3±238.7 kcal, p=0.0123) but not in the 2nd trimester (2312.3±516.1 vs 2408.0±248.9 kcal, p=0.14). In the 3rd trimester, average energy intakes were lower than EER (2213.3±468.7 vs 2493.9±219.8 kcal, p<0.0001). No significant changes were observed in all macronutrient intakes across trimesters. Participants exceeded the average estimated protein requirements in the 1st trimester only (95.9±20.7g vs 69.8±8.5g, p<0.0001). Total vitamin D intakes (food and supplements) were below estimated average requirements (EAR) for 26% (1st trimester) and 22% (2nd and 3rd trimesters) of participants. Across trimesters, a majority of women were below the vitamin D EAR when considering intakes from food sources only (93%, 84% and 79%). Total calcium intakes were equal or above the EAR for more than 92% of participants throughout pregnancy. In all trimesters, at least 75% of participants had total iron and folic acid intakes equal or higher than the EAR.

Conclusions:

Macronutrient intakes did not differ throughout trimesters, but participants significantly exceeded their estimated energy and protein requirements in the 1st trimester. Vitamin D intakes from food sources only were below the EAR for most women, which highlights the importance of consuming a vitamin D supplement during pregnancy.

Poster 194

GENDER DIFFERENCES IN PERCEPTION OF PREGNANCY RISK AMONG WOMEN WITH GESTATIONAL DIABETES AND THEIR MALE PARTNERS

Suzanne Lydia Lennon, University of Manitoba; **Maureen Heaman**, University of Manitoba

Background:

Each year in Canada, 6-7% of pregnant women are diagnosed with gestational diabetes (GD). Little is known about how these women perceive risk and no studies have examined the partner's risk perceptions.

Objective:

Objectives were to determine if gender differences exist in pregnancy risk perception, to identify gender specific predictors of risk perception and explore how couples perceive perception of pregnancy risk.

Methods:

Participants were pregnant women, with an index diagnosis of GD and their male partners, recruited from two Winnipeg hospitals. QUANTITATIVE: Participants (n=214; 107 couples) self-completed questionnaires. Paired t-test was used to test for significant differences between couple's risk perception scores. Multivariable linear regression analyses of predictor variables were conducted. QUALITATIVE: Individual in-depth interviews were conducted with 16 participants (8 couples) and analyzed using content analysis.

Results:

Women had significantly higher pregnancy risk perception scores (M 39.0 out of 100, SD 17.3) than men (M 33.6, SD16.6; paired t = 3.2; p =.002). There were unique predictors of risk perception. For women, perceived stress ($\beta = 0.32$, $p = .001$), and pre-pregnancy BMI ($\beta = 0.19$, $p = .028$) were significant predictors (adjusted $R^2 = .288$). For men, significant predictors were GD knowledge ($\beta = 0.24$, $p = .010$), anxiety ($\beta = 0.21$, $p = .020$), self-efficacy ($\beta = 0.17$, $p = .045$) and Winnipeg residence ($\beta = -0.18$, $p = .045$) (adjusted $R^2 = .302$). Qualitative findings revealed that risk perception was shaped by factors such as simultaneously acknowledging GD risk while minimizing personal vulnerability. Couples viewed risk perceptions as being related to personality characteristics, and not as a function of gender.

Conclusions:

These results suggest that gender differences exist in both levels and predictors of perceived pregnancy risk. Women perceived higher levels of pregnancy risk than men; however, both genders attempted to minimize the degree of personal risk.

Poster 195

THE EFFECTS OF SKIN-TO-SKIN CARE ON POSTPARTUM DEPRESSION AMONG MOTHERS OF PRETERM OR LOW BIRTH WEIGHT INFANTS: A SYSTEMATIC REVIEW AND META-ANALYSIS

Kathleen H. Chaput, Cumming School of Medicine, University of Calgary; **Natalie V. Scime**, University of Calgary; **Adam G. Gavarkovs**, Harvard University

Background:

Postpartum depression (PPD) is a serious and debilitating condition affecting 15% of mothers, and is associated with increased risk of adverse developmental outcomes in children. Mothers of preterm or low-birthweight (LBW) infants are at 2-3 times greater risk of PPD than mothers in the general population, which may be partially due to separation of the mother-infant dyad at birth and during hospitalization. Promotion of regular skin-to-skin (S2S) care between mothers and infants is a potentially effective intervention to prevent and treat PPD in this already vulnerable population.

Objective:

To examine the effects of S2S on PPD among mothers of preterm or LBW infants, through a systematic review and meta-analysis.

Methods:

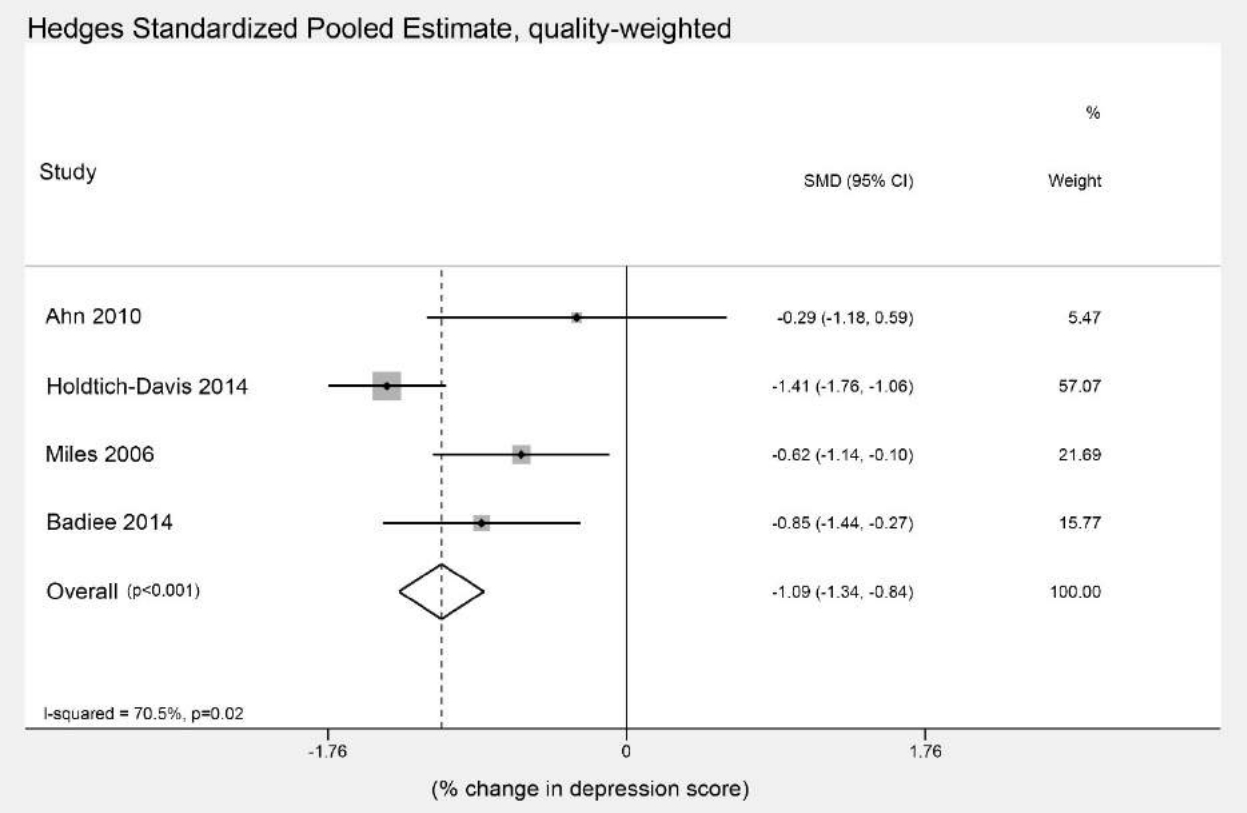
We systematically searched peer-reviewed databases (PubMED, Medline, CINAHL, Cochrane Library, PsycINFO, and EMBASE) for prospective studies of S2S interventions that took place in neonatal intensive care units, and included PPD as an outcome, published in English between 1979 and 2017.

Results:

A total of 44 relevant articles were identified through database and hand searching by two independent researchers. Eight studies met inclusion criteria and were critically appraised and rated using adapted Cochrane (RCT) or ROBINS-I (non-randomized) risk of bias assessment tools. Four studies were excluded for lack of appropriate controls and high risk of selection bias. Data extracted from the four remaining, moderate-quality studies were then standardized and pooled using hedges method, and weighted by quality. Overall, a reduction of 1.09% in depression scores was associated with skin-to-skin interventions, versus standard care ($p<0.001$), though a high degree of variability across studies was observed ($I^2=70\%$, $p=0.02$).

Conclusions:

Although a small statistically significant reduction of PPD symptoms among mothers of preterm and LBW infants is evident with skin-to-skin care, its clinical relevance is arguably small. Further randomized studies of higher quality are warranted to conclusively test the effectiveness of S2S on the prevention of PPD.


Hedges Standardized Pooled Estimate, quality-weighted
Study
SMD (95% CI)
%
Weight
Ahn 2010
-0.29 (-1.18, 0.59)
5.47
Holdtich-Davis 2014
-1.41 (-1.76, -1.06)
57.07
Miles 2006
-0.62 (-1.14, -0.10)
21.69
Badiee 2014
-0.85 (-1.44, -0.27)
15.77
Overall (p<0.001)
-1.09 (-1.34, -0.84)
100.00
I-squared = 70.5%, p=0.02
-1.76
0
1.76
(% change in depression score)

Poster 198

PLACENTAL MICRORNA EXPRESSION IN PREGNANCIES COMPLICATED BY INTRAUTERINE GROWTH RESTRICTION AND PREECLAMPSIA

Zain Awamleh, Western University; **Victor Han**, Western University

Background:

Preeclampsia (PE) and intrauterine growth restriction (IUGR) are pregnancy complications resulting from abnormal placental development. Placental microRNAs (miRNAs) regulate placental development and contribute to disease, by influencing gene expression. They may also serve as potential biomarkers for these complications. We hypothesize that miRNAs are expressed aberrantly in diseased placenta, leading to the dysregulation of genes involved in the development and function of the placenta.

Objective:

To identify differentially expressed miRNAs and mRNAs in placentae from complicated pregnancies, and to determine potential gene targets of miRNAs.

Methods:

Patients diagnosed with early-onset PE and/or IUGR were recruited. RNA was isolated following multi-site placenta sampling. miRNA and mRNA sequencing was completed using the Illumina Hiseq2000. Differential expression analysis was conducted for miRNA and mRNA expression data, in each patient group (PE only, IUGR only, PE+IUGR), and validated by real-time PCR. Luciferase reporter assays validated interactions between miRNAs and gene targets.

Results:

miRNA expression analysis revealed disease-specific miRNAs and miRNAs common to all disease groups. Six miRNAs found in all disease groups were validated, as well as 3 miRNAs specific to preeclampsia. Differential gene expression analysis revealed a number of genes that are aberrantly expressed in all disease groups, and some that are disease-specific. Four novel dysregulated genes important for placental function, possibly targets of miRNAs, were validated using luciferase reporter assays.

Conclusions:

We have identified and validated a number of miRNAs associated with PE and/or IUGR. Validated gene targets provide preliminary evidence for the impact of miRNAs on gene expression in the diseased placenta. Future work focuses on delineating the functional role of these miRNAs *in vitro* and assessing their expression in maternal sera.

Poster 199

METABOLOMIC ANALYSIS OF PRENATAL MATERNAL STRESS EFFECTS ON OFFSPRING AS A RESULT OF THE 2011 QUEENSLAND FLOOD

Rebecca R McHugh, University of Lethbridge; **Naveenjyote S Boora**, University of Lethbridge; **Gabrielle Simcock**, Mater Research Institute, University of Queensland; **Sue Kildea**, Mater Research Institute, University of Queensland; **Marie-Paule Austin**, University of New South Wales; **David P. Laplante**, Douglas Mental Health University Institute, McGill University; **Suzanne King**, Douglas Mental Health University Institute, McGill University; **Gerlinde A. Metz**, University of Lethbridge; **Tony Montina**, University of Lethbridge

Background:

It is widely acknowledged that the health outcomes of offspring are directly linked to the health of their mother during pregnancy. The impacts of pre-natal maternal stress (PNMS) can cascade as development of the offspring continues, and are linked to negative health outcomes.

Objective:

Our goal was to determine the metabolomic differences in offspring who were exposed *in utero* to the 2011 Queensland Flood in relation to the mother's level of subjective distress and objective hardship.

Methods:

Ninety urine samples were obtained from 51 male and 39 female 4-year-old offspring. Metabolomic profiles were acquired using a 700 MHz Bruker Avance III HD NMR spectrometer and subsequently binned. Partial Least Squares-Discriminant Analysis (PLS-DA) was used to identify differences in high vs. low composite subjective distress and high vs. low objective hardship in metabolic profiles, in both male and female groups. Metabolites leading to significant group separation were identified using both Variable Importance Analysis based on random Variable Combination (VIAVC) and a Mann-Whitney U test. Metabolanalyst software was used for metabolite sets enrichment analysis of altered metabolites, and to identify potential biochemical pathways and disease pathologies in the offspring.

Results:

Group separation was observed between high and low levels of both objective hardship and composite subjective distress groups, in both males and females. Several metabolites were detected as being either up- or down-regulated, thus contributing to the observed separation, including creatinine and formate.

Conclusions:

The metabolites identified as significantly altered have been associated with several negative health outcomes. Creatinine down-regulation has been associated with dysfunction in Krebs cycle thus potentially disturbing energy metabolism and contributing to psychiatric illness. Formate up-regulation has been linked to oxidative stress and correlated to metabolic dysfunction in genes relating to neurodegenerative diseases. Understanding the biological pathways affected by exposure to PNMS allows for an improved approach to patient treatment.

Poster 202

TRIMESTER-SPECIFIC DIETARY INTAKES IN COMPARISON WITH CURRENT NUTRITIONAL RECOMMENDATIONS IN PREGNANT WOMEN – PRELIMINARY RESULTS.

Claudia Savard, Université Laval; **Simone Lemieux**, Université Laval; **Claudia Gagnon**, Centre de recherche du CHU de Québec - Université Laval; **Julie Robitaille**, Université Laval; **Anne-Sophie Morisset**, Université Laval

Background:

Accurate dietary assessment during pregnancy is essential to identify potential macro- and micronutrient excesses or deficiencies that could impact the mother and the child's health.

Objective:

This study aims to 1) measure changes in macronutrient intakes throughout trimesters and 2) compare macro- and micronutrients intakes with current nutritional recommendations.

Methods:

Preliminary results include 76 pregnant women recruited in their 1st trimester (9.3±0.7 weeks) who completed, at each trimester, 3 web-based 24h dietary recalls combined with a web questionnaire on dietary supplements.

Results:

Average energy intakes decreased between the 2nd and 3rd trimesters (2312.3±516.1 vs 2213.3±468.7 kcal, p=0.015) and exceeded estimated energy requirements (EER) in the 1st (2268.5±477.2 vs 2110.3±238.7 kcal, p=0.0123) but not in the 2nd trimester (2312.3±516.1 vs 2408.0±248.9 kcal, p=0.14). In the 3rd trimester, average energy intakes were lower than EER (2213.3±468.7 vs 2493.9±219.8 kcal, p<0.0001). No significant changes were observed in all macronutrient intakes across trimesters. Participants exceeded the average estimated protein requirements in the 1st trimester only (95.9±20.7g vs 69.8±8.5g, p<0.0001). Total vitamin D intakes (food and supplements) were below estimated average requirements (EAR) for 26% (1st trimester) and 22% (2nd and 3rd trimesters) of participants. Across trimesters, a majority of women were below the vitamin D EAR when considering intakes from food sources only (93%, 84% and 79%). Total calcium intakes were equal or above the EAR for more than 92% of participants throughout pregnancy. In all trimesters, at least 75% of participants had total iron and folic acid intakes equal or higher than the EAR.

Conclusions:

Macronutrient intakes did not differ throughout trimesters, but participants significantly exceeded their estimated energy and protein requirements in the 1st trimester. Vitamin D intakes from food sources only were below the EAR for most women, which highlights the importance of consuming a vitamin D supplement during pregnancy.

Poster 203

VIZAR: A SOFTWARE TOOL FOR EPIDEMIOLOGICAL HYPOTHESIS GENERATION WITH GEO-SPATIAL DATA MINING

Colin Bellinger, University of Alberta; **Shazan M Mohomed Jabbar**, University of Alberta; **Saeed Hojjati**, University of Alberta; **Osmar Zaiane**, University of Alberta; **Alvaro Osornio-Vargas**, University of Alberta; **DoMiNo Team**, CIHR/NSERC Project

Background:

This work is a collaboration between epidemiologists, neonatal doctors, public health officials and researchers in AMII and the University of Alberta.

Objective:

The objective of our work is to support the development of hypotheses about the relationship between combinations of airborne chemical and adverse birth outcomes (ABOs). Chemical combinations are of interest as these are difficult to study with traditional methods. The desired outcome is achieved by building a software tool (Vizar) that enables users to explore associations discovered via geo-spatial data mining (DM), and identify valuable new research hypotheses.

Methods:

We acquired data on industrial chemical releases from the National Pollutant Inventory, ABO data from the Alberta Perinatal Health Program, and meteorological variables from Environment Canada. These are cleaned and integrated to form a table on which geo-spatial DM is performed to generate associations between chemicals and ABOs. Our interdisciplinary team established a set of functional and non-functional requirements for the software that would enable users to efficiently identify new hypotheses. An iterative cycle of software development and user feedback was applied to ensure Vizar met the requirements.

Results:

A set of associations with Fisher's exact test p-values below 0.05 are identified from the integrated dataset using DM. Vizar, a web-based software program that enables users to explore associations, and generate new hypotheses, is produced. To facilitate this, Vizar includes functionality to sort associations according to standard DM importance metrics, such as lift, to filter them, and plot their occurrences on a Google map. The tool facilitated the discovery of twelve associations that may serve as hypotheses for new studies in public health.

Conclusions:

The application of DM to integrated data enables the generation of associations not typically possible with standard epidemiological methods. Vizar enables efficient and effective knowledge transfer from the DM results to the users to facilitate hypothesis generation.

Poster 205

EMPATHETIC YET RESISTANT: ACCOMMODATING IMMIGRANT WOMEN'S PREFERENCES FOR FEMALE PROVIDERS

Zubia Mumtaz, School of Public Health, University of Alberta; **Christa Aubrey**, Department of Obstetrics and Gynecology, University of Alberta; **Peter (BF) Mitchell**, Department of Obstetrics and Gynecology, University of Alberta; **Radha Chari**, Department of Obstetrics and Gynecology, University of Alberta

Background:

For women migrating from different religio-cultural environments, having a female obstetrical provider may be particularly important. While accommodating these requests can be seen as providing patient-centered care, the feasibility and ethical questions of gender discrimination and educational implications make it a contentious issue.

Objective:

The objective of this study was to gain obstetricians' understanding of the importance, effect, and challenges to providing care when immigrant women prefer a female obstetrician.

Methods:

A focused ethnography was conducted using purposive sampling of 20 obstetrical providers in Edmonton, Alberta, Canada. Data collection comprised of a single semi-structured interview with participants. Interviews were audio-recorded and transcribed verbatim. Data was managed by a qualitative data analysis software, and analyzed using thematic analysis.

Results:

A total of 13 female and seven male physicians were interviewed. In line with patient-centered care, physicians recognized the validity, and empathized with immigrant women's preference for female providers. However, they were resistant to accommodating these requests, stemming from concerns about the extent to which host communities should accommodate immigrant cultural requests, based on the ability of the health system to respond, discerning coercion-free patient decision-making, implications for training and quality of care, and fear of perpetuating and exacerbating gender inequalities in medicine.

Conclusions:

Physicians faced a dilemma trying to balance patient preferences with their own autonomy as a physician and a person. Identifying physician's values and perspective will enhance understanding of the patient-physician relationship, ultimately progressing towards addressing this issue both philosophically and practically.

Poster 210

DOES THE TIMING OF MEDICAL TREATMENT OF PATENT DUCTUS ARTERIOSUS (PDA) HAVE AN IMPACT ON THE SUCCESS OF TREATMENT IN PRETERM INFANTS?

Sharandeep Kaur, University of Calgary; **Amelie Stritzke**, University of Calgary; **Amuchou Soraisham**, University of Calgary

Background:

Hemodynamically significant patent ductus arteriosus (hsPDA) is the most common cardiovascular problem of prematurity often treated with nonsteroidal anti-inflammatory drugs (NSAIDs-indomethacin and ibuprofen). There is limited data on the effect of postmenstrual age (PMA) at the time of start of treatment on response rates to NSAIDs.

Objective:

The objective of our study was to examine the effect of PMA on response to NSAIDs in hsPDA.

Methods:

In this retrospective cohort study, we included infants with gestational age (GA) ≤ 32 weeks admitted to a tertiary NICU between January 2014 and December 2016, who had received one or more doses of NSAIDs for the treatment of hsPDA. Positive response (responders) to NSAIDs was considered if post treatment echocardiogram showed that PDA was either closed or small, and did not require further medical or surgical treatment. We compared baseline characteristics between responders and non-responders using univariate and multivariable logistic regression.

Results:

A total of 183 infants received 257 courses (one, two and three courses in 183, 62 and 12 neonates respectively) of NSAIDs. Positive response rate was overall 60%, and 66%, 48%, and 50% for the first, second, and third course respectively. The baseline characteristics were comparable between responders and non- responders except for higher GA, birth weight (BW), and earlier (<14 days of life) start of NSAIDs in responders. After adjusting for BW, Apgar score and gender, GA at birth but not the PMA, was associated with positive response to NSAIDs (aOR 1.24, 95% CI 1.07, 1.42 for GA; aOR 0.92, 95% CI 0.79, 1.07 for PMA). Early NSAIDs treatment was associated with increased odds of PDA closure (aOR 1.95; 95% CI 1.00-3.8).

Conclusions:

Gestational age is the strongest predictor for response to NSAIDs in hs-PDA and PMA at the start of treatment does not affect efficacy of NSAIDs.

Poster 213

SUPPORTING HEALTHY PREGNANCIES: EXAMINING VARIATIONS IN PRENATAL CARE PROVIDER PREFERENCES AND PRENATAL EDUCATION PROVISION IN ALBERTA: A DESCRIPTIVE STUDY USING THE ALL OUR BABIES COHORT

Shainur Premji, University of Calgary; **Sheila W McDonald**, University of Calgary; **Dhwani D Paul**, University of Calgary; **Jennifer Zwicker**, University of Calgary

Background:

Prenatal education is an important determinant of healthy pregnancy. Yet low-risk women have many choices when it comes to seeking prenatal care support. Depending on the professional, certain aspects of prenatal care may be emphasized more than others.

Objective:

The purpose of this study will be to investigate prenatal care provider preferences among pregnant women, as well as whether the delivery of prenatal education is consistent between providers.

Methods:

Data will be drawn from the Alberta *All our Babies* community based pregnancy cohort (n=3200). Bivariate and multivariable analysis will take place to examine healthcare providers seen during pregnancy and factors that influenced the type of prenatal education received by women. Odds ratios (ORs) and 95% confidence intervals (CIs) will be reported to determine the likelihood of receiving certain prenatal advice by prenatal care provider, controlling for demographic and pregnancy characteristics.

Results:

Only preliminary results are presented. At the end of pregnancy, women reported visiting anywhere from 1-6 healthcare providers during their prenatal care, with the majority visiting either one (38%) or two (42%) providers. Among women who saw one provider, 40% reported receiving care by a doctor in a low-risk maternity clinic, 24% by their family doctor, 21% by their obstetrician, and 13% by a midwife. Factors that influenced whether women obtained care from multiple providers as opposed to a single provider included higher (post-secondary) educational attainment (p=0.017), higher annual household income (≥$60,000; p=0.001), and nulliparity (p=0.031).

Conclusions:

Understanding low-risk women's preferences in choosing which type of provider to engage for their prenatal care, as well as the variations in the type of advice provided by different providers, will support future healthcare policy planning, as well as messaging provided to prenatal families through public policy campaigns, such as the *Ready or Not* preconception and pregnancy planning campaign in Alberta.

Poster 214

ARE CANADIAN NEONATOLOGISTS READY FOR A STEM CELL TRIAL FOR BRONCHOPULMONARY DYSPLASIA?

Mireille Guillot, Children's Hospital of Eastern Ontario; **Sarah Asad**, Ottawa Hospital Research Institute; **Justin Presseau**, Ottawa Hospital Research Institute; **Manoj M Lalu**, Ottawa Hospital Research Institute; **Brigitte Lemyre**, Children's Hospital of Eastern Ontario; **Bernard Thébaud**, Children's Hospital of Eastern Ontario

Background:

Pre-clinical studies support the role of stem cells in preventing bronchopulmonary dysplasia (BPD), a chronic lung disease of prematurity. We are planning the first Canadian clinical trial of stem cell therapy for BPD.

Objective:

To ensure successful bench-to-bedside translation, the objective of our study was to identify the barriers and enablers that may influence neonatologists' decision to identify extremely preterm infants at risk of BPD for participation in a stem cell trial for BPD.

Methods:

Semi-structured interviews were conducted with neonatologists across Canada. We used the Theoretical Domains Framework (TDF) to develop an interview topic guide covering 14 key domains that influence behavior (e.g. knowledge, intentions, goals, social influences). Two independent researchers used directed content analysis (using qualitative software NVIVO 11) to assign utterances to TDF thematic domains. We further identified sub-themes within domains to identify key barriers and enablers to neonatologists identifying infants for the planned trial.

Results:

Sixteen interviews were conducted with neonatologists across Canada (Western Canada n=7, Central Canada n=7, Eastern Canada n=2). Seven were practicing as a neonatologist for 10 years or less, 5 for 11-20 years and 4 for >20 years. Preliminary analyses demonstrated that neonatologists are eager to help identify patients for this study due to the importance they place on trying to treat BPD. Many participants had worries concerning the lack of evidence on long-term outcomes of stem cell therapy. Access to clear protocols, well defined eligibility criteria, and research assistants were brought up as key facilitators for screening patients. The most commonly reported barrier included the need for human resources (e.g. research assistants), funding, and institutional support to help screen patients.

Conclusions:

Our interviews identified facilitators and barriers from a neonatologist perspective to a potential stem cells trial for BPD. Our findings will inform the design of a phase I/II clinical trial.

Poster 215

SYNDECAN-4 REGULATES EXTRAVILLOUS CYTOTROPHOBLAST CELL MIGRATION BY COORDINATING PROTEIN KINASE C-ALPHA ACTIVATION

Mariyan J Jeyarajah, University of Western Ontario; **Brianna Kops**, University of Western Ontario; **Gargi Jaju**, University of Western Ontario; **Stephen J Renaud**, University of Western Ontario

Background:

Insufficient remodeling of the uterine vasculature by invasive extravillous cytotrophoblast (EVT) cells can lead to severe obstetrical complications such as preeclampsia. Previous studies have shown that syndecan-4 (SDC4) is highly associated with cell invasion and migration by facilitating interactions with extracellular matrix, and coordinating cellular responses such as activation of the protein kinase C-alpha (PKCα) pathway. However, the role of SDC4 in EVT migration is not well understood.

Objective:

To determine the role of SDC4 in EVT cell migration.

Methods:

Immunohistochemistry was used to determine SDC4 localization within the placenta. To knockdown *SDC4* expression, HTR8 EVTs were transduced with lentivirus carrying short hairpin RNA (shRNA) targeting *SDC4*. Knockdown efficiency compared to control shRNA-treated cells was determined by quantitative RT-PCR and western blotting. PKCα activation was inhibited using 5 μM Gö6976. Matrigel-based transwell assays, scratch-wound migration assays, adhesion assays, and phospho-histone H3 immunofluorescence was used to determine motility, adhesion, and proliferation of EVT cells. Statistical comparisons were completed using a Student's *t* test and Analysis of Variance. Means were considered statistically different if $P<0.05$.

Results:

SDC4 was expressed in EVTs in placentas collected at 6, 14, and 39 weeks gestation, and was highly expressed by HTR8 EVTs. Using lentivirus-shRNA, *SDC4* was knocked down in HTR8 EVTs by 90% ($P<0.05$). Although *SDC4* knockdown did not affect cell proliferation or adhesion, *SDC4*-deficient HTR8 EVTs had significantly reduced PKCα and AKT phosphorylation, which correlated with decreased invasion and migration capacity (60% invasion deficit and 40% migration deficit, $P<0.05$). Concordant with this finding, inhibition of PKCα by Gö6976 mitigated HTR8 EVT invasion and migration (60% invasion deficit and 50% migration deficit, $P<0.05$).

Conclusions:

SDC4 is a vital regulator of EVT invasion and migration by coordinating PKCα activation.

Poster 217

RISK OF PRETERM BIRTH IN A SINGLETON PREGNANCY FOLLOWING PRIOR PRETERM TWIN BIRTH: A SYSTEMATIC REVIEW AND META-ANALYSIS

Rebecca Menzies, University of Toronto; **Adrienne Li**, University of Toronto; **Nir Melamed**, University of Toronto; **Prakesh S. Shah**, University of Toronto; **Daphne Horn**, Mount Sinai Hospital; **Jon Barrett**, University of Toronto; **Kellie Murphy**, University of Toronto

Background:

Prematurity, defined as birth prior to 37 completed weeks gestational age, is a leading cause of infant morbidity and mortality world-wide. The recurrence of spontaneous preterm labour (PTL) in singletons is estimated to be 15%. Recurrence risk of PTL in a singleton pregnancy after prior twin birth is postulated but the degree is unclear.

Objective:

To conduct a systematic review and meta-analyses of literature regarding the risk of preterm birth in singleton pregnancies following a prior preterm twin birth.

Methods:

We conducted a literature search of Embase, Medline, Cochrane and PubMed from inception until July 31, 2017 for studies evaluating women with a prior twin birth followed by a singleton birth. Local retrospective data was also included in the study. Data were abstracted and summary unadjusted odds ratios (uAOR) and confidence intervals (CI) were calculated using fixed effects model. A priori, the protocol was developed and registered with PROSPERO (Registration number: CRD42017053382).

Results:

Six studies at low risk-of-bias met inclusion criteria. Compared to women with previous term twin births, women who had previous preterm (<37 weeks gestation at birth) twin births were at increased odds of preterm singleton birth in subsequent pregnancy (unadjusted OR 4.76; 95% CI, 3.04-7.47). Gestational age at birth of previous twin pregnancy was an effect modifier. Compared to previous term twin births, the odds of subsequent preterm singleton birth were uAOR 2.16 (95% CI, 1.24 – 3.76) if twins were born between 34 and 36^6 weeks, uAOR 5.19 (95% CI, 2.83 – 9.51) if twins were born between 30 and 33^6 weeks and uAOR 9.4 (95% CI, 5.39 – 16.4) if twins were born before 30 weeks gestation (Table 1).

Conclusions:

History of preterm twin birth is associated with higher odds of subsequent preterm singleton birth. In addition, the odds increase with reducing gestational age of previous twin birth.

Gestational Age Twin Birth (weeks)	Pooled Rate of Subsequent Singleton Preterm Birth	Unadjusted OR (95% CI)
≥37	1.8%	Reference
34-36^6	4.1%	2.16 (1.24-3.76)
30-33^6	8.8%	5.19 (2.83-9.51)
<30	17.9%	9.4 (5.39-16.4)

Table 1. Pooled rates of singleton preterm birth and unadjusted OR for prior term and preterm twin births.

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BARRIERS AND FACILITATORS TO USE OF A MATERNAL NEWBORN AUDIT AND FEEDBACK SYSTEM IN ONTARIO: A CASE STUDY COMPARISON

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Background:

In November 2012, BORN Ontario implemented the Maternal Newborn Dashboard (MND), an audit and feedback (A&F) system for all maternal-newborn hospitals in Ontario. As part of a larger study to evaluate use of A&F to improve care, we conducted a case study comparison of a diverse group of maternal-newborn hospitals in Ontario.

Objective:

The aim of our study was to improve our understanding about factors that explain variability in performance after implementation of the MND.

Methods:

A criterion-based approach was used to identify a purposeful sample of diverse hospitals to participate in a 1-2 day visit by the research team. The site visits comprised: (1) interviews and focus groups using a semi-structured interview guide with health care providers, leadership, and key personnel involved in clinical change processes; and (2) observations and document review. Qualitative content analysis was used to code and categorize the data. Donabedian's health care quality model provided a lens to interpret our findings and identified facilitators and barriers are presented according to structure and process.

Results:

Between June and November 2016, we visited 14 maternal-newborn hospitals. Hospitals were grouped into four quadrants based on their level of buy-in/effort toward the MND, and performance on the MND key performance indicators. Findings revealed diverse facilitators and barriers between quadrants, related to (1) *structure* characteristics such as unit size, interprofessional hierarchies, roles of team members, and availability of resources; and (2) *process* characteristics such as use of change frameworks, communication of MND data, and types of strategies used for quality improvement.

Conclusions:

The identified quadrants and associated structure and process barriers and facilitators are informing (1) the identification of tools for assessing hospital readiness; and (2) development and testing of evidence-based strategies for supporting implementation of audit and feedback systems in maternal-newborn settings.

Poster 220

AN INTERNATIONAL EFFORT TO HARMONIZE OUTCOME SELECTION IN NEONATAL ABSTINENCE SYNDROME

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Background:

Neonatal abstinence syndrome (NAS) results from abrupt discontinuation of opioids following birth in newborns that were exposed to opioids during pregnancy. The prevalence of NAS is increasing globally (more than 5 fold since 2000) and treatment options vary across and within countries. Currently no consensus exists on what outcomes to measure in NAS that can be compared across studies to guide diagnosis and management.

Objective:

Our objective is to create, test and disseminate a harmonized minimum set of outcomes to be measured in NAS clinical practice and research.

Methods:

We are developing a NAS core outcome set, a minimum set of outcomes to be measured across in practice and research using standard methodologies. This process involves a systematic literature review, parent interviews, a multi-stage survey (Delphi), consensus meeting, pilot testing and an integrated knowledge translation plan. Stakeholders for this project include neonatologists, nurses, nurse practitioners, social workers, midwives, pharmacists, researchers and families. Our full study protocol is available open access https://trialsjournal.biomedcentral.com/articles/10.1186/s13063-016-1666-9.

Results:

Following abstract and full text screening, our literature review included 54 studies published in the last 10 years which evaluated pharmacologic or nonpharmacologic treatments for NAS. We identified 50 unique reported outcomes used to evaluate treatment success in the included studies. The most commonly reported outcomes included length of stay in hospital (59% of studies; 32/54), duration of treatment for NAS (31% of studies; 17/54) and NAS severity score (31% of studies; 17/54). These 50 reported outcomes are currently being prioritized by a Delphi process with international stakeholders to determine the importance of each reported outcome.

Conclusions:

We are in the process of developing an evidence-informed, consensus-based core outcome set for NAS with a diverse group of international stakeholders. Standardized outcome selection will improve NAS clinical research consistency, replicability, impact, and will increase informed decision making leading to improve health outcomes.

Poster 221

EXPLORING THE EFFECT OF DEVELOPMENTAL TOXICANTS EXPOSURE AND SOCIO-ECONOMIC STATUS ON CONGENITAL HEART DISEASE IN URBAN AND RURAL ALBERTA

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Background:

Emerging evidence suggests associations between environmental pollutants, socio-economic status (SES) and congenital heart disease (CHD); however, it is still inconclusive.

Objective:

We sought to explore the effect of exposure to groups of developmental toxicants (DTs) and SES on CHD development in urban and rural Alberta.

Methods:

We identified 2,413 CHD cases and postal codes (PC) from echocardiographic databases (2003-2010). We used previously defined groups of DTs comprised of: 1- organics and gases, 2-organics and 3-heavy metals. Exposure was assigned to each PC as the sum of the product of multiplying amounts of DTs (tonnes) emitted from any industrial facility within 10 km radius, by the inverse distance from the facility to the centroid of the PC. Exposures were categorized into deciles from 1(lowest) to 10(highest) for group 1 DTs and tertiles (1=lowest to 3 =highest), for groups 2 and 3 DTs and the SES index. Poisson regression models were used to calculate risk ratios and 95% CI, adjusted for SES index or DTs and traffic-related surrogates (NO_2, $PM_{2.5}$).

Results:

Effect of DT Exposure: Group 1 DT showed increased risk in urban and rural regions in the 10^{th} decile of exposure, aRR=1.85 (1.5, 2.3) and 2.67(1.04, 6.8, respectively). Group 2 DT risk was increased only in urban 3^{rd} tertile, RR=1.45(1.3, 1.6). Group 3 DTs were associated with an increased risk in urban and rural regions in the 3^{rd} tertile of exposure [aRR=1.16(1.04, 1.3), and 2.8 (1.14, 7.1, respectively)]. Effect of SES: SES was independently associated with increased risk of CHD in urban lowest tertile, [aRR=1.13(1.0, 1.3)] and rural lowest and middle SES tertile, [aRR=2.9(1.9, 4.8) and 1.6(1.1, 2.6), respectively].

Conclusions:

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

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HISTONE DEACETYLASES PLAY A VITAL ROLE IN SYNCYTIOTROPHOBLAST DEVELOPMENT

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Background:

A specialized placental layer called syncytiotrophoblast performs critical functions during pregnancy, including the regulation of nutrient and gas exchange between maternal and fetal blood and the production of hormones. Syncytiotrophoblast is maintained by differentiation of underlying stem-like cytotrophoblasts, but the mechanisms underlying syncytiotrophoblast development are unknown. One group of proteins that regulates differentiation of many cell-types is histone deacetylases (HDACs), so we hypothesize that HDACs are important regulators of syncytiotrophoblast development.

Objective:

The objective of this project is to determine the role of HDACs in syncytiotrophoblast development.

Methods:

Human trophoblast BeWo cells were treated with two different HDAC inhibitors, trichostatin A (TSA, 1-20 nM) and suberoylanilide hydroxamic acid (SAHA, 50-750 nM). Cells were induced to differentiate to syncytiotrophoblast by exposure to 250 µM 8-bromo-cyclic adenosine monophosphate (cAMP) for 48 h. To confirm the efficacy of the HDAC inhibitors, acetylation of histones H2B-K5, H3-K27, and H3-K14 was determined by western blotting. Transcripts associated with syncytiotrophoblast development (*ERVW-1, ERVFRD-1, CGB, HSD11B2*) were analyzed by quantitative RT-PCR. The effect of HDAC inhibition on syncytiotrophoblast development was determined by immunofluorescence for E-cadherin and human chorionic gonadotropin. One way ANOVA was used for statistical analysis, and $P<0.05$ was considered statistically significant.

Results:

BeWo trophoblast cells exhibited a global loss of histone acetylation during differentiation, suggesting that HDAC activity was associated with syncytiotrophoblast development. Treatment of trophoblast cells with TSA or SAHA reduced HDAC activity, based on increased histone H2B-K5, H3-K27, and H3-K14 acetylation following treatment. TSA and SAHA dose-dependently abrogated induction of *ERVW-1, ERVFRD-1, CGB,* and *HSD11B2* ($P<0.05$). Furthermore, exposure of trophoblast cells to 20 nM TSA and 750 nM SAHA abrogated syncytiotrophoblast development by 75% and 73%, respectively ($P<0.05$).

Conclusions:

Reduced HDAC activity prevented induction of various syncytiotrophoblast markers and abrogated cytotrophoblast differentiation, suggesting that HDACs are vital regulators of syncytiotrophoblast development.

Poster 230

EXAMINING THE MICROVASCULATURE FOLLOWING A PREGNANCY COMPLICATED BY PREECLAMPSIA

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Background:

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 manifesting clinically as cardiovascular disease. Postpartum microvascular assessment- namely endothelium-dependent, endothelium-independent, and flow-mediated vasodilation- would further characterize the microvascular changes that occur following PE. Parallel measurement of macrovascular function would clarify any correlation between the two domains and help elucidate the natural history of disease in these women.

Objective:

This study aims to

a. Determine the extent to which PE precipitates postpartum microvascular changes.

b. Evaluate continuous microvascular endothelial function measurement as a surrogate for macrovascular dysfunction.

Methods:

Women with previous PE (N=40) and matched controls (N=40) will be sorted into high- and low-risk groups using lifetime risk scores. Microvascular reactivity in the right volar forearm will be assessed using laser speckle contrast imaging (moorFLPI-2, Moor Instruments Inc, Axminster, UK). Iontophoresis of 1% acetylcholine and sodium nitroprusside solutions will be performed in 14-millimeter Perspex electrode chambers affixed to the forearm. Stepwise application of current (15 uA, 20 uA, 50 uA, 100 uA, and 120 uA) will be conducted using an iontophoresis controller (MIC2, Moor Instruments Ltd, Axminster, UK). Finally, a post-occlusive reactive hyperaemia test will be performed using a blood pressure cuff inflated to suprasystolic pressures (moorVMS-PRES, Moor Instruments Ltd, Axminster, UK). Finally, a two-dimensional carotid artery ultrasound will assess plaque height, vessel stiffness and carotid intima-media thickness.

Results:

The results of this study will elucidate the microvascular sequelae of a pregnancy complicated by PE and clarify the relationship between microvascular and macrovascular dysfunction.

Conclusions:

This study could also enhance understanding of physiological features that characterize PE patients at greatest risk for future cardiovascular disease.

Poster 231

THE ONTARIO BIRTH STUDY: A PROSPECTIVE PREGNANCY COHORT STUDY INTEGRATING PERINATAL RESEARCH INTO CLINICAL CARE

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Background:

Pregnancy and early childhood represent critical developmental epochs that impact health throughout the life-course. The Ontario Birth Study (OBS) is a prospective pregnancy cohort study designed as a platform for research on pregnancy complications, maternal and infant health, and the developmental origins of health and disease.

Objective:

To describe the development of the OBS and the methods used for integration of perinatal research into clinical care.

Methods:

Pregnant women < 17 weeks gestational age were recruited from antenatal clinics at Mount Sinai Hospital, Toronto, Canada. Women were recruited between January 2013 and November 2015. Detailed phenotypic data, including lifestyle and diet questionnaires, biospecimens, and clinical data, were collected throughout the pregnancy and postpartum period at the time of clinical care. The OBS was integrated into clinical care to reduce the participant burden and increase the research potential.

Results:

A total of 3181 eligible women were approached for recruitment and 1374 (43%) participated in the study. Among the 1374 participants, 1276 (93%) remained in the study and delivered a live birth. Four (0.3%) women experienced a neonatal loss and were excluded from the study. Of the remaining 1272 women, 98% had at least one pregnancy blood sample collected, 97% had vaginal swabs collected, 90% completed the prenatal lifestyle questionnaires, and 78% completed the Diet History Questionnaire. Most women (88%) were ≥30 years of age, 55% had no previous children, and 24% were overweight or obese pre-pregnancy. There were 10% of women who experienced depressive symptoms during pregnancy and 8% consumed alcohol. Most pregnancies were singleton (3% twins), 34% delivered by cesarean section, and 6% were preterm (<37 weeks gestation).

Conclusions:

The OBS is a contemporary cohort with deep phenotyping including banked biospecimens for studies of pregnancy health and the gene-environment interactions that establish developmental trajectories to health, learning and social functioning.

Poster 233

KNOWLEDGE, WORKPLACE CULTURE, AND PARTICIPANT EXPERIENCES ASSOCIATED WITH PARTICIPATION IN THE MOREOB PROGRAM: A MIXED-METHODS EVALUATION

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Background:

The MOREOB (Managing Obstetrical Risk Efficiently) program is an obstetrical patient safety program for obstetric healthcare teams in hospitals.

Objective:

The study assessed the effects of the MOREOB program in 26 Ontario hospitals on participant (1) knowledge, (2) perception of organizational culture, and (3) experiences implementing and participating in the program.

Methods:

A mixed-methods study with participants from 26 newly enrolled hospitals in the MOREOB program. The quantitative component used a descriptive pre-post design with data from two questionnaires, to assess participant knowledge and perception of culture, administered pre-MOREOB and after each of the three MOREOB modules. Changes in mean scores were assessed using mixed effects regression. The qualitative component used an interpretive descriptive design with individual semi-structured telephone interviews to explore participant experiences. Qualitative content analysis was used to code, categorize, and thematically describe data. A concurrent triangulation design was used to corroborate findings from quantitative and qualitative data sources.

Results:

A total of 308 participants completed the knowledge test, and 329 completed the culture assessment, at all four time points. Between baseline and completion of the 3rd MOREOB module, statistically significant increases on both scores were observed, with a mean increase of 6.17 (on a percentage scale, 95% CI: 0.51 to 11.85) on the knowledge test, and 0.71 (on scale of 1-5, 95% CI: 0.41 to 1.00) on the culture assessment. These increases in knowledge and culture were corroborated by our qualitative findings from 15 MOREOB participant interviews. Participants described increases in knowledge shared amongst team members, improvements in interprofessional communication, improved ability to provide safe care, and increased confidence in skills. Both facilitators and barriers to program implementation were identified.

Conclusions:

Results of this mixed-methods study suggest participants were satisfied with their participation in the MOREOB program. The program has positive effects on participant knowledge and organizational culture.

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LEVELS OF ANGIOGENIC FACTORS AND CYTOKINES IN THE SECOND AND THIRD TRIMESTER OF PREGNANCY

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Background:

Normal human pregnancy is an inflammatory state. Changes in levels of cytokines, angiogenic and growth factors in different trimesters of pregnancy are not well established.

Objective:

To compare levels of cytokines, angiogenic and growth factors in the second and third trimester of pregnancy.

Methods:

Healthy women with singleton pregnancies were recruited to the study. Exclusion criteria included fever, diabetes mellitus, renal, cardiovascular, endocrine or autoimmune disease, chronic and gestational hypertension, substance abuse, smoking, TORCH infections, premature rupture of membranes, preterm premature rupture of membranes, congenital malformations and any sign of labor. Soluble vascular endothelial growth factor receptor (sVEGFR) 1 and 2, placental growth factor (PLGF), insulin like growth factor (IGF) -1 and insulin like growth factor binding protein (IGFBP)-3 were quantified by ELISA. Tumor necrosis factor (TNF)-α, interleukin (IL)-8, IL-6, IL-10, IL-1ß, granulocyte stimulating factor (G-CSF), granulocyte macrophage stimulating factor (GM-CSF), interferon (IFN)-γ were quantified by multiplex assay. Mann-Whitney test was used for statistical analysis. $P < 0.05$ was considered significant.

Results:

There was no difference in age, body mass index and parity between the groups. Cytokine and angiogenic and growth factor results are summarized in Table 1.

Conclusions:

Inflammatory markers change between the second and third trimester of normal pregnancy. Our data provides insight into normal pregnancy physiology and can be used for comparison with pregnancy complications like preeclampsia.

Table 1. Cytokine, angiogenic and growth factors in second and third trimester of pregnancy

Variable	Second Trimester *N* = 54	Third Trimester *N* = 63	P-value
sVEGFR1 (pg/ml)	1730(621)	2112(780)	.00*
sVEGFR2 (ng/ml)	11(3)	11(3)	.72
PlGF (pg/ml)	432(384)	512(380)	.21
IGF-1 (ng/ml)	178(78)	241(139)	.00*
IGFBP-3 (ng/ml)	2.7(0.7)	3.3(1)	.00*
TNF-α (pg/ml)	11(7)	14(6)	.04*
IL-8 (pg/ml)	4.5(5)	8(6)	.01*
IL-6 (pg/ml)	2(4)	2.5(5)	.89
G-CSF (pg/ml)	91 (54)	84(34)	.42
GM-CSF (pg/ml)	3.4 (6)	4.7(10)	.29
IFN- γ (pg/ml)	4.7(5)	5(7)	.21
IL-10 (pg/ml)	2.7(3)	3.7(5)	.11
IL-1ß (pg/ml)	3.4(10)	11(12)	.54

Data as median and interquartile range.

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EARLY LIFE STRESS ALTERS THE GLOBAL METABOLOME AND LIFETIME HEALTH TRAJECTORIES IN A MOUSE MODEL

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Background:

The physical effects of stress are extensive and span entire body systems. These effects differentially affect organs and are reflected in physiological and metabolic changes. The metabolic implications of stress extend to physiology, where stress can potentially alter future health and disease risks. Shipment stress serves as representation of the effects of a multivariate stressor and it is a common laboratory procedure.

Objective:

Here, we propose that shipment stress during the perinatal period of development can alter the global metabolome and predict lifetime health trajectories in a mouse model.

Methods:

Fourteen male mice were shipped from Saint-Constant, Quebec to Lethbridge, Alberta on postnatal day (P)12 from 7:30 am to 7:30 pm. Nine animals bred in our facility for at least three generations served as controls. On P50, animals were euthanized and their heart, kidneys, lungs, adipose and spleen tissues were collected, subjected to chloroform and methanol-based metabolite extraction, and ran on a 700 MHz ^{1}H nuclear magnetic resonance (NMR) spectrometer. The resulting spectra were then analyzed for differences between treatment groups.

Results:

Our findings suggest that perinatal shipment stress produces persistent changes in the global metabolome of the laboratory mouse. Concentrations of metabolites were significantly altered by stress in hearts, kidneys and lungs. Adipose tissue and spleen also exhibited changes, but these were comparatively less substantial. Specifically, several metabolites were shown to be either up- or down-regulated in stressed animals with respect to the controls, thus producing a metabolomic biomarker signature of early life stress.

Conclusions:

Shipment stress during the perinatal period of development produced significant metabolic differences between treatment groups. These persistent changes in metabolite expression provide potential prognostic biomarkers of stress and disease.

Poster 236

DECORIN-DEPENDENT EXPRESSION AND FUNCTION OF CONNEXIN-43 IN THE TROPHOBLAST: IMPLICATIONS FOR PRE-ECLAMPSIA.

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Background:

Pre-eclampsia (PE) is a leading cause of maternal/fetal/neonatal morbidity in North America. The pathobiology of PE is attributed to a sick placenta receiving inadequate supply of maternal arterial blood, resulting from poor trophoblast invasion, endovascular differentiation and uterine arterial remodeling. We have shown that Decorin (DCN), a leucine-rich proteoglycan made by the uterine decidua restrains trophoblast functions to maintain a healthy utero-placental homeostasis; that decidual DCN overproduction is associated with PE; and that elevated maternal plasma DCN during the second trimester is a predictive biomarker for PE. Connexin 43 (Cx43) is an important gap-junctional protein that allows gap junctional intercellular communication (GJIC) in placental cells. It is currently unclear whether Cx43 expression and functions regulated by DCN are compromised in PE.

Objective:

To test if DCN mediated impairment in Cx43 expression and functions in trophoblast is associated with PE.

Methods:

1. Compare Cx43 expression and GJIC in a first trimester human Extravillous trophoblast (EVT) cell line (HTR-8/SVneo, which does not express DCN) and ectopic DCN-overexpressing EVT cells. (a) DCN and Cx43 mRNA expression by qPCR
(b) Cx43 protein expression by Western blot
(c) Localization of Cx43 protein by immuno-staining
(d) Lucifer yellow dye transfer for evaluation of functional GJIC. 2. Compare & correlate Cx43 expression in control vs PE placentas matched for gestational ages.

Results:

1. Reduced ($p < 0.05$, $n=3$) expression of Cx43 (mRNA & protein) in DCN overexpressing EVT cells.
2. Reduced GJIC ($p < 0.05$, $n=3$) in DCN-overexpressing EVT cells.
3. Reduced Cx43 protein expression in immune-stained PE placentae compared to controls (preliminary results, n=2 each, 26-29 weeks)

Conclusions:

DCN over-expression in PE placentas may compromise Cx43 expression and GJIC in trophoblast.

Significance:

Pending further verification, dysregulated Cx43 expression and GJIC resulting from DCN overproduction in the placenta may contribute to PE.

Poster 240

SHORT TERM NEONATAL OUTCOMES IN PREGNANCY INDUCED HYPERTENSION

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Background:

Studies have demonstrated heterogeneity in association of pregnancy-induced hypertension (PIH) and respiratory outcomes or mortality in preterm infants, largely attributed to effect of gestation and antenatal steroids.

Objective:

To comparatively evaluate mortality and short-term respiratory outcomes in preterm-infants < 33 weeks GA born to mothers with and without PIH.

Methods:

This retrospective cohort study of preterm infants younger than 33 weeks' gestation born between July 1, 2014 to June 30, 2016 was conducted at tertiary academic hospital. Infants exposed to PIH (exposure) were matched to infants not exposed to PIH (control) in a 1:2 ratio, based on gestation, sex and antenatal steroid exposure status. The primary outcomes were respiratory index (RI), mortality and bronchopulmonary dysplasia (BPD). RI was defined as area under curve (AUC) for mean airway pressure and fraction inspired oxygen on invasive ventilation during first 72 hours.

Results:

Of 539 infants, 79 (exposure) were matched with 158 infants (control). Infants born to mothers with PIH had lower birth weight, more likely to delivered through caesarean section and less likely to exposed to chorioamnionitis compared to infants born to mothers without PIH. No differences in RI were noted in infants with (median 1854; IQR 186, 13901) or without PIH (median 1359; IQR 210, 11302). On conditional regression analysis, PIH did not predict RI (adjusted risk 1.15; 95% C.I 0.69-1.90). No association between PIH and death (OR 3.14; 95% C.I 0.76-13.0) was identified. PIH was significantly associated with BPD on univariate analysis (odds ratio (OR) 2.29; 95% C.I 1.02-5.17; P-value 0.046), but on regression analysis was not significant (adjusted OR 1.26; 95% C.I 0.38-4.19) (Table-1).

Conclusions:

PIH was not associated with RI, mortality or BPD in this matched cohort. This contradicts from previous studies which may have been influenced with the survival bias. Further studies with larger samples are needed to confirm our results.

Table 1: Analysis of outcomes

Outcomes	Infants not exposed to PIH n=158	Infants exposed to PIH n=79	Unadjusted analysis	Adjusted analysis
Categorical Outcomes	**n (%)**	**n (%)**	**Odds ratio (95% CI) P**	**Adjusted risk (95% CI) P**
Mortality	7 (4.4)	7 (8.9)	3.14 (0.76-13.0) 0.115	N/A
BPD	27 (17.1)	21 (26.6)	**2.29 (1.02-5.17) 0.046**	1.26 (0.38,4.19) 0.705[¥]
Survival without morbidity	40 (25.3)	26 (32.9)	1.76 (0.84-3.67) 0.132	1.03 (0.30,3.57) 0.958[€]
Surfactant therapy	71 (44.9)	39 (49.4)	1.31 (0.67-2.56) 0.429	
> 1 Surfactant dose	13 (8.2)	17 (21.5)	**3.43 (1.45-8.10) 0.005**	
Need for intubation	81 (51.3)	39 (49.4)	0.90 (0.48-1.70) 0.746	
Pulmonary air leak	13 (8.2)	3 (3.8)	0.44 (0.12-1.60) 0.213	
Count outcomes	**Median (Q1, Q3)**	**Median (Q1, Q3)**	**Relative risk (95% CI) P**	
RI	1359 (210, 11302)	1854 (186, 13901)	1.15 (0.69-1.90) 0.594	0.96 (0.79,1.17) 0.712*
Invasive ventilation (days)	2.5 (1.0, 12.0)	4.0 (1.0, 10.0)	1.08 (0.49-2.38) 0.856	
Respiratory support (days)	13.5 (5.0, 44.0)	14.0 (5.0, 57.0)	1.23 (0.98-1.54) 0.080	
Oxygen therapy (days)	4.0 (1.0, 27.0)	4.0 (1.0, 36.0)	1.31 (0.84-2.02) 0.232	

Note: BPD: bronchopulmonary dysplasia; [¥]adjusted for: ventilated status, chorioamnionitis, small for gestational age (SGA); [€]adjusted for: ventilated status, chorioamnionitis, SGA, birthweight, type of delivery; *adjusted for: chorioamnionitis, SGA, birthweight, type of delivery, outborn; N/A: not available (events were low to include in regression model); survival without morbidity defined as survival of infant without moderate-severe BPD, stage 3 or above retinopathy of prematurity, severe brain injury (either grade 3 or 4 intraventricular hemorrhage or intraparenchymal echogenicity), definite necrotizing enterocolitis, and culture positive late-onset sepsis.

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OUTCOMES IN EXTREMELY PREMATURE INFANTS WITH TWIN-TWIN TRANSFUSION SYNDROME TREATED BY LASER THERAPY

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Background:

Twin pregnancies and fetal therapies are associated with increased risk of preterm delivery. Limited literature exists on outcomes for extremely preterm infants born in the context of a pregnancy complicated with twin-twin transfusion syndrome (TTTS).

Objective:

To compare mortality of preterm newborns who received laser therapy for TTTS to preterm controls born in the context of a di-chorionic-diamniotic (di-di) pregnancy. Secondary outcomes are: short-term neonatal morbidities and neurodevelopmental measures at 18 months of corrected gestational age (cGA).

Methods:

Case-control retrospective study of all twins infant born <29 weeks of gestation between 2006 and 2015 at Sainte-Justine Hospital. Preterm with TTTS and fetal laser therapy were compared to preterm di-di twins. Survival analysis was done using Cox proportional regression model.

Results:

Thirthy-three preterms with TTTS (TTTS-laser group) were compared to 101 preterms without TTTS (non-TTTS group). Demographic data and comparisons for short- term morbidities are presented in Table 1. TTTS status was not associated with increased mortality when adjusting for birth weight and antenatal steroids (Hazard Ratio of 1.66, 95% Confidence Interval = 0.77-3.56). Median days at death in the TTTS group was 1.3 days (IQR: 0.9 to 4.4 days) and of 1.2 days (IQR: 0.3-4.4 days) in the non-TTTS group (p=0.67). Odds ratio (OR) for cerebral palsy in the exposed group to TTTS with laser was not significant (OR=2.0, 95% Confidence Interval = 0.4–11.0). No differences were found for Bayley-3rd edition score, cerebral palsy, vision impairment, hearing impairment and growth parameters at 18 month cGA.

Conclusions:

Extremely premature newborns exposed to fetal laser therapy due to TTTS had similar survival and neurodevelopmental outcomes compared to contemporaneous extremely preterm di-di twins.

Table 1: Demographic data and short-term neonatal morbidities

	Non-TTTS (n = 101)	TTTS-Laser (n = 33)	p-value
Gestational age at birth (weeks)	26.9 (1.6)	26.4 (1.4)	0.07
Birth weight (g)	960 (220)	812 (235)	0.95
Small for gestational age (%)	1 (1)	6 (18.2)	**<0.001**
Male (%)	59 (58.4)	19 (58)	0.93
Pre-eclampsia (%)	8 (7.9)	0 (0)	0.10
Antenatal steroids (%)	99 (98)	29 (88)	**0.01**
Caesarean-section (%)	75 (74)	32 (97)	**0.005**
Surfactant use (%)	74 (73)	29 (94)	**0.02**
Necrotizing enterocolitis (%)	9/98 (9)	7/28 (25)	**0.03**
Bronchopulmonary dysplasia (%)	62/84 (74)	20/20 (100)	**0.01**
Intraventricular hemorrhage (grade 3 or 4) (%)	10/98 (10)	6/29 (21)	0.14
Mortality (%)	18 (18)	13 (40)	**0.008**

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PERINATAL OUTREACH EDUCATION IMPROVED THE CARE OF INFANTS WITH HYPOXIC ISCHEMIC ENCEPHALOPATHY (HIE)

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Background:

Southern Alberta Neonatal Transport Services (SANTS) serves a population of 1.8 million. In February 2016, SANTS made outreach education a priority to improve the referral process by enhancing local skills and knowledge. Timely identification of infants with perinatal asphyxia and consideration for therapeutic hypothermia (TH), neuroprotection during stabilization, seizure recognition and management were highlighted.

Objective:

To study the impact of Outreach Education on the care of infants with moderate to severe HIE

Methods:

A retrospective case review of 85 outborn infants referred with moderate to serve HIE between January 2013 and August 2017 was conducted prior to and after outreach education. Age at time of referral to the tertiary care center, initiation of passive cooling, episodes of clinical seizures, use of inotropes and volume expanders, infants eligible for TH who were not cooled and mortality were recorded in the pre and post outreach education periods

Results:

The basic demographics and illness severity were comparable before and after the outreach education (table 1).There was a trend towards earlier referral and initiation of passive cooling in the post outreach education period. The number of patients eligible for TH but not cooled dropped from 25% in the pre to 6% in the post outreach education period (table 2). There was a 69% reduction in mortality, a significant reduction in use of inotropes and anti-seizure therapy (table 3).

Conclusions:

This quality improvement review highlights the impact of outreach education on the referral, clinical care and mortality of outborn infants with suspected[HZ1] hypoxic ischemic encephalopathy. Further studies are required to assess the effect of this intervention on long term outcomes. Perinatal outreach education is an invaluable forum to engage regional care partners and enhance the care of high-risk neonates.

[HZ1]Should we take it out!

Because we are using all referrals, we should leave that in as suspected.

Table 1: Demographics and illness severity

	Outreach Education		
	Before n = 58	After n = 27	P value
Gestational age at birth, mean (SD)	39 (1.64)	39(1.59)	0.561
Birth weight, mean (SD)	3389.5(644.3)	3208(507.8)	0.167
Gender, Male	35	18	0.575
Apgar score at 10 min, Mean (SD)	4.77 (2.73)	5.15(2.35)	0.523
Cord PH, mean (SD)	6.98(0.172)	7.04(0.168)	0.128
Cord Base Excess, mean (SD)	-15.6(7.31)	-13.0(6.94)	0.135
Intubation, N (%)	36 (62%)	12(76%)	0.127

SD = standard deviation

Table 2: Outreach education and therapeutic hypothermia

	Outreach Education		
	Before	After	P value
Eligible and not cooled (%)	25	6	0.015
Time to passive by referral Team (minutes), mean (SD)	154.27(82.733)	92.14(105.948)	0.063
Time to initiation of active cooling, (minutes), mean (SD)	264.15(109.440)	226.17(124.802)	0.329
Time to referral(minutes), mean (SD)	106.7(73.8)	89.5(64.2)	0.32

Table 3: outreach education and sort term clinical outcomes:

	Outreach Education		
	Before n = 58	After n = 27	P value
Mortality, n (%)	7 (12)	1 (3.7)	0.219
Inotropes, n (%)	17 (29)	1 (3.7)	0.007
Anti-seizure medication use, n (%)	29 (50)	6 (22)	0.015
Confirmed seizure by EEG, n (%)	11 (19)	5 (19)	0.941

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TEMPORAL TRENDS IN MORTALITY AND SEVERE MORBIDITY ASSOCIATED WITH ECTOPIC PREGNANCY REQUIRING HOSPITALIZATION.

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Background:

Ectopic pregnancy is the leading cause of maternal death in early pregnancy, however, associated severe morbidity is understudied.

Objective:

To examine temporal trend in severe morbidity associated with hospitalization for ectopic pregnancy.

Methods:

A population-based study including all women hospitalized for ectopic pregnancy in Washington State, 1987-2014. Diagnostic and procedure codes were used to identify ectopic pregnancy and severe morbidity; a composite outcome of severe morbidity/mortality included death, sepsis, need for transfusion, hysterectomy, and systemic or organ failure. Rates of ectopic pregnancy were calculated per number of births per year. Severe morbidity/mortality rates were expressed as incidence rates among women hospitalized for ectopic pregnancy. The Cochran-Armitage test for trend, rate ratios (RR) and 95% confidence intervals (CI) were used to assess statistical significance and magnitude of temporal changes. Logistic regression was used to obtain odds ratios adjusted for demographic factors and chronic conditions (AOR).

Results:

Rates of ectopic pregnancy requiring hospitalization declined from 20.0 in 1987-89 to 3.3 per 1000 births in 2012-14 ($p<0.001$). Mortality rate increased from 0.2 to 3.5 per 1000 hospitalized women $p<.001$). Mortality rate increased from 0.2 to 3.5 per 1000 hospitalized women (RR=17.5, 95% CI 1.6-144.9), and severe morbidity/mortality among hospitalized women increased from 3.9% in 1987-89 to 21.6% in 2012-14 (RR=5.5, 95% CI 4.5-6.9). This represents an 8% average increase in odds of severe morbidity/mortality per year (AOR=1.08, 95% CI 1.07-1.08), adjusted for age, type of health insurance, and chronic comorbidity. The need for transfusion of blood or other blood products was the most common complication (6.1 per 100 hospitalized women). Severe morbidity/mortality increased with age from 8.7% in 15-24 years old to 12.0% in >34 years old hospitalized women ($p<0.001$).

Conclusions:

While the rate of hospitalization for ectopic pregnancy declined between 1987 and 2014, severe morbidity and mortality associated with ectopic pregnancy increased dramatically among hospitalized women.

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THE "DOUBLE PAIN" OF CHILDBIRTH: IMMIGRANT WOMEN'S PREFERENCE FOR FEMALE PROVIDERS

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Background:

Having a male obstetrical provider can be particularly problematic for some immigrant women whose religio-cultural ideals instill a strong preference for female providers.

Objective:

The objective of this study was to gain understanding of the importance and effect of provider gender for immigrant women accessing obstetrical care.

Methods:

A focused ethnography was conducted using purposive and convenience sampling of 38 immigrant women from one hospital in Edmonton, Alberta, Canada. Data collection comprised of semi-structured interviews antenatally (38) and postpartum (21), and observation intrapartum (17). Interviews were audio-recorded and transcribed verbatim. Data was managed by a qualitative data analysis software, and analyzed by thematic analysis.

Results:

Women came from various educational and ethnic backgrounds, but the majority were Muslim (30) and married (36), with a mean age of 27.7 years. All women stated that although they preferred a female, they would accept care from a male provider, as provider competency and desire for a safe birth were most important. A culture of modesty, often interwoven with Islam, informed this preference. Nonetheless, women experienced varying degrees of psychological stress from having received care from a male provider intrapartum, which for a small minority led to considerable, potentially serious consequences.

Conclusions:

As a whole, women are accepting of care from a male provider. However, for a small minority of women, it can be quite detrimental. There is a need to identify those women for whom this is a substantial barrier, so that optimal support can be determined.

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SUBNORMAL BIRTHWEIGHT AND INDUSTRIAL AIR POLLUTANTS – COMPARISON OF SPATIAL-TEMPORAL HOT SPOT PATTERNS

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Background:

Disorders related to short gestation and low birth weight are the 2nd cause of infant death in Canada and have been increasing, especially in Alberta. Individual maternal risks are important but environmental exposures during pregnancy may restrict fetal growth. This contributes to small for gestational age (SGA: < tenth percentile weight for pregnancy duration) and low birth weight at term (LBWT: <2500 grams at ≥37 weeks-gestation).

Objective:

We examined the spatial-temporal patterns of SGA and LBWT with patterns of pollutants around conception, middle trimester, and birth.

Methods:

We aggregated postal code locations of mothers' residences from the 2006-2012 birth registry in to space-time bins to analyze emerging hot spots. We applied the space-time pattern analysis on 70 industrial chemical emissions from the National Pollutant Release Inventory (NPRI) in estimated three month intervals. Then we statistically associated the classified patterns of SGA/ LBWT with the pollutant patterns using the kappa statistic to determine how much the hot spot categories agree. The difference between kappa values indicated which trimester would be more important for which chemical.

Results:

There was an increasing trend for SGA (consecutive hot spots) and for LBWT (sporadic hot spots) in major urban centers. There was an increasing trend for 15 chemicals (varying hot spots). 28 chemical patterns had a kappa index greater than 0.2 with SGA or LBWT patterns. Although there is poor agreement between the space-time patterns, the maximum kappa values occurred mostly with LBWT and around birth.

Conclusions:

Spatial-temporal patterns of chemicals identified in published literature (e.g. particulate matter and gases) agreed more with timing around conception; however, there were additional pollutants identified during the birth trimester. Our research is moving us toward a better understanding of the spatial-temporal link between environment and early health.

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SERUM LEVELS OF ANGIOGENIC FACTORS IN PREECLAMPSIA AND THE HELLP SYNDROME

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Background:

Preeclampsia is a major cause of maternal and neonatal morbidity and mortality worldwide. A severe form of preeclampsia is the HELLP (*H*emolysis, *E*levated *L*iver enzymes, *L*ow *P*latelets) syndrome. Angiogenic factors play a key role in the pathogenesis of preeclampsia. It is unknown if differences in levels of these factors exist in preeclampsia and HELLP syndrome.

Objective:

To estimate levels angiogenic factors in HELLP and preeclampsia.

Methods:

Mothers with preeclampsia and HELLP syndrome were recruited from the Obstetrics floor of the Foothills Hospital in Calgary. Exclusion criteria included chronic hypertension, gestational hypertension, cardiovascular, renal, or endocrine disease and mothers in labor. Placental Growth Factor (PlGF), soluble Vascular Endothelial Growth Factor Receptor (sVEGFR) 1 and 2 were assessed by enzyme-linked immunosorbent assays. Mann-Whitney U and $\chi 2$ tests were used for statistical analysis as appropriate. P-value of <0.05 was considered significant.

Results:

Results

Conclusions:

1. Compared to mothers with preeclampsia, we found lower levels of Placental growth factor (PlGF) in HELLP syndrome.

2. Placental growth factor levels may be used for early detection of HELLP in mothers with preeclampsia.

Variables	HELLP Syndrome N = 35	Preeclampsia N = 40	P-value
Maternal age (yrs)	31 (9)	32 (9)	0.05
Gestational age (wks)	29 (6)	30 (6)	0.10
Systolic blood pressure (mmHg)	147 (27)	154 (28)	0.54
Diastolic blood pressure (mmHg)	98 (13)	97 (16)	0.10
Caucasian N (%)	24 (68)	23 (58)	0.32
Primigravidas N (%)	23 (65)	23 (57)	0.09
Male fetus N (%)	16 (45)	15 (33)	0.72
Body Mass Index	25 (6)	26 (8)	0.53
Platelets x 10^9/L	89 (62)	184 (85)	0.00
Urate (µmol/L)	451 (121)	414 (139)	0.05
sVEGFR-1 (pg/mL)	4224 (2989)	3104 (2164)	0.54
sVEGFR-2 (ng/mL)	6.43 (6.15)	6.6 (6.7)	0.91
PlGF (pg/mL)	30 (16)	95 (37)	0.01

Continuous variables as median and interquartile range.

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IDENTIFICATION AND MANAGEMENT OF MATERNAL EMOTIONAL HEALTH – EVIDENCE-BASED BEST PRACTICES

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Background:

One in four women experience anxiety or depression during their pregnancy, making emotional health issues one of the top three pregnancy complications.

Objective:

The aim of this study was to establish evidence-based best practices for the identification and manaement of maternal emotional health during the perinatal period.

Methods:

A review of the literature was employed in two databases (Pubmed and CINAHL), gray literature, and practice guidelines with key words; matern*, preg*, prenatal, perinatal, postpartum, stress, anxiety, depression, mental health/mental illness/mental disorder, and psycholog*. A total of 87 articles were reviewed.

Results:

Assessing maternal emotional health frequently, minimum twice in both pregnancy and the postpartum period, with the same tools allows the opportunity to note changes over time. Quickly identifying anxiety can be done using the 2-item Generalized Anxiety Disorder Scale (GAD-2). Comprehensive screening for anxiety is warranted when there is a score greater than 3 on the GAD-2. Comprehensive Screening for Anxiety can be done using the Perinatal Anxiety Screening Scale (PASS), a screening tool specifically developed to identify a broad range of anxiety symptoms, without the inclusion of overlapping physiological symptoms commonly associated with pregnancy. Quickly identifying depression can be done using the two Whooley Questions. Comprehensive screening for depression is warranted when there is a positive response to either/both Whooley Questions. Comprehensive Screening for Depression can be done using the Edinburgh Postnatal Depression Scale (EPDS), developed to assist with identification of depression during the pregnancy and postnatal period. Screening results provides a glimpse of the symptoms in that moment and provides suggestions for referrals and interventions that fall into one of four categories: support, psychology, psychiatry, and emergency services.

Conclusions:

Regular emotional health screening is essential during the perinatal period. Screening is critical as it directs interventions that are appropriate, timely, and aimed at reducing anxiety and depression during the perinatal period.

Suggestions for Intervention	EPDS Scores	The PASS Scores
Support (mild anxiety/depression)	8 or less in pregnancy 7 or less in the postpartum period	20 or less
Psychological Intervention (mild to moderate anxiety/depression)	9 and above in pregnancy 8 or 11 in the postpartum period	21-40
Psychiatric Assessment and Intervention (moderate to severe anxiety/depression and/or taking psychotropic medications and considering changing or stopping)	14 and above in pregnancy 12 and above in the postpartum period	41 and above
Emergency Psychiatric Services	Actively suicidal or at risk for harming baby	Actively suicidal or at risk for harming baby
	any answer other than 'never' on the 10th question of the EPDs requires further investigation of plan, intent to act on plan, and impulsivity to act on plan or new or persistent expression of incompetency as a mother or estrangement from the infant	

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IMPLEMENTATION OF NEONATAL NEURO-CRITICAL CARE (NNCC) PROGRAM ASSOCIATED WITH IMPROVED SHORT TERM OUTCOMES IN NEONATES WITH MODERATE TO SEVERE HYPOXIC ISCHEMIC ENCEPHALOPATHY (HIE)

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Background:

Despite advances in neonatal care and therapeutic hypothermia, neonates with moderate to severe Hypoxic Ischemic Encephalopathy (HIE) are still at high risk for increased rates of mortality and morbidity.

Objective:

The purpose of this report is to demonstrate how a dedicated Neonatal Neuro Critical Care (NNCC) team can improve care through management pathways, improved communication, and implementation of quality improvement projects.

Methods:

A retrospective cohort study on term and near term neonates admitted with the diagnosis of moderate to serve HIE was conducted between July 1st 2008 and May 31st 2017. The primary outcome was a composite of death and/or brain MRI findings consistent with HIE. Secondary outcomes were: death, brain injury on MRI, rate of cooling in eligible neonates, length of hospital stay, use and burden of anti-seizure medications, and use of inotropes. A regression analysis was done adjusting for gestational age, birth weight, gender, out-born status, Apgar score at 10 minutes, cord blood pH, and HIE clinical staging.

Results:

A total of 198 neonates with HIE were included, 109 before NNCC implementation, and 89 thereafter. Having a NNCC program resulted in a significant reduction in the composite outcome of death or brain injury after adjusting for the confounding factors (AOR: 0.48, CI: 0.25-0.92, p=0.027), HIE changes on MRI (AOR: 0.37, CI: 0.19-0.74, p=0.005). The NNCC program also resulted in a decreased average length of stay of 4.6 days per infant (p=0.085), an 26% increased cooling rate in eligible neonates (p=0.001), a decreased anti-seizure medication burden (P value: 0.001), and a 26% reduction in inotrope use (p=0.051).

Conclusions:

Implementation of NNCC program further decreased mortality and brain injury, shortened the length of hospital stay and improved care in neonates with moderate to severe HIE.

Table 1: short term outcomes before and after NNCC program

	Before NNCC N=109	After NNCC N=89	P value
Eligible and received therapeutic hypothermia, N (%)	80 (73%)	82 (92%)	0.001
Electrographic seizures	24 (22%)	30 (34%)	0.91
Cumulative burden of anti-seizure medication, mg/kg/hospital stay, mean (SD)	66.38 (128.63)	14.74(43.01)	0.001
Inotropes use in the first 72 hours, N (%)	58(53%)	35(39%)	0.051
Length of hospital stay, mean (SD)	16.83(22.01)	12.20(13.37)	0.085
Mortality, N (%)	16(14.6%)	7(7.8%)	0.13
Death or any HIE abnormality on MRI, N(%)	68(62%)	43(48%)	0.039
HIE abnormality on MRI, N (%)	54 (49.5%)	30(33.7%)	0.011

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MATERNAL NUTRIENT RESTRICTION CAUSES NEUROINFLAMMATION AND UPREGULATES AMYLOID RELATED PROTEINS IN GUINEA PIG OFFSPRING BORN GROWTH RESTRICTED

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Background:

Fetal growth restriction (FGR) has been linked to later life neural abnormalities including cognitive impairment, learning disorders, and possibly Alzheimer's disease (AD). Neuroinflammation may be contributory given evidence for systemic inflammation in FGR offspring and the interplay between neuroinflammation and β-amyloid (Aβ) accumulation in Alzheimer's pathology.

Objective:

In this study, we investigated whether maternal nutrient restriction (MNR) in guinea pigs leading to FGR causes neuroinflammation and amyloid precursor protein (APP)/Aβ upregulation during early adult life as precursors to neurodegenerative change.

Methods:

Guinea pig sows were fed ad libitum (Control) or 70% of the control diet pre-pregnancy, increasing to 90% at mid-gestation (MNR). Control newborns >95 g (appropriate for gestational age or AGA, N=18) and MNR newborns <85 g (FGR, N=16) were fed ad libitum from weaning until necropsy as young adults. Brains were weighed and processed for immunohistochemistry to quantify microglia using anti-Iba1, and Aβ and APP expression using anti-Aβ, in 6 brain regions. Two-tailed unpaired t-tests were performed to compare between the animal groups.

Results:

While FGR-MNR animals were ~27% smaller than the AGA-Controls at birth ($p<0.001$), body and brain weights did not differ between the two groups at necropsy. Additionally, whereas microglia quantity in the grey matter, thalamus, white matter and CA1 brain regions did not vary between the two groups, FGR-MNR animals had ~39% and ~29% more Iba1 positive cells/mm^2 in areas CA3 ($p<0.001$) and dentate gyrus ($p<0.05$), respectively. Similarly, the APP/Aß percent area stained was increased in FGR-MNR offspring by ~2.7, ~4.4 and ~4 fold in regions CA3 ($p<0.05$), dentate gyrus ($p<0.05$) and thalamus ($p<0.001$), respectively. Notably, no Aß plaques were observed.

Conclusions:

FGR-MNR offspring as young adults exhibit neuroinflammation and increased APP/Aβ expression in hippocampal brain regions. Both events mediate neurodegeneration implicating FGR as a risk factor for AD.

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PRE-PREGNANCY DIETARY PATTERNS AND ASSOCIATIONS WITH SOCIO-DEMOGRAPHIC CHARACTERISTICS AND PREGNANCY COMPLICATIONS IN THE ALBERTA PREGNANCY OUTCOMES AND NUTRTION (APRON) STUDY

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Background:

Few studies have explored diet prior to pregnancy and associations with the risk of developing pregnancy complications.

Objective:

The objectives of this study were to: (i) derive pre-pregnancy dietary patterns for women enrolled in a prospective cohort (APrON) in Alberta and (ii) describe associations between diet patterns with socio-demographics and pregnancy complications including gestational hypertension and diabetes.

Methods:

Upon enrolment into the APrON study, women (n=1545) completed a 142-item food frequency questionnaire (FFQ) to assess frequency of foods and beverages consumed `prior to pregnancy'. Dietary patterns were derived using principal components analysis. Scores were calculated to represent women's compliance with each dietary pattern retained. These scores were expressed as z-scores.

Results:

Four patterns were retained which, combined, accounted for 22.9% of the total variation in diet. The four patterns and the foods that characterize them are displayed in Table 1. Higher `Healthy-Eating' scores were associated with higher levels of education (β0.15; P<0.001) or higher physical activity from sport (β0.07; P0.045), whereas women who were obese were more likely to have lower healthy-eating scores (β-0.21; P=0.024). Women with higher `Meat and Refined Carbohydrate' scores were more likely to have lower levels of education (β-0.08; P=0.001). Women with higher `Beans, Cheese and Salad' scores were more likely to have higher household incomes (β0.08; P=0.04) or be more physically active (β0.05; P=0.025). Finally women with higher 'Tea and Coffee' scores were more likely to be older (β 0.02; P=0.01) or be more physically active at work (β 0.08; P=0.049). Women with higher 'Healthy-eating' pattern scores were less likely to develop gestational hypertension (OR:0.56 P=0.004), independent of pre-pregnancy BMI and other confounders.

Conclusions:

Our results suggest that consuming a diet characterised by more frequent intakes of vegetables, fruit, fish, oils and wholegrains prior to pregnancy could protect against the development of complications such as gestational hypertension.

Table 1 showing the four retained dietary patterns and the food groups associated with each pattern (coefficients ≥0.2)

'Healthy' pattern		**'Meat and refined carbohydrate' pattern**		**'Cheese, beans and salad' pattern**		**'Tea and coffee' pattern**	
Food group	Coefficient	Food group	Coefficient	Food group	Coefficient	Food group	Coefficient
Green vegetables	0.37	Red meat	0.38	Beans and pulses	0.48	Reduced-fat milk	0.47
Other vegetables	0.37	Processed meat	0.3	Cheese/ cheese sauce	0.47	Tea	0.39
Fruit (excluding juice)	0.34	Roast potatoes	0.30	Salad	0.47	Decaf tea	0.38
Orange vegetables	0.30	White bread	0.26			Coffee	0.33
Oils	0.28	Boiled potatoes	0.21			Added sugar	0.27
Brown pasta/rice	0.23					Cream	0.27
Fish	0.22					Full-fat milk	0.26
Tomatoes	0.20					Decaf coffee	0.23

Poster 264

IMPROVED RATE OF FETAL DIAGNOSIS OF COARCTATION OF THE AORTA IN ALBERTA. A POPULATION -LEVEL STUDY.

Luke Eckersley, University of Alberta Fetal and Neonatal Cardiology Unit; **Mehdi Houshmandi**, University of Alberta Fetal and Neonatal Cardiology Unit; **Winnie Savard**, University of Alberta Fetal and Neonatal Cardiology Unit; **Deborah Fruitman**, Alberta Children's Hospital Pediatric Cardiology; **Lisa K Hornberger**, University of Alberta Fetal and Neonatal Cardiology Unit

Background:

Coarctation of the aorta (CoA) is one of the most difficult congenital cardiac lesions to detect in the fetus, and late diagnosis is associated with elevated morbidity and mortality. Since 2007 several important updates in obstetric ultrasound guidelines have been implemented that mandate evaluation of the ventricular outflow tracts and encourage views of the great arteries and arches. We hypothesized that fetal CoA detection is currently higher than reported previously.

Objective:

To identify at population-level the rate of fetal diagnosis of CoA and any unappreciated early mortality.

Methods:

We conducted a population-based retrospective analysis of cases of simple coarctation of the aorta managed in Alberta with births between 2004 and 2015. Using medical record and echocardiographic review we established fetal diagnosis, requirement for and timing of operation. Data on cases of CoA reported to the Alberta Congenital Anomalies Surveillance System (ACASS) were also analysed to identify if critical CoA was associated with deaths prior to contact with the cardiology service.

Results:

A total of 167 cases of CoA were repaired in the first year of life; 59 had a fetal diagnosis and 105 were diagnosed after birth. Fetal diagnostic rate was 30% in 2004-2007, 26% in 2008-2011 and 49% in 2012-2015. In three early cases we could not identify timing. An additional 20 unoperated cases were identified through ACASS as mortalities at less than one year with CoA. Of these, 11 had additional malformations or syndromes and 9 were isolated cases. Three isolated cases were identified with death at less than two months of age, possibly secondary to critical CoA.

Conclusions:

Fetal diagnosis of CoA has improved to include half of all cases requiring infant operation. Additional cases associated with mortality were predominantly attributable to co-morbidities, however 1-2% of cases may only receive a perimortem or post-mortem diagnosis if undetected on fetal screening.

Poster 265

NON-COMMUNICABLE DISEASES AND THE RISK OF HYPERTENSIVE DISORDERS OF PREGNANCY

Howard Berger, St. Michael's Hospital; **Nir Melamed**, Sunnybrook Health Sciences Centre; **Beth Murray-Davis**, McMaster University; **Haroon Hasan**, BORN Ontario; **Karizma Mawjee**, St. Michael's Hospital; **Joel G. Ray**, St. Michael's Hospital; **Michael Geary**, St. Michael's Hospital; **Jon Barrett**, Sunnybrook Health Sciences Centre; **Sarah D. McDonald**, McMaster University

Background:

The non-communicable diseases of pregnancy, mainly pre-existing Diabetes (D), Obesity (O) and Hypertension (H) are associated with hypertensive disorders of pregnancy (HDP), which have a long-term impact on maternal-fetal health.

Objective:

Our objective was to determine the relationship between D-O-H, alone, and in combination, and HDP.

Methods:

This population-based cohort study comprised singleton hospital births at > 20 weeks' gestation in Ontario, Canada from 2012-2016, using data from the Better Outcomes Registry & Network (BORN). Rates of preeclampsia (PE), PE < 32 weeks and gestational hypertension (GH) (for D and O) were calculated according to various combinations of D-O-H. Multivariable Poisson regression with robust error variance was used to calculate crude and adjusted relative risks (RR) and 95% confidence intervals (CIs). Population attributable fractions (PAF) and 95% CIs for PTB were also calculated, to estimate the proportion of HDP that could be potentially prevented if D, O and/or H were hypothetically eliminated.

Results:

Of 497,535 singleton deliveries > 20 weeks, 94,009 (18.89%) had D, O or H. HDP complicated 21,823 pregnancies, with 9597 (44.0%) occurring in the DOH group. The risk of HDP was significantly higher in women with D-O-H than in those without, with the highest risk found in H (aRR=47.55; 44.23-51.12) and DOH combined (aRR=65.11; 56.82-74.6). Amongst the individual components of DOH, the risk of PE was highest in H (aRR=47.55; .81; 44.23 – 51.12) and D (aRR=4.69; 3.79-5.8) and lowest in O (aRR=2.13; 1.98-2.28). For PE < 32 weeks, D was not associated with increased risk but O and H retained significance (Fig. 1). D-O-H, in any combination, had a PAF of 35.36% (34.61-36.1) for all HDP, and an even higher PAF of 42.75% (41.21-44.24) for PE.

Conclusions:

Pre-pregnancy DO-H significantly increases the risk of HDP and disproportionately contributes to hypertensive morbidity in pregnancy.

Table 1: Age-adjusted Relative Risk for Hypertensive Disorders in Pregnancies with Pre-existing Diabetes, Obesity and Hypertension in Ontario

	Adjusted Relative Risk (95% CI)^					
Outomes	Diabetes (D) (n = 2,872)	Obesity (O) (n = 83,628)	Hypertension (H) (n = 2,656)	DOH (AND) (n = 349)	DOH (OR) (n=94,0009)	NO DOH (n=403,526)
Hypertensive disorders	3.11 (2.77-3.49)	3.02 (2.94-3.11)	47.55 (44.23-51.12)	65.11 (56.82-74.6)	3.51(3.42-3.60)	0.24 (0.24-0.25)
Preeclampsia	4.69 (3.79-5.8)	2.13 (1.98-2.28)	47.55 (44.23-51.12)	65.11 (56.82-74.6)	5.09 (4.83-5.36)	0.2 (0.19-0.21)
Preeclampsia <32 weeks	1.33 (0.33-5.33)	2.28 (1.77-2.92)	55.43 (42.22-72.77)	30 (13.3-67.67)	4.99 (4.14-6.01)	0.2 (0.17-0.24)
Gestational Hypertension	2.69 (2.34-3.1)	3.27 (3.17-3.37)	N/A	N/A	3.08 (2.98-3.18)	0.26 (0.25-0.27)

* Singleton pregnancies with a hospital birth > 20 weeks gestation and had BMI available.
^ Adjusted for maternal age and parity
N/A Not Applicable

Poster 266

THE IMPACT OF PRE-PREGNANCY DIABETES, OBESITY AND HYPERTENSION ON PRETERM BIRTH

Howard Berger, St. Michael's Hospital; **Nir Melamed**, Sunnybrook Health Sciences Centre; **Beth Murray-Davis**, McMaster University; **Haroon Hasan**, BORN Ontario; **Karizma Mawjee**, St. Michael's Hospital; **Joel G Ray**, St. Michael's Hospital; **Michael Geary**, St. Michael's Hospital; **Jon Barrett**, Sunnybrook Health Sciences Centre; **Sarah D McDonald**, McMaster University

Background:

The non-communicable diseases of pregnancy, mainly pre-existing Diabetes (D), Obesity (O) and Hypertension (H), significantly impact perinatal outcomes and have a long-term impact on maternal-fetal health.

Objective:

Our objective was to determine the relationship between D-O-H, alone and in combination, and preterm birth (PTB) at <32 and <37 weeks' gestation.

Methods:

This population-based cohort study comprised all singleton hospital births at > 20 weeks' gestation in Ontario, Canada, using data from the Better Outcomes Registry & Network (BORN) from 2012-2016. Rates of spontaneous (sPTB) and provider-initiated (piPTB) PTB were calculated according to various combinations of D-O-H. Multivariable Poisson regression with robust error variance was used to calculate crude and adjusted relative risks (RR) and 95% confidence intervals (CIs). Population attributable fractions (PAF) and 95% CIs for PTB were also calculated, to estimate the proportion of PTB that could be potentially prevented if D, O and/or H were hypothetically eliminated.

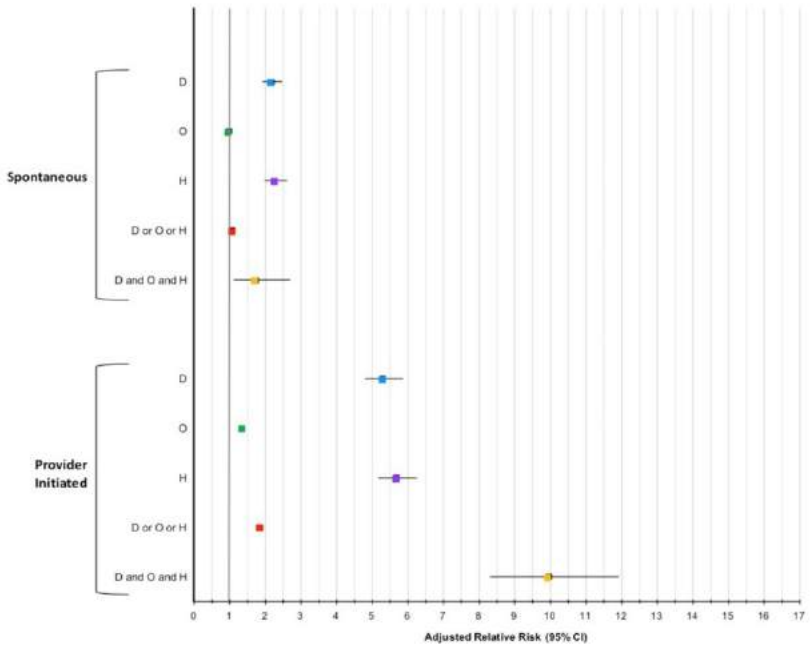
Results:

Of 497,535 singleton deliveries >20 weeks, 94,009 (18.89%) had pre-existing diabetes, obesity or hypertension (DOH) in isolation or combined. There were 30,151 preterm births <37 weeks, 7379 (24.47%) of which occurred in the DOH group. The risk of sPTB and PiPTB <37 weeks was higher in women with D-O-H compared to those without, especially with all three together (Fig. 1 and 2). Amongst the individual components of DOH the risk of PTB <37 weeks was highest in H (aRR-3.81; 3.55-4.1) and D (aRR=3.51; 3.26-3.78) and lowest in O (aRR-1.14; 1.1-1.17). For PTB <32 weeks, the RRs were even more pronounced, notably for women with H. D-O-H, in any combination, had a PAF of 7.0% (95% CI 6.3-7.7) for all PTB <37 weeks, and a PAF of 12.0% (95% CI 10.0-13.9) for PTB < 32 weeks.

Conclusions:

Pre-pregnancy D-O-H significantly increases the risk of sPTB and piPTB, especially PTB at < 32 weeks' gestation.

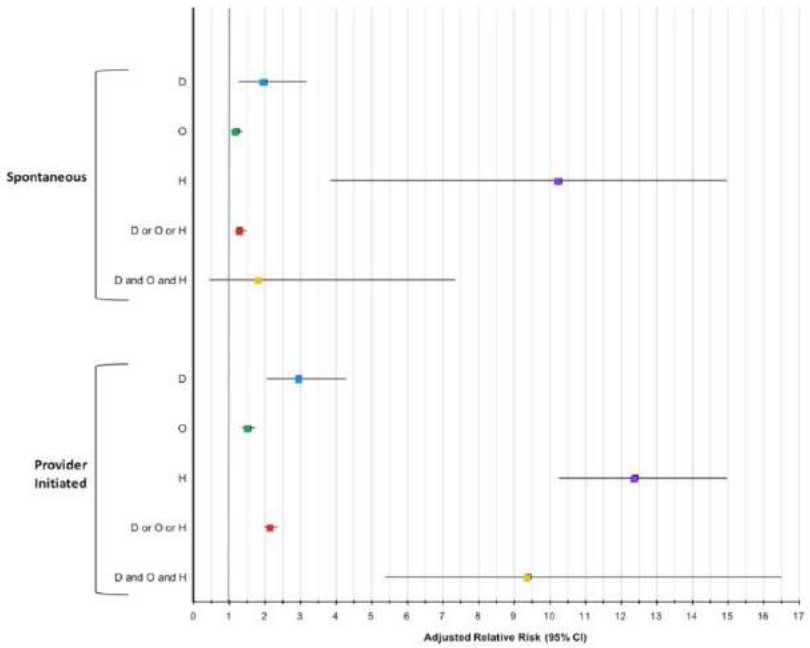
Figure 1. Preterm Delivery 24 to <37 weeks



	Total No. of pregnancies	No. of pregnancies affected	Event Rate (%)
Spontaneous D	2,872	204	7.10
Spontaneous O	83,628	2,735	3.27
Spontaneous H	2,656	193	7.27
Spontaneous D or O or H	94,009	3,392	3.61
Spontaneous D and O and H	349	19	5.44
Provider Initiated D	2,872	362	12.60
Provider Initiated O	83,628	2,523	3.02
Provider Initiated H	2,656	386	14.53
Provider Initiated D or O or H	94,009	3,920	4.17
Provider Initiated D and O and H	349	91	26.07

* Adjusted for maternal age and parity

Figure 2. Preterm Delivery 24 to <32 weeks



	Total No. of pregnancies	No. of pregnancies affected	Event Rate (%)
Spontaneous D	2,872	18	0.63
Spontaneous O	83,628	314	0.38
Spontaneous H	2,656	21	0.79
Spontaneous D or O or H	94,009	382	0.41
Spontaneous D and O and H	349	<6	1.72
Provider Initiated D	2,872	29	1.01
Provider Initiated O	83,628	413	0.49
Provider Initiated H	2,656	117	4.41
Provider Initiated D or O or H	94,009	658	0.70
Provider Initiated D and O and H	349	12	3.44

* Adjusted for maternal age and parity

Poster 267

THE ASSOCIATION BETWEEN HYPERTENSIVE DISORDERS OF PREGNANCY AND BIRTHWEIGHT IN TWINS: THE IMPORTANCE OF USING TWIN-BASED GROWTH CURVES

Leslie K Proctor, Division of Maternal-Fetal Medicine, Sunnybrook Health Sciences Centre, University of Toronto, Ontario, Canada; **Julia Kfouri**, Division of Maternal-Fetal Medicine, Sunnybrook Health Sciences Centre, University of Toronto, Ontario, Canada; **Jon Barrett**, Division of Maternal-Fetal Medicine, Sunnybrook Health Sciences Centre, University of Toronto, Ontario, Canada; **Nir Melamed**, Division of Maternal-Fetal Medicine, Sunnybrook Health Sciences Centre, University of Toronto, Ontario, Canada

Background:

Hypertensive disorders of pregnancy (HDP) are associated with fetal growth restriction (FGR) in singleton pregnancies, an association that may be attributed to abnormal placentation as the shared etiology between these conditions. Given that the pathogenesis of HDP in twin pregnancies may involve mechanisms other than abnormal placentation, it is unclear whether a similar association between HDP and FGR is present in twins. Available data regarding this latter question are conflicting.

Objective:

We aimed to describe the association between HDP and small-for-gestational-age (SGA) in twins compared to singletons using appropriate birthweight reference.

Methods:

This was a retrospective study of all women with twin or singleton pregnancies followed in a single tertiary centre during 2003-2015. SGA was defined as birthweight <10th percentile for gestational age and sex based on either singleton- or twin-based references. The association of HDP with SGA was compared between twins and singletons, and was adjusted for potential confounding variables.

Results:

A total of 49,139 singleton and 2,232 twin pregnancies were included. The rate of HDP was higher for twins than singletons (10.7% vs 4.1%, p<0.001). The association of HDP with SGA was stronger among singletons than among twins when SGA was defined using a singleton-based reference (Singletons: 8.9% vs. 3.7%, p<0.001, aOR=2.27 [95%-CI 2.00-2.58]; Twins: 12.6% vs. 9.7%, p=0.038, aOR=1.37 [95%-CI 1.03-1.83], respectively) (Table). However, when a twins-based reference was used to define SGA in the twins group, the association of HDP with SGA among twins (19.3% vs. 9.5%, p<0.001, aOR 2.33 [95% CI 1.64-3.33]) was similar to that observed in singletons (Table).

Conclusions:

The association of HDP with SGA in twin pregnancies is similar in magnitude to that observed in singletons.

Poster 268

EVIDENCE-BASED STRATEGIES FOR INCREASING ENGAGEMENT AND RECRUITMENT OF MALES IN MENTAL HEALTH RESEARCH – SYSTEMATIC LITERATURE REVIEW

Katherine S Bright, University of Calgary; **Muhammad Kashif Mughal**, University of Calgary; **Abdul Wajid**, University of Calgary; **Elyse Mireille Lecharrois**, University of Calgary; **Karly Jarema**, University of Calgary; **Dawn Kingston**, University of Calgary

Background:

Males are less likely to seek help or engage in mental health research. Understanding barriers and facilitators for males participating in mental health studies is the critical link between developing strategies for recruiting males in mental health research.

Objective:

The aim of this study was to develop evidence-based strategies for improving recruitment of males in mental health research.

Methods:

A search of the literature was employed in two databases (Pubmed and CINAHL) with key words; male*, men, mental health/ mental illness/mental disorder, psycholog*, barriers, facilitators, recruiting, and research. One hundred and thirty-eight articles were generated. Of the 138, articles without evidence-based finding were excluded, yielding a final number of 56 articles.

Results:

The four main strategies for recruitment that emerged from the literature. were: evolving masculinity ideology; overcoming self-stigma; strength-based approach; and careful use of language. Masculine ideology and stigma are reported as significant barriers to involvement in mental health research and interventions. Changing masculinity ideology and stigma requires significant time and collaboration with all members of society. A strength-based approach to masculinity ideology distinguishes healthy forms of masculinity from harmful ones in the moment. Working with healthy forms of masculinity and building upon the strengths of 'being a man' helps to restore a sense of pride. Strength-based approaches may resonate better with men than an emotion-based and symptom-reduction approach to mental health research and interventions. Strength-based discussions support the strengths associated with some aspects of traditional masculinity including the roles of partner, provider, and protector. Recruiting men for mental health research requires careful consideration of the use of language to describe experiences of mental health symptoms and interventions.

Conclusions:

Increasing recruitment of males in mental health research requires normalizing mental health challenges in males, using language that is acceptable to men, and focusing on strength-based approaches to masculinity in recruitment scripts, studies, and interventions.

Poster 269

CEREBRAL NEAR INFRARED SPECTROSCOPY (NIRS) AND PREDUCTAL PERIPHERAL OXIMETRY IN EXTREMELY PRETERM INFANTS WITH PULMONARY AND/OR CEREBRAL INTRAVENTRICULAR HEMORRHAGE IN THE FIRST 72 HOURS OF LIFE

Mathieu Dehaes, Université de Montréal and CHU Sainte-Justine; **Thierry P Beausoleil**, Université de Montréal and CHU Sainte-Justine; **Marie Janaillac**, Université de Montréal and CHU Sainte-Justine; **Keith J Barrington**, Université de Montréal and CHU Sainte-Justine; **Marie-Josée Raboisson**, Université de Montréal and CHU Sainte-Justine; **Oliver Karam**, Geneva University Hospital; **Anie Lapointe**, Université de Montréal and CHU Sainte-Justine

Background:

Extremely premature infants born <28 weeks of gestation are at higher risk of pulmonary (PH) and cerebral intraventricular (IVH) hemorrhage due to immature cardiovascular and transitioning physiology. Non-invasive monitoring has the potential to detect early abnormal circulation.

Objective:

To explore time-frequency relationships between cerebral oxygenation and peripheral oximetry.

Methods:

Near infrared spectroscopy cerebral regional haemoglobin oxygen saturation ($CrSO_2$), preductal peripheral perfusion index (*PI*), heart rate (*HR*), capillary oxygen saturation (SpO_2), and blood pressure (*BP*) were monitored in the first 72h of life. Patients were grouped in infants with PH and/or IVH (n=8) and controls (n=10). Signals were decomposed in wavelets allowing the analysis of localized variations of power. This approach allowed to quantify the common power and determine the duration of significant cross-correlation, phase and coherence between any pair of signals. Patient groups were compared with Wilcoxon tests.

Results:

Figure 1 shows an example of $CrSO_2$ and *PI,* and their cross-correlation, phase (semblance) and coherence in a control (left column) and a PH-IVH patient (right column). Durations of significant cross-correlation between $CrSO_2$ and *HR* (p<0.01), and $CrSO_2$ and SpO_2 (p=0.02) were significantly lower in PH-IVH infants compared to controls. The duration of significant anti-phase between $CrSO_2$ and SpO_2 (p=0.01) and the duration of significant coherence between *PI* and *BP* (p=0.03) were also significantly lower in PH-IVH infants compared to controls. These differences may indicate a disruption in auto-regulation, which is currently incompletely understood in this population.

Conclusions:

This study is the first to apply time-frequency analysis to simultaneous $CrSO_2$ and preductal peripheral oximetry in extremely preterm infants early in life. Significantly lower durations of cross-correlation ($CrSO_2$ with *HR* and SpO_2), anti-phase ($CrSO_2$, SpO_2) and coherence (*PI, BP*) in PH-IVH patients may reflect early abnormal circulation. Our results show the potential of non-invasive monitoring to identify premature infants at-risk of early PH-IVH.

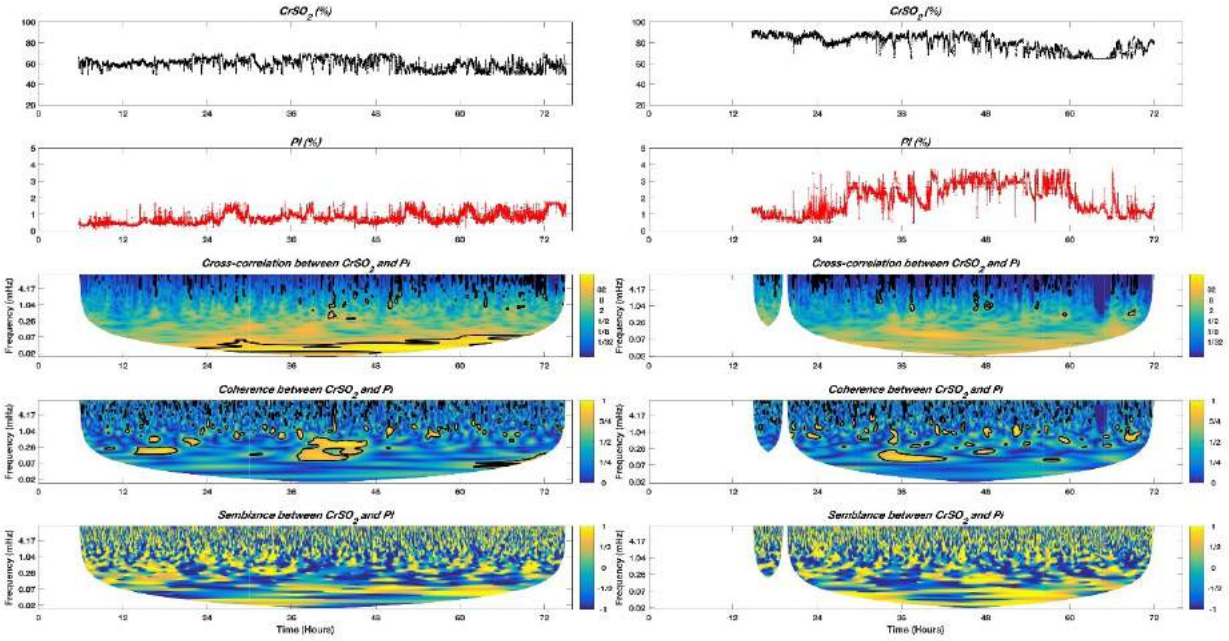


Figure 1. From top to bottom: example of temporal cerebral regional haemoglobin oxygen saturation ($CrSO_2$), preductal peripheral perfusion index (PI), and their cross-correlation, semblance (phase) and coherence in a healthy control (left column) and in an infant with pulmonary and/or cerebral intraventricular hemorrhage (right column). Regions of significant cross-correlation, coherence and semblance are delimented by a black bold contour.

Poster 270

IDENTIFICATION AND MANAGEMENT OF MATERNAL EMOTIONAL HEALTH – EVIDENCE-BASED BEST PRACTICES

Katherine S Bright, University of Calgary; **Gisela Becker**, Newfoundland and Labrador Provincial Midwifery Consultant

Background:

One in four women experience anxiety or depression during their pregnancy, making emotional health issues one of the top three pregnancy complications.

Objective:

The aim of this study was to establish evidence-based best practices for the identification and management of maternal emotional health during the perinatal period.

Methods:

A review of the literature was employed in two databases (Pubmed and CINAHL), gray literature, and practice guidelines with key words; matern*, preg*, prenatal, perinatal, postpartum, stress, anxiety, depression, mental health/mental illness/mental disorder, and psycholog*. A total of 87 articles were reviewed.

Results:

Assessing maternal emotional health frequently, minimum twice in both pregnancy and the postpartum period, with the same tools allows the opportunity to note changes over time. Quickly identifying anxiety can be done using the 2-item Generalized Anxiety Disorder Scale (GAD-2). Comprehensive screening for anxiety is warranted when there is a score greater than 3 on the GAD-2. Comprehensive Screening for Anxiety can be done using the Perinatal Anxiety Screening Scale (PASS), a screening tool specifically developed to identify a broad range of anxiety symptoms, without the inclusion of overlapping physiological symptoms commonly associated with pregnancy. Quickly identifying depression can be done using the two Whooley Questions. Comprehensive screening for depression is warranted when there is a positive response to either/both Whooley Questions. Comprehensive Screening for Depression can be done using the Edinburgh Postnatal Depression Scale (EPDS), developed to assist with identification of depression during the pregnancy and postnatal period. Screening results provides a glimpse of the symptoms in that moment and provides suggestions for referrals and interventions that fall into one of four categories: support, psychology, psychiatry, and emergency services.

Conclusions:

Regular emotional health screening is essential during the perinatal period. Screening is critical as it directs interventions that are appropriate, timely, and aimed at reducing anxiety and depression during the perinatal period.

Title: Identification and Management of Maternal Emotional Health – Evidence-based Best Practices

Authors and Affiliations: Katherine Bright RN, BSc, MN, Doctoral Candidate[1], Gisela Becker, RM, MA[2]

[1]University of Calgary, Faculty of Nursing, Calgary, AB.

[2]Newfoundland and Labrador Provincial Midwifery Consultant

300 words **(currently at 300 words)**

Introduction: One in four women experience anxiety or depression during their pregnancy, making emotional health issues one of the top three pregnancy complications. The aim of this study was to establish evidence-based best practices for the identification and management of maternal emotional health during pregnancy and the postpartum period. **(48 words)**

Methods: A review of the literature was employed in two databases (Pubmed and CINAHL), gray literature, and practice guidelines with key words; matern*, preg*, prenatal, perinatal, postpartum, stress, anxiety, depression, mental health/mental illness/mental disorder, and psycholog*. A final number of 87 articles were reviewed and synthesized. **(46 Words)**

Results:

Assessing maternal emotional health frequently, twice in both pregnancy and the postpartum period, with the same tools allows the opportunity to note changes over time.

Quickly identifying anxiety can be done using the 2-item Generalized Anxiety Disorder Scale (GAD-2). Comprehensive screening for anxiety is warranted when there is a score greater than 3 on the GAD-2. Comprehensive Screening for Anxiety can be done using the Perinatal Anxiety Screening Scale (PASS), a screening tool specifically developed to identify a broad range of anxiety symptoms, without the inclusion of overlapping physiological symptoms commonly associated with pregnancy.

Quickly identifying depression can be done using the two Whooley Questions. Comprehensive screening for depression is warranted when there is a positive response to either/both Whooley Questions. Comprehensive Screening for Depression can be done using the Edinburgh Postnatal Depression Scale (EPDS), developed to assist with identification of depression during the pregnancy and postnatal period.

Screening results provides a glimpse of the symptoms in that moment and provides suggestions for referrals and interventions that fall into one of four categories: support, psychology, psychiatry, and emergency services.

(179 words)

Conclusion: Regular emotional health screening is essential during the perinatal period. Screening directions intervention to the most appropriate and timely resources aimed at reducing these symptoms are essential. **(27 words)**

Suggestions for Intervention	EPDS Scores	The PASS Scores
Support (mild anxiety/depression)	8 or less in pregnancy 7 or less in the postpartum period	20 or less
Psychological Intervention (mild to moderate anxiety/depression)	9 and above in pregnancy 8 or 11 in the postpartum period	21-40
Psychiatric Assessment and Intervention (moderate to severe anxiety/depression and/or taking psychotropic medications and considering changing or stopping)	14 and above in pregnancy 12 and above in the postpartum period	41 and above
Emergency Psychiatric Services	Actively suicidal or at risk for harming baby	Actively suicidal or at risk for harming baby
	any answer other than never on the 10th question of the EPDs requires further investigation of plan, intent to act on plan, and impulsivity to act on plan or new or persistent expression of incompetency as a mother or estrangement from the infant	

Poster 272

NEONATAL FOLLOW-UP IN CANADA. A NATIONAL SURVEY

Fawaz Albaghli, BC Women's Hospital; **Alberta Girardi**, Capilano University; **Paige Church**, Sunnybrook Hospital; **Marilyn Ballantyne**, Holland Bloorview Hospital; **Anne Synnes**, BC Women's Hospital

Background:

Previous Canadian surveys showed a large variability in neonatal follow-up (NFU) practices. The Canadian Neonatal Follow-Up Network (CNFUN) implemented standardized neurodevelopmental assessments in 2008 and the effect on NFU practices is unknown.

Objective:

The objective is to describe the current status of Canadian NFU services and compare to a 2006 survey. We hypothesize that CNFUN increased 18 and 36 month visits, use of the Bayley-III and recruitment for < 29 weeks gestation.

Methods:

All 26 Canadian Level-III NFUs were invited to participate in this comprehensive online survey. Questions were based on previous surveys, current literature and expert opinions. Proportions were compared using chi square, p value < 0.006 adjusted for multiple comparisons.

Results:

23/26 (88%) of NFUs completed the survey in 2017 and 19 in 2006. *Scope of service:* All NFU programs provided neurodevelopmental screening and referral for intervention. Data collection, training and education were provided by >80% and therapeutic interventions by >50%. *Type of Assessments:* The use of Bayley-III cognitive and motor testing increased significantly. For other standardized assessments large variations persist. *NFU Schedule of assessments:* 18 month visit increased from 84% to 91% p=0.48 and 36 month visit from 73% to 83% p=0.48. *Eligibility Criteria:* Since 2006, *t*he gestational age < 29 weeks criteria increased from 26% to 65% p=0.01, neonatal stroke increased from 1 site (5%) to 20 (87%) p < 0.00001, congenital diaphragmatic hernia from 21% to 65% p =0.004 and fetal diagnostics / therapies from 5% to 52%, p=0.001.

Conclusions:

After CNFUN, use of the Bayley-III increased significantly, 18 month visits are now routine in 91 % (a nonsignificant increase), but standardization for < 29 weeks gestational age didn't improve significantly. Non-preterm eligibility criteria increased dramatically. Marked variability in NFU practices persist. Standardized NFU may facilitate multi-centered research, site benchmarking, and continuity of care for families who move.

	2006	2017	P-Value
Schedule			
18 months Follow-up	16/19 (84%)	21/23 (91%)	0.48
3 years Follow-up	14/19 (73%)	19/23 (83%)	0.48
Standardized Assessments			
Bayley – III Cognitive Scale	4/19 (21%)	19/23 (83%)	0.0001
Bayley – III Motor Scale	4/19 (21%)	17/23 (74%)	0.001
Eligibility Criteria			
<29 wks GA	5/19 (26%)	15/23 (65%)	0.01
Neonatal Stroke	1/19 (5%)	20/23 (87%)	<.00001
Congenital Diaphragmatic Hernia	4/19 (21%)	15/23 (65%)	0.004
Fetal diagnosis & Therapies	1/19 (5%)	12/23 (52%)	0.001

Poster 273

BEWO CELLS MIGHT NOT ACCURATELY MODEL EFFECTS OF TNF-α ON SPHINGOSINE 1-PHOSPHATE RECEPTOR 2 (S1PR2) EXPRESSION IN HUMAN TROPHOBLASTS

Yuliya Fakhr, University of Alberta, Faculty of Medicine and Dentistry; **Martina Mackova**, University of Alberta, Faculty of Medicine and Dentistry; **Denise G. Hemmings**, University of Alberta, Faculty of Medicine and Dentistry

Background:

Preeclampsia (PE) is the leading cause of maternal death in the developed world. Tumor Necrosis Factor-α (TNF-α), an inflammatory cytokine, is elevated in placentas of mothers with PE and also increases trophoblast apoptosis. S1P, a bioactive sphingolipid, induces apoptosis in endothelial cells by signalling through S1PR2 and this receptor is increased in PE. TNF-α increases S1PR2 expression in endothelial cells. However, it is unknown whether TNF-α mediates this same effect in trophoblasts.

Objective:

Therefore, we hypothesized that TNF-α increases S1PR2 protein expression in BeWo cells, a common model of human term trophoblasts.

Methods:

Human placental sections from normal term pregnancies were stained for dual expression of endothelial or trophoblast markers with S1PR1-3. A dose response (n=3) with TNF-α (0-20ng/mL) was assessed in BeWo cells after 24hrs. LPS (lipopolysaccharide; 20µg/mL) was the positive control as it increases S1PR2 in other cell types. A time course (12-36hrs) at 10ng/mL TNF-α (n=3) followed. Western Blot analysis of S1PR1-3 with β-actin as the housekeeping protein was performed. Results were analyzed by one-way ANOVA, Dunnett's test, and Linear Trend analysis.

Results:

S1PR1, 2 but not S1PR3 were expressed in trophoblasts from term placentas of normal human pregnancies. S1PR1 was also expressed in endothelial cells and S1PR3 was expressed in several other cell types. S1PR2 expression decreased linearly ($p=0.0044$) to 51.5+/-3.7% at 20 ng/mL of TNF-α and to 47.5+/-4.9% with LPS. The time course with 10ng/mL TNF-α revealed no differences in S1PR2 expression at 12, 24, and 36 hrs.

Conclusions:

BeWo cells respond to TNF-α and LPS by reducing, not increasing, S1PR2 expression, contradicting our hypothesis. BeWo cells are choriocarcinoma cells and likely respond to TNF-α differently than primary cells. We will now focus on primary trophoblasts isolated from placentas of women with and without PE.

Funding: Maternal and Child Health Program at University of Alberta and CIHR

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RELATIONSHIPS BETWEEN NEAR-INFRARED SPECTROSCOPY, PREDUCTAL PERFUSION INDEX AND CARDIAC OUTPUTS IN EXTREMELY PRETERM INFANTS IN THE FIRST 72 HOURS OF LIFE

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Background:

Assessment of hemodynamics during the transitional period in preterm infants is challenging.

Objective:

We aimed to describe the relationship between cerebral regional tissue oxygenation saturation ($CrSO_2$), preductal perfusion index (PI), echocardiographic and clinical parameters in extremely preterm infants in their first 72 hours of life.

Methods:

This single center prospective observational study was conducted in the level 3 neonatal intensive care unit of Sainte-Justine Hospital between July 2015 and May 2016. Twenty newborns born at <28 weeks of gestation were continuously monitored with $CrSO_2$ and preductal PI as well as cardiac outputs measured at 6, 24, 48 and 72 hours of life. Data were assessed for normality and Pearson correlation statistics were performed. Serial data were tested using a one-way ANOVA with repeated measures and Bonferroni adjustment. The level of significance was set to 0.05.

Results:

Median gestational age and birth weight were 25.0 weeks (24-26) and 750 g (655-920) respectively. Table 1 describes the measures over the 72 hours of the study period. $CrSO_2$ and preductal PI were weakly correlated (r values <0.35) with mean blood pressure, $PaCO_2$, lactates and haemoglobin. Fifteen patients had at least one episode of low left and/or right ventricular output (RVO) measured and showed strong correlation between $CrSO_2$ and superior vena cava (SVC) flow at H6 (r=0.74) and H24 (r=0.86) and between PI and RVO at H6 (r=0.68) and H24 (r=0.92). Five patients had low SVC flow at H6 and showed strong correlation between PI and RVO (r=0.98).

Conclusions:

$CrSO_2$ and preductal PI were weakly correlated with clinical parameters in the preterm infants. However, $CrSO_2$ and PI showed stronger correlation with RVO and SVC flow during low cardiac output states.

Table 1. Echocardiographic parameters, blood results and optical measures over the 72 hours of life (n=20)

	H6	H24	H48	H72	*p*-value$^{\phi}$
TnECHO measurements					
LVO (mL/kg/min)	128 (13)	193 (19)**	212 (21)	230 (10)	**0.0002**
RVO (mL/kg/min)	229 (27)	318 (24)*	357 (32)	389 (30)	**0.0011**
SVC flow (mL/kg/min)	71 (10)	87 (6)	81 (9)	87 (10)	0.5522
LVEF (%)	57 (3)	66 (2)**	71 (2)	73 (2)	**< 0.0001**
LVSF (%)	27 (2)	33 (1)*	37 (1)	39 (2)	**< 0.0001**
PDA diameter (mm)	1.69 (0.1)	1.47 (0.1)	1.39 (0.2)	1.24 (0.2)	0.1847
Blood results					
pH	7.29 (0.02)	7.28 (0.01)	7.25 (0.01)	7.27 (0.01)	0.1853
Lactates (µMol/L)	2.44 (0.33)	2.33 (0.25)	2.29 (0.16)	2.92 (0.44)	0.4571
Hb (g/dL)	145 (4)	132 (5)	125 (5)	128 (6)	0.0501
$PaCO_2$ (mmHg)	50 (3)	47 (2)	49 (2)	46 (2)	0.5069
NIRS and PI measures					
$CrSO_2$ (%)	69 (2)	76 (2)**	71 (2)	68 (2)	**0.0256**
PI (%)	0.94 (0.11)	1.03 (0.10)	1.13 (0.12)	1.03 (0.07)	0.6255

Results are described in mean±SD

TnECHO: targeted neonatal echocardiography, LVO: left ventricular output, RVO: right ventricular output, SVC: superior vena cava, Hb: haemoglobin, LVEF: left ventricular ejection fraction, LVSF: left ventricular shortening fraction, PDA: patent ductus arteriosus, $PaCO_2$: partial pressure of oxygen carbon dioxide, NIRS: near infrared spectroscopy, PI: perfusion index, $CrSO_2$ cerebral regional saturation, PI: perfusion index,

*$p < 0.05$; **$p < 0.01$ between H6 and H24

$^{\phi}$ *p*-values for one-way ANOVA with repeated measures. Values are compared to the previous measurements (H6 vs. H24, H48 vs. H24 and, H72 vs. H48) using the Bonferoni adjustment

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OUTCOME OF PRETERM INFANTS AFTER DELIVERY ROOM CARDIOPULMONARY RESUSCITATION. A RETROSPECTIVE OBSERVATIONAL STUDY

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Background:

Chest compression in the delivery room (CPR-DR) during neonatal resuscitation is considered as an extreme measure. When respiratory support alone is unable to establish circulatory transition, chest compression with or without epinephrine is necessary. The results of earlier studies have shown varied results in mortality and morbidity of preterm infants who received CPR-DR.

Objective:

To examine the relationship between need of CPR-DR in infants born between 23 and 32 weeks gestation and neonatal mortality and morbidity.

Methods:

This was a population-based cohort study of 23 0/7 to 32 6/7 weeks gestational age infants born at a Canadian tertiary care hospital between January 1, 2007 and December 31, 2016. Data were retrieved from the Neonatal-Perinatal database. Neonatal mortality and morbidities were examined between infants who did and did not receive CPR-DR.

Results:

Of 1443 newborns meeting study criteria, 55 (3.8%) received CPR-DR. On bivariate analysis, outcome of infants requiring CPR-DR was associated with higher mortality (40% vs. 5.8%, $p < 0.001$), intraventricular hemorrhage grade 3 or 4 (21.8% vs. 6.1%, $p < 0.001$), patent ductus arteriosus (54.5% vs. 27.7%, $p<0.001$), bronchopulmonary dysplasia (35.4% vs. 19.6%, $p=0.007$), need of mechanical ventilation (90.9% vs. 61.1%, $p<0.001$) and sepsis (23.6% vs. 13.5%, $p=0.034$). However, in a multivariable logistic regression analysis controlling for predictor variables, CPR-DR was only associated with increased neonatal mortality (aOR=4.41 $p<0.001$, 95%CI [2.18, 8.92]).

Conclusions:

While CPR-DR is associated with a high mortality rate in infants less than 32 weeks gestation, associated morbidities are largely predicted by other risk factors.

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NEUROPROTECTION CARE BUNDLE IS ASSOCIATED WITH SIGNIFICANT REDUCTION IN MORTALITY AND SEVERE BRAIN INJURY IN EXTREMELY PREMATURE INFANTS

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Background:

Extremely premature infants are at high risk for mortality and brain injury. The etiology of neonatal brain injury is multifactorial and therefore unlikely to be significantly modified by single-intervention strategies

Objective:

TO evaluates the effect of using concurrent multisystem strategies, using a neuroprotection care bundle approach, aimed at minimizing neonatal brain injury.

Methods:

A retrospective cohort study of infants born <29 weeks gestational age (GA) between January 2013 and June 2017. Components of the neuroprotection care bundle were incorporated based on local evidence and national site visits. The primary outcome was composite of death and or severe brain injury on head ultrasound, reviewed blindly by a neuroradiologist, using a standard classification system. Severe brain injury was defined as the presence of any: grade III or IV Intraventricular Hemorrhage (IVH), post IVH porencephalic cyst, cystic periventricular leukomalacia (PVL), or moderate to severe post hemorrhagic ventricular dilatation (PHVD). A regression analysis was done adjusting for GA, birth weight, out-born status, gender, use of antenatal corticosteroids, mode of delivery, multiples, low Apgar score at 5 minutes. cord blood PH < 7, and early onset sepsis

Results:

A total of 568 infants born < 29 weeks gestational age (GA) were included, 333 infants before and 235 after the bundle. Basic characteristics is shown in table 1. The implementation of the neuroprotection bundle improved systems targeted management (table 2) and contributed to a significant reduction in death and or severe brain injury (AOR: 0.38, CI: 0.19-0.74, p = 0.004), mortality (AOR: 0.20, CI: 0.06-0.64, p = 0.007), severe brain injury (AOR: 0.45, CI: 0.22-0.94, p = 0.03). Brain injury of any grade was not statistically significant (AOR: 0.65, CI: 0.39-1.05, p = 0.08)

Conclusions:

The adoption of a Neuroprotection care bundle in our center contributed to significant reduction in death and or severe brain injury in extremely premature infants

Table 1: basic characteristics

	Before neuroprotecti on bundle N=333	After Neuroprotectio n bundle N=235	P value
Gestational age, weeks, median (IQ)	27 (25-28)	27 (25-28)	0.21
Birth Weight, grams, Mean (SD)	860.51(236.38)	906.59(242.30)	0.024
Male, N (%)	177 (53%)	119(51%)	0.59
Out-born, N (%)	37(11%)	18(7.7%)	0.17
Antenatal steroid, N (%)	289 (87%)	170(72%)	<0.001
Caesarian section, N (%)	96(29%)	144(61.3%)	<0.001
Multiples, N (%)	100 (30%)	66(28%)	0.62
Apgar score < 5 @ 5 minutes, N (%)	74 (22%)	32(13.6%)	0.01
Cord PH < 7, N (%)	13(3.9%)	3 (1.3%)	0.08
Early onset sepsis, N (%)	7 (2.1%)	7(2.9%)	0.50

Table: practice change based on systems

		Before neuroprotec tion bundle N=333	After Neuroprotectio n bundle N=235	P Value
Hemodynamic management	Inotrope use in the first 72 hours, N (%)	83(25%)	15(6.4%)	<0.001
	Normal saline boluses, N (%)	127 (38%)	40(17%)	<0.001

	Medically Treated PDA, N (%)		129(38.7%)	98(41.7%)	0.45
	Surgically ligated PDA, N (%)		31(9.3%)	15(6.4%)	0.21
	Timing of PDA treatment, N (%)	In the first 72 hours	35(10.5%)	22(9.4%)	0.67
		After 72 hours	97(29.1%)	76(32.3%)	
	Delayed cord clamping, N (%)		82(24.6%)	144 (61.3%)	<0.001
Respiratory management	Any Hypercapnia > 60 mmHg in the first 72 hours, N (%)		129(38.7%)	76(32.3%)	0.13
	Any hypocapnia <35 mmHg in the first 72 hours, N (%)		150(45%)	77(32.8%)	0.004
	Extubation failure in the first72, N (%)		31(9.3%)	12(5.1%)	0.062
	Pneumothorax, N (%)		16(4.8%)	4(1.7%)	0.048
Impact of minimal handling	Use of Sedation, N (%)		63(18.9%)	24(10.2%)	0.005

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INCONSISTENCIES IN PRETERM INFANT GROWTH VELOCITY CALCULATIONS DEPEND ON THE CALCULATION METHOD AND TIME PERIOD

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Background:

Growth velocities of preterm infants may vary by calculation method and by time frames used.

Objective:

This study's objective was to examine preterm VLBW infants' weight, head circumference and length in hospital and post discharge to determine whether the calculation method and timing influences the resulting growth velocity estimates, using data from the Prem Growth study, a cohort study.

Methods:

Weight gain was estimated using 4 growth velocity methods (2-point-Average, 2-point-Exponential, 1-point-Early, and Daily) for various start (birth versus weight nadir, regain or day 7) and various end times (28 days, 36 and 48 weeks postmenstrual age). Z-scores; head circumference and length growth (centimeters/week) were calculated.

Results:

For the 103 preterm VLBW infants studied, including infants with morbidities, growth velocity estimates to 28 days and 36 weeks averaged between 10.1 to 44.0 g/kg/day if the postnatal weight loss phase was included, 14.6 to 54.7 g/kg/day if this phase was not included, and between 14.6 to 18.8 g/kg/day if the 1-point Early method was excluded. Z-score analysis showed growth priorities of head sparing before weight gain before length gain. 1-day growth velocity calculations had 4 times the standard deviation compared to 7-day calculations.

Conclusions:

Growth velocity estimates varied considerably by calculation method, making comparisons between studies and meta-analyses across studies problematic. Although the early 1-point method results were most divergent from the other methods, the three remaining methods had small but clinically significant differences in estimated growth rates over different time periods. Consistent preterm infant growth monitoring and reporting practices are needed.

ClinicalTrials.gov Identifier: NCT03064022

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1H NMR ANALYSIS OF THE EFFECTS OF OBESITY ON THE PREGNANT METABOLOME

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Background:

Obesity represents one of the largest strains on our healthcare system, with one third of American women of childbearing age being obese. Previous research has shown that obesity increases the risk of several pregnancy related disorders, such as gestational diabetes, preeclampsia, and preterm birth. While metabolomic biomarkers of both obesity and pregnancy have been independently studied, the combined effect of their interactions on the maternal metabolome remains unknown.

Objective:

This study utilizes 1H nuclear magnetic resonance (NMR) spectroscopy to investigate changes in the urinary metabolome of pregnant women that are caused by obesity.

Methods:

Urine was collected during the second trimester from 33 obese (BMI > 30) and 34 normal weight pregnant women from the APrON (Alberta Pregnancy Outcomes and Nutrition) cohort. 1H-NMR spectra were collected for each sample using a 700 MHz Bruker Avance III HD spectrometer and the resulting data was divided using spectral binning techniques. Multivariate statistical analysis, including principle component analysis and partial least squares discriminate analysis, were used to examine group differences. Feature selection tools, including variable importance analysis based on random variable combination and Mann-Whitney U-tests, were used to identify which metabolites led to the observed separation. Lastly, pathway analysis was used to determine which biochemical pathways are impacted by the identified metabolites.

Results:

Separation between the obese and control groups was observed and several metabolites were identified as significantly altered. Pathway analysis identified multiple pathways that could potentially be altered due to obesity during pregnancy.

Conclusions:

A subset of metabolites that can potentially act as biomarkers of obesity during pregnancy were identified. The identified biochemical pathways can have cascading effects on the health of both the mother and her child. The information we have collected may aid in the development of precision medicine, and a predictive model of the health outcomes of maternal obesity.

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MATERNAL DEPRESSIVE SYMPTOMS ACROSS THE POSTNATAL AND EARLY CHILDHOOD PERIOD, AND EMOTIONAL-BEHAVIORAL FUNCTIONING OF CHILDREN AT AGE 10 YEARS: FINDINGS FROM A PROSPECTIVE AUSTRALIAN PREGNANCY COHORT

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Background:

Maternal depression is one of the most common morbidities during the perinatal period. Children exposed to maternal depression are at increased risk of social, emotional and behavioral development. While several studies have explored the influence of perinatal depression on child development, little research has explored the impact of chronicity and severity of maternal depression on children emotional-behavioral functioning.

Objective:

This study examined association between the maternal depressive symptoms across ten years from the first year postpartum and children emotional-behavioral difficulties at 10 years of age.

Methods:

Data were drawn from 3582 mother-child dyads participating in a large prospective pregnancy cohort in Australia. Longitudinal latent class analyses was conducted to identify trajectories of maternal depressive symptoms across six time points (3-6 months, 1-2 years, 3-4 years, 5-6 years, 7-8 years and 9-10 years). Bivariate and multivariate models were conducted to evaluate the relationships between the preceding trajectories and child emotional-behavioral difficulties. The covariates in the study included maternal, child and family characteristics.

Results:

Five distinct trajectories of maternal depressive symptoms were identified: minimal symptoms (68.1%), subclinical symptoms (22.4%), early symptoms (3.1%), persistent symptoms (3.5%) and increasing symptoms (2.9%). The proportion of children with SDQ scores in the “at risk” and “clinical” ranges for each of the trajectories was: 44.5% for minimal symptoms, 30.8% for subclinical symptoms, 6.7% for early symptoms, 9.8% for persistent symptoms, and 8.2% for increasing symptoms. Multivariate model showed that compared to children of mothers with minimal depressive symptoms, children exposed to subclinical, early, persistent and increasing maternal depressive symptoms were at increased risk (AOR ranged from 1.95-3.42) of emotional-behavioral difficulties at age 10 years.

Conclusions:

The study findings provide evidence the need to undertake routine mental health screening and interventions for women across early childhood and school age period, to improve both maternal and child outcomes in the early years.

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ANCESTRAL TRAUMA AND MATERNAL BEHAVIOUR AS PREDICTORS OF OFFSPRING HEALTH

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Background:

Various methods have been developed to characterize the impact of early environment. The allostatic load (AL) model is a tool that has been used to determine the cumulative "wear and tear" by stress and predict health trajectories in mothers and children.

Objective:

We aim to develop a multi-level AL type measure as a new approach to predict maternal and offspring health in stressed laboratory rodents.

Methods:

Pregnant rats underwent stress from days 12-18 of pregnancy. The assessments involved the transgenerational prenatal stress (TPS) and multigenerational prenatal stress (MPS) third generation (F3). Weight, plasma glucose, and corticosterone were collected during gestation. Maternal behaviour was scored in an offspring retrieval test. Markers were grouped together into a maternal stress index (MSI). Offspring health was assessed with pregnancy outcomes, litter size, and pup weight. Offspring risk assessment, sensorimotor integration, and play behaviour were also recorded as phenotypic markers.

Results:

Mixed measure ANOVA revealed an effect of time ($p<0.01$) but no effect of treatment ($p=0.071$, observed power=0.516), with elevated MSI in MPS between gestational day (G) 11 and G18. There was no change in litter characteristics or gestation time ($p=2.66$) but higher rates of fetal reabsorption ($p<0.05$) in TPS. Offspring behaviour results are recorded in Table 1 below. Female and male rearing movements were negatively correlated to MSI at G11 ($p<0.05$). Center square entries in females were positively correlated to MSI at G18 ($p=0.001$).

Conclusions:

Stress during gestation increased the MSI value only during the stress treatment. Therefore, the MSI is sensitive to current stress but not generational stress. Ancestral stress significantly affected offspring health including birth outcomes, anxiety, exploration, and motor development. The results indicate that the MSI is a valid preclinical research tool to predict select birth and offspring development outcomes.

		Control Male	TPS Male	MPS Male	P Value	Control Female	TPS Female	MPS Female	P value
Negative Geotaxis (P7)	**Falls**	n=21 $\bar{X}$=4.7 SD=3.3	n=18 $\bar{X}$=6.7 SD=3.1	n=18 $\bar{X}$=4.7 SD=2.7	p=0.076	n=27 $\bar{X}$=4.7 SD=2.5	n=17 $\bar{X}$=6.8 SD=2.7	n=16 $\bar{X}$=6.6 SD=2.8	p<0.05
Open Field Exploration (P15)	**Inside Square Entries**	**n=20 $\bar{X}$=9.1 SD=4.3**	n=15 $\bar{X}$=5.7 SD=2.7	n=18 $\bar{X}$=8.7 SD=3.0	p<0.05	n=26 $\bar{X}$=8.3 SD= 2.9	n=15 $\bar{X}$=7.7 SD=2.7	n=17 $\bar{X}$=7.8 SD=3.4	p=0.797
Automated Open Field Exploration (P110)	**Margin Time**	n=21 $\bar{X}$=27.7 SD=10.3	n=18 $\bar{X}$=28.3 SD= 10.9	n=17 $\bar{X}$=28.1 SD=10.1	p=0.982	n=29 $\bar{X}$=32.9 SD=6.8	n=18 $\bar{X}$=37.9 SD=7.0	n=16 $\bar{X}$=36.0 SD= 4.9	p<0.05
	Center Time	n=21 $\bar{X}$=32.3 SD=10.3	n=18 $\bar{X}$=31.7 SD=10.9	n=17 $\bar{X}$=31.9 SD=10.1	p=0.982	n=29 $\bar{X}$=27.1 SD=6.8	n=18 $\bar{X}$=22.1 SD=7.0	n=16 $\bar{X}$=24.0 SD=4.9	p<0.05
	Rearing Activity	n=21 $\bar{X}$=5.4 SD=1.3	n=18 $\bar{X}$=5.1 SD= 1.1	n=17 $\bar{X}$=5.3 SD=0.8	p=0.67	n=28 $\bar{X}$=6.1 SD=1.0	n=18 $\bar{X}$=5.6 SD=0.8	n=16 $\bar{X}$=6.6 SD=1.1	p<0.05
	Number of Vertical Movement	n=21 $\bar{X}$=5.4 SD=1.3	n=18 $\bar{X}$=5.1 SD= 1.1	n=17 $\bar{X}$=5.3 SD=0.8	p=0.67	n=29 $\bar{X}$=6.1 SD= 1.0	n=18 $\bar{X}$=5.6 SD=0.8	n=16 $\bar{X}$=6.5 SD=1.1	p<0.05

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FACTORS MATERNITY CARE PROVIDERS CONSIDER IN COUNSELLING WOMEN ABOUT TRIAL OF LABOUR AFTER CAESAREAN BIRTH: FINDINGS FROM A DISCRETE CHOICE CONJOINT EXPERIMENT

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Background:

A trial of labour (TOL) after one previous Caesarean section (CS) is a reasonable and safe option for most Canadian women, yet relatively few women attempt a TOL. Maternity care providers are well positioned to influence women's decisions about method of childbirth.

Objective:

We explored the factors Canadian obstetricians, family physicians and midwives consider when counselling women on TOL versus repeat CS.

Methods:

A discrete choice conjoint experiment was implemented with 480 maternity care providers who completed 15 choice tasks, each presenting 3 scenarios. Each scenario described 3 of 12, 3-level attributes thought to influence the decision to recommend a TOL. The attributes were derived from interviews with maternity care providers and the literature. Using conditional logit and latent class segment analyses, we estimated the relative influence of each attribute on the decision to recommend a TOL and identified subsets of participants with different attribute preferences.

Results:

Two subsets of providers were identified. The 5 most influential attributes in subset 1, in order of importance, were woman's preference, woman's chance for a successful vaginal delivery, woman's anxiety regarding TOL, woman's understanding of the risks of TOL, and colleague support for TOL. The 5 most influential attributes in subset 2, in order of importance, were woman's chance for a successful vaginal delivery, BMI, woman's preference, woman's understanding of the risks of TOL, and provider reimbursement for a TOL.

Conclusions:

Findings suggest that both provider subsets are patient-centred with women's preference and chance of TOL success being amongst the 3 most influential attributes. In order to reduce the rates of non-medically indicated repeat CSs, women must have adequate knowledge about the risks and benefits of a TOL and CS to make informed choices. In addition, professional education to promote colleague support for TOL and improved reimbursement for TOL may help increase TOL rates.

Standardized Importance Scores for Segments Subset 1 and Subset 2.

	Latent Class Segments			
	Subset 1		Subset 2	
Attributes	R	I	R	I
Woman's preference	1	**0.196**	3	**0.105**
Patient's understanding of the risks of TOL	2	**0.157**	4	**0.099**
Woman's chance for a successful vaginal delivery	3	**0.150**	1	**0.164**
Patient's anxiety regarding TOL	4	**0.116**	6	0.098
Support for TOL by colleagues in my call group	5	**0.078**	9	0.055
Patient's understanding of the risks of planned CS	6	0.068	10	0.045
Counseling-Time	7	0.068	8	0.070
The woman's BMI is	8	0.054	2	**0.106**
Time to mount emergency CS	9	0.048	7	0.088
Patient's anxiety regarding CS	10	0.035	12	0.029
Provider payment/reimbursement for a TOL	11	0.015	5	**0.098**
Previous CS Experience	12	0.014	11	0.043

R = Rank of each attribute's importance within each subset. I = Relative importance score of each attribute. Scores having the highest importance are bolded. Variations in the levels of attributes with higher importance scores exert a greater influence on implementation choices.

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MYOCARDIN REGULATED GENETIC PATHWAY MODULATES MITOCHONDRIAL FUNCTION TO PREVENT CELL DEATH DURING CARDIAC DEVELOPMENT

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Background:

Fluctuating maternal glucose levels during gestational diabetes mellitus increases the risk of offspring developing diabetic cardiomyopathy, a disease linked to structural remodeling and programmed cell death.

Objective:

As the underlying mechanisms regulating cardiac cell death remain undefined, we hypothesize that Myocardin, a protein required for cardiac development, regulates mitochondrial function to prevent programmed cell death.

Methods:

A rat cardiac tissue culture model (H9C2) was genetically manipulated or exposed to drugs (n=3) and compared to control (empty vector/scrambled or drug vehicle). The primary outcome assessed cell viability while the secondary outcome assessed mitochondrial function by measuring permeability transition pore closure, membrane potential, oxidative stress and calcium localization by fluorescent imaging. Gene and protein expression was determined by qPCR, protein immunoblot and immunofluorescence, respectively. An empty vector (ds-Red) was used to control for transfection efficiency, cells were counter-stained with nuclear Hoechst/DAPI and fluorescent signal was normalized to area.

Results:

Tissue culture experiments illustrate that loss of Myocardin function reduces cell viability by 25% (95%CI, 17.74 to 31.76; $p<0.0001$), reduces mitochondrial function and reduces expression of miR-133a in comparison to control. Loss of Myocardin also increases expression of a mitochondrial death protein Nix, which is reversed by miR-133a inhibition. An *in vivo* Myocardin knockout mouse embryo model indicates an increase in cardiac Nix signal in comparison to wild type. A series of *in vitro* gain of function studies demonstrate expression of Myocardin or miR-133a independently restore cell viability ($p<0.01$), mitochondrial function ($p<0.01$) and reduces Nix protein levels. To assess the calcium crosstalk between the endoplasmic reticulum (ER) and mitochondria, Nix localized to the ER (Nix-ER) increases mitochondrial calcium uptake in comparison to control.

Conclusions:

Our data supports the hypothesis that Myocardin prevents Nix-induced cell death by restoring mitochondrial function and the therapeutic potential of miR-133a molecules for improving diabetic cardiomyopathy.

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DESCRIPTION OF SUSPECTED PRENATAL ZIKA VIRUS INFECTION IN THE BRAZILIAN FEDERAL DISTRICT SINCE THE 2015 OUTBREAK

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Background:

In 2015, Brazil experienced a Zika virus outbreak that lead to severe neurological disorders, including Prenatal Zika Virus (PZIKV) infection, which causes malformations in fetuses.

Objective:

We described the suspected cases of PZIKV in the Brazilian Federal District (DF), as reported in the Public Health Event Registry (RESP).

Methods:

We analysed secondary data of all pregnant women registered in RESP as suspected cases of PZIKV infection, from November 2015 to July 2017, in the DF.

Results:

175 women were registered as suspected cases of PZIKV infection during the study period. Mean maternal age was 27 years (SD 6.7), 26% were white, 40% were non-white, and 34% unknown. Thirty-four (19%) were considered suspected cases based on exanthema during pregnancy, 114 (65%) based on the microcephaly diagnosis at delivery, while 13 (8%) were diagnosed after 28 days of life. There was one case of spontaneous miscarriage and 8 stillbirths (8%). Of the 175 suspected cases, 57 (33%) were tested for PZIKV, 37 (65%) were positive, 19 (33%) were negative, and one was inconclusive (2%). In relation to ultrasound during pregnancy, 12 women (7%) did not have an ultrasound, 26 had at least one abnormality reported (15%), 42 (24%) had a normal ultrasound, and 95 (54%) did not have information available. 173 were singleton pregnancy, and 2 were twin gestations. Of the 43 newborns who had a normal ultrasound during pregnancy, 40 had microcephaly diagnosed at birth or during the neonatal period. In total, there was information available for 127 live births. Mean birth weight was 2,607g (SD 641), 25 (20%) were preterm, 97 (76%) were born at term, and 5 (4%) unknown.

Conclusions:

Timely diagnosis of PZIKV infection showed to be a challenge. Our results point to fetal growth restriction and microcephaly related to PZIKV infection, frequently not reported in ultrasounds during pregnancy.

Poster 286

A DOSE-RESPONSE RELATIONSHIP BETWEEN PRENATAL MATERNAL STRESS AND THE LEVELS OF MICROELEMENTS IN THE HAIR OF 4-YEAR OLD CHILDREN: THE QF2011 QUEENSLAND FLOOD STUDY

Thomas William Kenney, University of Lethbridge; **Mirela Ambeskovic**, University of Lethbridge; **Pierre Beaumier**, CanAlt Health Labs; **Nagy Azat**, CanAlt Health Labs; **Gabrielle Simcock**, University of Queensland; **Guillaume Elgbeili**, McGill University; **David Laplante**, McGill University; **Sue Kildea**, University of Queensland; **Suzanne King**, McGill University; **Gerlinde A.S. Metz**, University of Lethbridge

Background:

The fetal brain is sensitive to the gestational environment and vulnerable to homeostatic interference by stress. Most mental and physical disorders are influenced by stress and are, therefore, associated with dysregulated cellular homeostasis.

Objective:

Here we investigated if elemental analysis of hair provides a diagnostic biomarker of stress exposure in a population sample prenatally exposed to natural disaster.

Methods:

Hair samples were collected from 4-year-old children whose mothers endured the 2011 Queensland Flood (QF2011) in the Brisbane area, Australia. Hair elemental analysis by inductively coupled plasma mass spectrometry (ICPMS) was used to examine effects of objective (threat, loss, scope, change) and subjective (intrusive thoughts, avoidance, hyperarousal) prenatal maternal stress (PNMS) on 41 microelements.

Results:

Our data show significant linear or curvilinear associations between PNMS and the content levels of metals (Cu, Cd, W), trace elements (K, Na, Mg, Mn, P) and ratios (Zn/Cu, Na/Mg, and Ca/K) in hair of boys and girls.

Conclusions:

Here we show dose-response, linear or curvilinear, relationships between PNMS and microelement levels in boys and girls. Nutritional variables and environmental contamination may have influenced these results. PNMS, however, still demonstrated a significant dose-dependent relationship with minerals central to regulatory metabolic pathways although high PNMS was not a reliable indicator of abnormal concentrations. Control samples and blood levels from Brisbane-based age matched children unaffected by the flood in utero are required to ascertain the significance of these findings considering the QF2011 participants are a healthy normally developing cohort of children.

Poster 287

METABOLOMIC PROFILING OF GESTATIONAL DIABETES MELLITUS: A 1H-NMR-BASED APPROACH

Caylin Chadwick, University of Lethbridge; **Hannah Scott**, University of Lethbridge; **Brenda Leung**, University of Lethbridge; **Gerlinde A. S. Metz**, University of Lethbridge; **Tony Montina**, University of Lethbridge

Background:

Gestational diabetes mellitus (GDM) has been shown to increase the occurrence of pregnancy complications, including preeclampsia, preterm births, caesarean sections, intrauterine growth retardation, and neonatal intensive care unit admissions. Current tests for diagnosing GDM and pre-diabetic states (preclinical signs of insulin resistance) in pregnancy are multi-stepped and often cannot detect it in women of younger age, lower weight, and median income.

Objective:

Our main objective was to characterize any metabolomic differences in the urine of women with GDM and healthy pregnant controls to identify diagnostic and predictive biomarkers.

Methods:

Urine samples from the second trimester of pregnancy from 33 women with GDM and 34 age-, income-, and education-matched healthy controls were obtained from the Alberta Pregnancy Outcomes and Nutrition (APrON) cohort. Proton nuclear magnetic resonance (^{1}H-NMR) data was acquired using a 700 MHz spectrometer and subsequently binned for data analysis. Group separation was evaluated using principle component analysis and partial least square discriminant analysis. Variable importance analysis based on random variable combination and Mann-Whitney testing were used to determine which metabolites were significantly altered across the comparison groups. Lastly, pathway analysis was carried out to determine which biological pathways were potentially altered by these metabolites.

Results:

The analyses revealed group separation between the metabolomic profiles of pregnant women diagnosed with GDM and health pregnant controls. Several significantly altered metabolites, along with some potentially altered biological pathways, were identified across the comparison groups.

Conclusions:

These results demonstrate the potential for ^{1}H-NMR and metabolomics to diagnose pregnant woman with, or assess their risk for developing, GDM. Furthermore, the subset of metabolites identified as significantly altered provides potential biomarkers that can be correlated with pregnancy outcomes in order to identify women at high risk of negative pregnancy outcomes.

Poster 288

LACK OF POSTNATAL MULTIVITAMIN SUPPLEMENTATION MAY BE A RISK FACTOR FOR POSTPARTUM DEPRESSION

Kelsea Drall, University of Alberta; **Liane J Kang**, University of Alberta; **Justin Mahoney**, University of Alberta; **Allen B Becker**, University of Manitoba; **Piushkumar J Mandhane**, University of Alberta; **Malcolm R Sears**, McMaster University; **Stuart E Turvey**, University of British Columbia; **Padmaja Subbarao**, University of Toronto; **James A Scott**, University of Toronto; **Anita Kozyrskyj**, University of Alberta

Background:

Generally, 13% of mothers will experience depressive symptoms that are linked to poor health outcomes for their children. Vitamin and mineral (micronutrient) deficiencies, which arise during pregnancy and breastfeeding, have been correlated with postpartum depression (PPD). Thus, postnatal multivitamin supplementation is of interest to treat post-pregnancy deficiency and prevent PPD.

Objective:

The aim of this study was to investigate the association between postnatal multivitamin use and PPD in Canadian mothers.

Methods:

2,871 mothers were included from the Canadian Healthy Infant Longitudinal Development (CHILD) birth cohort. Questionnaires were delivered at 3 months postpartum to determine multivitamin use and at 6 months and 1 year postpartum to score depressive symptoms. Depressive symptoms were ascertained using the validated Centre for Epidemiologic Studies Depression Scale (CES-D). Chi-square analysis and stratification of covariates was completed to determine the association between multivitamin use and PPD.

Results:

Of those included in the study, 43.1% reported regular multivitamin use. The proportion of women reporting clinically significant depressive symptoms was elevated (60.2%) among those without multivitamin use compared to those who regularly took multivitamins ((39.8%) χ^2; $p = 0.069$). The stratified analyses demonstrate that the proportion of women reporting depressive symptoms was significantly increased among those who were un-supplemented and had an emergency cesarean section ($p = 0.03$), were aged 30-39 ($p = 0.02$) or did not have a history of depression ($p = 0.05$).

Conclusions:

Lack of multivitamin supplementation may be a risk factor for PPD; however, the evidence supporting this finding is inconclusive in this study and controversial in the literature. Further investigation is of interest to explain how micronutrient deficiency and supplementation impact maternal mental health and outcomes for their infants.

Poster 289

ADHERENCE TO MAINTENANCE MEDICAL THERAPY IN WOMEN WITH INFLAMMATORY BOWEL DISEASE DURING PREGNANCY

Sangmin Lee, University of Calgary; **Cynthia H Seow**, University of Calgary; **Amy Metcalfe**, University of Calgary

Background:

Women with inflammatory bowel disease (IBD) have increased risks of disease flares during pregnancy and pregnancy complications. However, as women are often more concerned about the impact of their IBD medications than the impact of their disease activity on pregnancy, many women will stop taking their medications during pregnancy.

Objective:

The objective of this study was to assess medication adherence during pregnancy for women with IBD.

Methods:

A validated case definition for administrative databases was used to identify pregnant women with IBD from the National Ambulatory Care Reporting System, Discharge Abstract Database, and Physician Claims in Alberta, Canada between 2010 and 2016. Data on medications were obtained from the Pharmaceutical Information Network. Women who had at least two consecutive prescriptions for specific classes of IBD medications (i.e. 5-ASA, biologics, thiopurines, methotrexate, steroids, or antibiotics) in the year prior to pregnancy were included. Chi-square tests were conducted to examine if medication non-adherence during pregnancy differed by drug class.

Results:

Overall 659 women with IBD were identified, of which 373 (56.6%) were adherent to maintenance therapy in the preconception period. During pregnancy, 109 (29.2%, 95% CI: 24.8%-34.1%) previously adherent women discontinued using their prescribed medications. There was a significant association between medication class and adherence during pregnancy ($p<0.05$). For each drug class, the following proportion of women were non-adherent during pregnancy: 84.6% (95% CI: 49.0%-96.9%) for steroids, 50.0% (95% CI: 0.0%-100%) for methotrexate, 40.8% (95% CI: 31.4%-51.0%) for thiopurines, 26.7% (95% CI: 20.1%-34.5%) for 5-ASA, and 15.8% (95% CI: 10.1%-23.8%) for biologics.

Conclusions:

Almost a third of women discontinued their IBD medications during pregnancy and greater proportion of women discontinued their medications for thiopurines, methotrexate, and steroids. Potential reasons for non-adherence to these drugs may be due to the reported or misconception adverse effects of these classes of medication on pregnancy.

Poster 290

THE IMPACT OF ANTENATAL HEALTH CARE PROVIDERS ON GESTATIONAL WEIGHT GAIN RELATED OUTCOMES

Beth Murray-Davis, St. Michael's Hospital; **Howard Berger**, St. Michael's Hospital; **Nir melamed**, Sunnybrook Health Sciences Centre; **Haroon Hasan**, BORN Ontario; **Karizma Mawjee**, St. Michael's Hospital; **Joel G. Ray**, St. Michael's Hospital; **Michael Geary**, St. Michael's Hospital; **Jon Barrett**, Sunnybrook Health Sciences Centre; **Sarah D. McDonald**, McMaster University

Background:

Inappropriate gestational weight gain (GWG) has a significant impact on perinatal outcomes and long-term health for mothers and their infants.

Objective:

Our objective was to examine whether total GWG and the rate of adverse perinatal outcomes varied by the type of antenatal health care provider (aHCP).

Methods:

Data from the Better Outcomes Registry & Network (BORN) from 2012-2016 was used to examine the association of GWG and perinatal outcomes by antenatal HCP for women who had a singleton hospital birth at 20-42 weeks in Ontario, Canada. aHCP was inclusive of family doctors (FD), obstetricians (OB), family doctors + obstetricians (FD+OB) and midwives (MW). Multivariable regression models were used to calculate adjusted relative risks (RR) with 95% confidence intervals (CI) for the exposure GWG below (<GWG) or above (>GWG) recommendation on caesarean section, pre-term birth (PTB), large-for-gestational-age >90th percentile (LGA> 90) and small-for-gestational-age <10th percentile (SGA <10) by HCP.

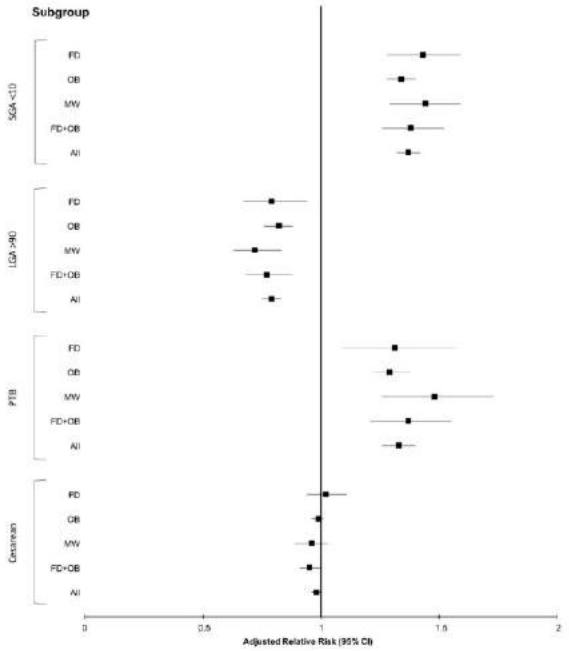
Results:

Of 231,697 pregnancies, 11.2% were seen by FD, 59.1% by OB, 15.7% by FD + OB and 14.0% by MW. A similar proportion of women achieved GWG below, within and above their recommendation for each aHCP group. For <GWG, there were no significant differences between aHCP groups in the risk of adverse perinatal outcomes. For >GWG, there was a significantly higher risk of LGA>90 with women in OB care compared to MW (RR 1.94 [CI; 1.85-2.03] vs. RR 1.69 [CI; 1.56-1.82] and a significantly lower risk of caesarean with OB and OB+FD [RR 1.12 [CI; 1.10-1.14] & RR 1.10 [CI; 1.06-1.13]) compared to MW and FD (RR 1.20 [CI; 1.14-1.25] & RR 1.23 [CI; 1.16-1.30]) (all P<0.01).

Conclusions:

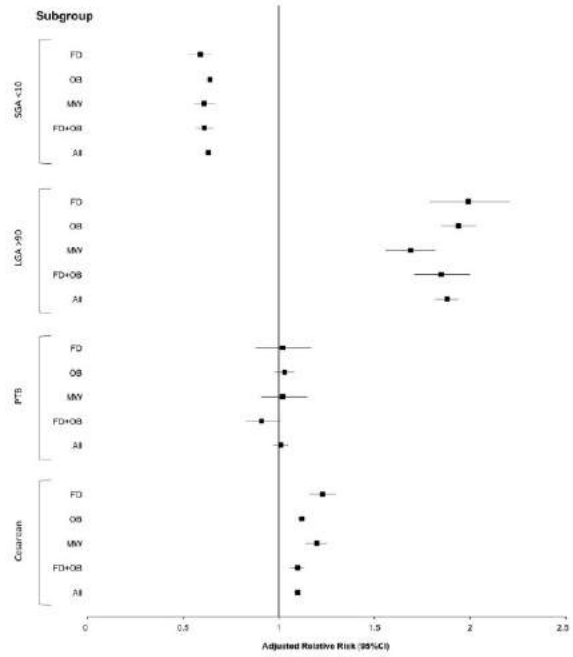
GWG did not differ by provider group. Compared to women who gained within their recommendation, across all provider groups >GWG was associated with varying adverse perinatal outcomes, but was not for women who <GWG.

Association of Lower than Recommended Gestational Weight Gain with Adverse Maternal and Neonatal Outcomes



Subgroup	Adjusted Relative Risk (95% CI)	No. of pregnancies affected/Total No. of pregnancies (Event Rate %)	
		GWG <recommended	Recommended GWG
SGA <10			
FD	1.43 (1.28-1.59)	538/3567 (15.1%)	817/7768 (10.5%)
OB	1.34 (1.28-1.40)	3,190/19,936 (16.0%)	5,317/43,270 (12.3%)
MW	1.44 (1.29-1.59)	488/3742 (13.0%)	949/10,405 (9.1%)
FD+OB	1.38 (1.26-1.52)	656/4559 (14.4%)	1,097/10,334 (10.6%)
All	1.37 (1.32-1.42)	4,872/31,804 (15.3%)	8,180/71,777 (11.4%)
LGA >90			
FD	0.79 (0.67-0.94)	203/3567 (5.7%)	482/7768 (6.2%)
OB	0.82 (0.76-0.88)	1,010/19,936 (5.1%)	2,389/43,270 (5.5%)
MW	0.72 (0.63-0.83)	245/3742 (6.5%)	835/10,405 (8.0%)
FD+OB	0.77 (0.68-0.88)	284/4559 (6.2%)	732/10,334 (7.1%)
All	0.79 (0.75-0.83)	1,742/31,804 (5.5%)	4,438/71,777 (6.2%)
PTB			
FD	1.31 (1.09-1.57)	201/3567 (5.6%)	314/7768 (4.0%)
OB	1.29 (1.22-1.38)	1,666/19,936 (8.4%)	2,573/43,270 (5.9%)
MW	1.48 (1.26-1.73)	235/3742 (6.3%)	430/10,405 (4.1%)
FD+OB	1.37 (1.21-1.55)	387/4559 (8.5%)	596/10,334 (5.8%)
All	1.33 (1.26-1.40)	2,489/31,804 (7.8%)	3,913/71,777 (5.5%)
Cesarean			
FD	1.02 (0.94-1.11)	585/3567 (16.4%)	1,258/7768 (16.2%)
OB	0.99 (0.96-1.01)	5,464/19,936 (27.4%)	11,848/43,270 (27.4%)
MW	0.96 (0.89-1.03)	592/3742 (15.8%)	1,720/10,405 (16.5%)
FD+OB	0.95 (0.91-1.00)	1,197/4559 (26.3%)	2,689/10,334 (26.0%)
All	0.98 (0.96-1.00)	7,838/31,804 (24.6%)	17,515/71,777 (24.4%)

Association of Higher than Recommended Gestational Weight Gain with Adverse Maternal and Neonatal Outcomes



Subgroup	Adjusted Relative Risk (95% CI)	No. of pregnancies affected/Total No. of pregnancies (Event Rate %)	
		GWG >recommended	Recommended GWG
SGA <10			
FD	0.59 (0.53-0.65)	895/14,708 (6.1%)	817/7768 (10.5%)
OB	0.64 (0.62-0.66)	5,543/73,788 (7.5%)	5,317/43,270 (12.3%)
MW	0.61 (0.56-0.67)	993/18,215 (5.5%)	949/10,405 (9.1%)
FD+OB	0.61 (0.57-0.66)	1,310/21,405 (6.1%)	1,097/10,334 (10.6%)
All	0.63 (0.61-0.64)	8,741/128,116 (6.8%)	8,180/71,777 (11.4%)
LGA >90			
FD	1.99 (1.79-2.21)	1,951/14,708 (13.3%)	482/7768 (6.2%)
OB	1.94 (1.85-2.03)	9,186/73,788 (12.4%)	2,389/43,270 (5.5%)
MW	1.69 (1.56-1.82)	2,645/18,215 (14.5%)	835/10,405 (8.0%)
FD+OB	1.85 (1.71-2.00)	3,085/21,405 (14.4%)	732/10,334 (7.1%)
All	1.88 (1.82-1.94)	16,867/128,116 (13.2%)	4,438/71,777 (6.2%)
PTB			
FD	1.02 (0.88-1.17)	625/14,708 (4.2%)	314/7768 (4.0%)
OB	1.03 (0.98-1.08)	4,714/73,788 (6.4%)	2,673/43,270 (5.9%)
MW	1.02 (0.91-1.15)	805/18,215 (4.4%)	430/10,405 (4.1%)
FD+OB	0.91 (0.83-1.01)	1,176/21,405 (5.5%)	596/10,334 (5.8%)
All	1.01 (0.97-1.05)	7,320/128,116 (5.7%)	3,913/71,777 (5.5%)
Cesarean			
FD	1.23 (1.16-1.30)	3,217/14,708 (21.9%)	1,258/7768 (16.2%)
OB	1.12 (1.1-1.14)	24,397/73,788 (33.1%)	11,848/43,270 (27.4%)
MW	1.20 (1.14-1.25)	4,101/18,215 (22.5%)	1,720/10,405 (16.5%)
FD+OB	1.10 (1.06-1.13)	6,627/21,405 (31.0%)	2,689/10,334 (26.0%)
All	1.10 (1.08-1.11)	38,342/128,116 (29.9%)	17,515/71,777 (24.4%)

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Z-SCORE DIFFERENCES BASED ON CROSS-SECTIONAL GROWTH CHARTS DO NOT REFLECT WEIGHT GAIN IN PRETERM INFANTS: AN ADJUSTED Z-SCORE FOR LONGITUDINAL ASSESSMENT OF GROWTH

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Background:

Growth of preterm infants is often assessed by z-score differences and it is suggested that a change in z-score reflects weight change. Current z-scores are calculated using references based on birth weights of pregnancies with known gestational age (GA). A significant proportion of pathological pregnancies skews the distribution of percentiles and affects the z-score calculation. Larger distances are seen between percentiles and standard deviations from 24 to~30 weeks followed by a decrease until term age. A physiological explanation for the resulting fluctuation of weight gain suggested when following the 3rd and 10th percentile curves is lacking. It is hypothesized that the current z-score differences approach has a systematic error indicating growth restriction in infants even they grow with desired rates.

Objective:

To test the hypothesis, in a large-scale data set, that the assessment of growth by z-score differences in preterm infants is affected by GA and birth weight percentile reference data.

Methods:

This observational study included 6832 (male=3429) VLBW infants from German Neonatal Network (2009 to 2015). For each infant, z-score differences and weight gain from birth to discharge was calculated. Primary outcome is the homogeneity of z-score differences versus weight gain.

Results:

In male infants the correlation between z-score differences and weight gain is weak R^2=0.56, the inter-individual variation is high, up to a factor of 5 with a median (IQR) deviation from line of identity of 0.36 (0.17;0.58). Z-score differences are affected by birth weight percentile and GA. A significant proportion n=761 (22%) of infants with negative z-score differences had higher weight gain than in-utero. An adjusted z-score differences reduces the confounding effect of GA.

Conclusions:

Z-score differences are confounded by skewed reference data. Cross-sectional data of interrupted pregnancies with pathologies have been used to create birth weight charts. New z-score references optimized for GA showed a high correlation with weight gain.

Poster 293

USING CHEST COMPRESSIONS WITH ASYNCHRONOUS VENTILATION AT VARIOUS CHEST COMPRESSION RATES (90, 100, 120/MIN) – RANDOMIZED CONTROLLED ANIMAL TRIAL.

Sparsh Patel, University of Alberta; **Po-Yin Cheung**, University of Alberta; **Tze-Fun lee**, University of Alberta; **Matteo Pasquin**, Centre for the Studies of Asphyxia and Resuscitation; **Megan O'Reilly**, University of Alberta; **Georg Schmölzer**, University of Alberta

Background:

Current Pediatric Advanced Life Support guidelines recommend that newborns who require cardiopulmonary resuscitation (CPR) in settings (prehospital, Emergency department, or pediatric intensive care unit, etc.) should receive continuous chest compressions with asynchronous ventilations (CCaV) if an advanced airway is in place. However, this has never been examined in a newborn model of neonatal asphyxia.

Objective:

To determine if CCaV at rates of 90/min or 120/min compared to current standard of 100/min will reduce time to return of spontaneous circulation (ROSC) in a porcine model of neonatal resuscitation.

Methods:

Term newborn piglets were anesthetized, intubated, instrumented, and exposed to 40-min normocapnic hypoxia followed by asphyxia, achieved by clamping the endotracheal tube until asystole. Piglets were randomized into 3 CCaV groups: chest compressions (CC) at a rate of 90/min (CCaV 90, n=7), 100/min (CCaV 100,n=7), 120/min (CCaV 120,n=7), or sham-operated group. To reduce bias, we utilized two-step randomization with sequentially numbered sealed brown envelopes. First envelope opened after surgery for allocating “sham” or “intervention”, second envelope opened containing group allocation for intervention after asystole. Cardiac function, carotid blood flow, cerebral oxygenation, and respiratory parameters were continuously recorded throughout the experiment.

Results:

The mean (±SD) duration of asphyxia was similar between groups with 260 (±133)sec, 336 (±217)sec, and 231 (±174)sec for CCav 90, CCaV 100, and CCaV 120, respectively (p=1.000; oneway ANOVA with Bonferroni post-test). The mean (SD) time to ROSC was also similar between groups 342 (±345)sec, 312 (±316)sec, and 309 (±287)sec for CCav 90, CCaV 100, and CCaV 120, respectively (p=1.000; oneway ANOVA with Bonferroni post-test). Overall, 5/7 in the CCaV 90, 5/7 in CCaV 100, and 5/7 in the CCaV 120 survived.

Conclusions:

There was no significant difference in time to ROSC for either chest compression technique during cardiopulmonary resuscitation in a porcine model of neonatal asphyxia.

Poster 295

COLLABORATIVE RESEARCH, CAPACITY BUILDING AND KNOWLEDGE TRANSLATION DEVELOPMENT FOR RESEARCH ON ADVERSE BIRTH OUTCOMES AND THE ENVIRONMENT

Osnat Wine, University of Alberta; **Jude Spiers**, University of Alberta; **Michael van Manen**, University of Alberta; **Katharina Kovacs Burns**, University of Alberta; **Alvaro R. Osornio Vargas**, University of Alberta, and the **DoMiNO Project**

Background:

The DoMiNO (Data mining & Neonatal outcomes) project explores the relationship between the environment and adverse birth outcomes. The project applies integrated Knowledge Translation(KT); a collaborative approach that builds on the participation, expertise and perspectives of interdisciplinary researchers, clinicians and knowledge-users, to ground and enhance the depth and breadth of research and to facilitate KT. Understanding the components that impact team building processes can contribute to supporting collaborative efforts.

Objective:

Based on the DoMiNO project we present major components that contributed to building team capacity for knowledge creation and KT plan development.

Methods:

We use this project's integrated KT process as a case study in a qualitative evaluation of the ongoing research collaboration (experience and learnings) following team engagement in the research process (e.g., meetings, informal interactions). Participants included all 24 DoMiNO team members. Data were collected through interviews, focus groups, surveys and participant observations, all adding to the cumulative understanding of the collaborative research process and the KT plan evolution. All data were coded and analyzed using thematic analysis procedures.

Results:

Findings highlight the interrelated components of building capacity to support the research progress, co-production and KT plan development. These components include commitment, work etiquette, balancing perspectives, power and ownership, as well as communication, transparency, learning/ sharing knowledge and alignment. These contribute to building relationships, trust and capacity. Once those were established, the research progressed and deliverables were clearer, the main messages and attainable KT goals were identified. The KT plan was then articulated to identify potential users, audiences, and strategies.

Conclusions:

Several components contribute to capacity building and the development new knowledge and KT plan. In this complex context, it is an ongoing iterative process that evolves through time, as the team works and builds capacity. Identifying and supporting the essential components of team development could optimize team capacity building.

Poster 297

DURATION OF SUSTAINED INFLATION DURING SUSTAINED INFLATION AND CHEST COMPRESSION IN A PORCINE MODEL OF ASPHYXIA

Sparsh Patel, University of Alberta; **Jannatul Mustofa**, University of Alberta; **Po-Yin Cheung**, University of Alberta; **Tze-Fun lee**, University of Alberta; **Matteo Pasquin**, Centre for the Studies of Asphyxia and Resuscitation; **Megan O'Reilly**, University of Alberta; **Georg Schmölzer**, University of Alberta

Background:

Current resuscitation guidelines recommend 3:1 C:V ratio, however the most effective C:V ratio in newborns remains controversial. We recently demonstrate that combining chest compressions (CC) with a sustained inflation (SI) (=CC+SI) significantly improves return of spontaneous circulation (ROSC) in asphyxiated newborn piglets compared to 3:1 C:V resuscitation. However, the optimal length of SI during CC+SI is unknown.

Objective:

We aimed to examine whether a 60sec SI compared to a 20sec SI or 3:1 C:V will reduce time to ROSC during resuscitation in asphyxiated newborn piglets.

Methods:

Cardiac arrest was induced in newborn piglets by asphyxiation and then randomized to receive either "3:1 C:V ratio, SI+CC-20sec" or "SS+CC-60sec". Piglets randomized to "SI+CC+20sec" or "SI+CC+60sec" received 90/min CC during a SI of 20sec or 60sec. Piglets randomized to 3:1 C:V received 90/min CC and 30 inflations/min. The default settings for airway pressures were peak inflation pressure of 30 cm H_2O and a positive end expiratory pressure of 6 cm H_2O. The primary outcome was duration of CC to achieve ROSC.

Results:

Eight piglets were randomized to each group; the mean (SD) age and weight was similar between groups. Median (IQR) ROSC was significantly shorter in the SI+CC-20sec and SI+CC-60sec group with 96 (68-168) sec and 78 (60-91) sec compared to the 3:1 C:V group with 235 (182-347)sec (p=0.002). 5/8 in the SI+CC-60sec group, 7/8 in the SI+CC-20sec and 8/8 in the 3:1 C:V group received epinephrine (p=0.82).

Conclusions:

Lengths of SI during CC+SI does not affect ROSC, however CC+SI compared to 3:1 C:V does improve ROSC in newborn piglets.

Poster 298

ASSESSMENT OF HEART RATE USING AUSCULTATION AND ELECTROCARDIOGRAPHY DURING NEONATAL RESUSCITATION IN A PORCINE MODEL OF ASPHYXIA

Sparsh Patel, University of Alberta; **Po-Yin Cheung**, University of Alberta; **Tze-Fun lee**, University of Alberta; **Jannatul Mustofa**, University of Alberta; **Matteo Pasquin**, Centre for the Studies of Asphyxia and Resuscitation; **Megan O'Reilly**, University of Alberta; **Georg Schmölzer**, University of Alberta

Background:

Recent neonatal resuscitation guidelines have suggested the potential benefit of introducing Electrocardiography (ECG) to monitor neonatal heart rate (HR) as standard of care for newborns receiving respiratory support in the delivery room due to advantages over auscultation.

Objective:

To assess effectiveness of HR detection using either ECG or auscultation.

Methods:

We reviewed recordings from our piglet neonatal resuscitations to compare an ECG with auscultation for assessing the detection of HR at cardiac arrest. Term newborn piglets (n=41) were anesthetized, intubated, instrumented, and exposed to 40-min normocapnic hypoxia followed by asphyxia, which was achieved by clamping the endotracheal tube until asystole. Asystole was confirmed by using Electrocardiography and auscultation.

Results:

The median (±IQR) duration of asphyxia was 318 (200-560)sec. In 41 piglets both auscultation and ECG HR were assessed. In 11 (27%) cases both auscultation and ECG correctly identified a bradycardic HR (mean (SD) 32(14)/min) at the beginning of chest compression. In 11 (27%) cases both auscultation and ECG correctly identified absent of any HR. However, in 19 (46%) cases auscultation did not detect a HR while ECG did detect a HR. Overall, the Positive Predictive Value was 37%, Negative Predictive Value was 100%, Sensitivity was 100%, and Specificity was 37% for the ECG to display accurate HR during asphyxia in newborn piglets.

Conclusions:

Our data illustrates the need for caution in the routine use of ECG monitoring for all neonates who might require advanced resuscitation in the deliver room.

Poster 299

ASSESSMENT OF HEART RATE CHANGES DURING POSITIVE PRESSURE VENTILATION IN AN ASPHYXIA INDUCED BRADYCARDIA PORCINE MODEL OF NEONATAL RESUSCITATION

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Background:

The Neonatal Resuscitation Program (NRP) states that if positive pressure ventilation (PPV) was started because a baby had a low heart rate (HR), the baby's HR should begin to increase within the first 15sec of PPV. However, this has not been examined in animal models nor in the delivery room.

Objective:

To assess changes in HR in piglets with asphyxia induced bradycardia.

Methods:

Term newborn piglets (n=30) were anesthetized, intubated, instrumented, and exposed to 40min normocapnic hypoxia followed by asphyxia. Asphyxia was achieved by clamping the endotracheal tube until the piglet had bradycardia (defined as HR 25% of baseline); at that time CPR was initiated. As per NRP protocol PPV was immediately started for 30sec followed by chest compression. HR was continuously recorded using an ECG during the whole duration of the experiment. Changes in HR during PPV were assessed and divided into four epochs (0-10sec, 5-15sec, 10-20sec and 20-30sec, respectively) after start of PPV.

Results:

The median (IQR) duration of asphyxia was similar between the groups with 189 (128-291)sec, 126 (70-197)sec, 118 (66-250) sec for 3:1C:V, SI+90 and SI+120 respectively (p=0.37; oneway ANOVA with Bonferroni). Return of spontaneous circulation (ROSC) during PPV was observed in 6/30 (5%) at 30 seconds of PPV, 10/30 (33%) had an increase in HR. None achieved ROSC at the epochs 0-10sec, 5-15sec, or 10-20sec. After 15sec of PPV 13/30 (43%) had a decrease in HR and 11/ 30 (36%) had no change in HR.

Conclusions:

Adequate PPV does not increase HR in piglets with asphyxia induced bradycardia. This is contrary to the current NRP, which recommends that after 15 sec of PPV HR should be assessed.

Poster 300

BEYOND A SEAT AT THE TABLE: THE VALUE-ADDED OF VETERAN RESOURCE PARENTS IN NEONATAL INITIATIVES

Sonia Dahan, Université de Montréal; **Claude-Julie Bourque**, Université de Montreal; **Martin Reichhertzer**, CHU Sainte Justine, Montreal, Quebec; **Ginette Mantha**, Prema-Quebec; **Annie Janvier**, université de Montreal

Background:

Resource parents (RPs) who have experienced the hospitalisation of their child in Neonatal Intensive Care Unit (NICU) can contribute to clinical, research and teaching activities with a unique perspective.

Objective:

Describe the involvement of RPs the impacts of these initiatives. Investigate the experience of RPs and providers who worked with them.

Methods:

Retrospective case series of RP-involvement in CHU Sainte-Justine (Montréal, Québec). We also surveyed all RPs and the providers who worked with them. The questionnaire included open ended questions about knowledge gaps. Descriptive statistics and content analysis coding of qualitative data were used.

Results:

Since 2009, 22 RPs have teamed up with 19 providers in 42 Neonatal initiatives: ranging from peer-to-peer support on the unit, teaching/simulation activities and research collaboration. All providers and RPs reported positive impacts of these initiatives, which had a direct impact on healthcare teaching or research. When asked about their motivation to participate, themes invoked by RPs were: giving back, improve care and meaning-making: "*we want to give back.*"; "*This is a legacy to my daughter who passed away*". RPs have many different interests, some preferred engaging in activities outside of the NICU "*I don't want to hear these alarms ever again but I wanted to help*." 3 RPs had negative experiences, related to post-traumatic experiences. RPs disagreed on remuneration: 12/22 thought they should be compensated for transportation and meals, 6/22 thought additional payment was not indicated: « *I am doing this in memory of my child ... It would be insulting";* 7/22 considered they should be paid like other members of the team. Gaps in knowledge were identified relating to recruitment, training, and responsibility.

Conclusions:

Resource parents optimize Neonatology and contribute something meaningful to the system. Some activities involve risks for RPs and NICU parents. Future research will continue to empirically measure the impacts of their contribution.

Poster 301

MOSAIC PARTIAL MOLAR PLACENTA: A RARE OCCURRENCE WITH DISCUSSION OF SUSPECTED MECHANISM AND REVIEW OF LITERATURE

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Background:

There is increasing recognition that complex reproductive cytogenetic events may give rise to molar placenta.

Objective:

To describe a case of mosaic partial molar placenta with fetal intrauterine demise and discuss possible mechanisms of formation.

Methods:

Clinical history, pathological examination and cytogenetic analysis results were described and literature relevant to the case was reviewed.

Results:

A primigravida 22 year old female was found to have intrauterine demise at 20 weeks gestation. On gross pathology, half of the placenta showed multiple thin walled cysts in keeping with a hyatidiform mole, and the remaining placenta was normal in appearance. Histological examination of the placenta confirmed two distinct populations of villi. One population showed hydropic villi, but was negative for trophoblastic hyperplasia or atypia. The remaining villi were unremarkable. Cytologic analysis of the abnormal placental tissue demonstrated a 46,XX karyotype. On QF-PCR analysis, the fetal and normal appearing placental tissues demonstrated normal diploid and biparental complements for chromosomes 13, 18, 21, and were consistent with an XX complement. The molar placental tissue demonstrated an abnormal female hybridization pattern on QF-PCR, with the majority of alleles showing a biallelic pattern exhibiting a maternal to paternal ratio of 1:3. Maternal cell contamination was excluded, and allele sizing was consistent with the alleles amplified in the normal placental tissue. Possible mechanisms of formation were reviewed and suggested to be most in keeping with postzygotic diploidization of a diandric triploid zygote, with diploidization to a normal cell line in addition to endoreduplication of the eliminated paternal haploid line.

Conclusions:

In addition to the well-described complete and partial molar pregnancies, it is increasingly recognized that other types of rare molar pregnancies can arise through complex mechanisms. In our case, it is likely that diploidization of a triploid zygote would explain the mosaic placenta with molar and non-molar portions, and the diploid fetus.

Poster 302

CESAREAN DELIVERY FOR FAILURE TO PROGRESS IN NULLIPAROUS WOMEN UNDERGOING INDUCTION OF LABOUR: IS THE LENGTH OF LABOUR AFFECTED BY MATERNAL BODY MASS INDEX?

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Background:

Obesity has become an increasingly prevalent medical concern in recent years. There is a well-known relationship between obesity and increased rates of pregnancy complications. This leads to increasing rates of induction of labour (IOL) which has been shown to be associated with increased risk of cesarean delivery (CD). Further, obese women are known to have longer labours. We aimed to assess the impact of BMI on the length of active labour in primiparous women prior to CD for failure to progress (FTP) following IOL.

Objective:

To assess the length of labour prior to cesarean delivery for FTP in primiparous women following IOL.

Methods:

Singleton, primiparous women who underwent CD for FTP following IOL were extracted from Mount Sinai database. 866 women were subdivided into 4 groups according to their BMI. The principle indication for IOL was considered for analysis. FTP was defined as little or no progress over 2-4 hours with contractions in patients at least 3 cm dilated. Active labour was defined as regular contractions Q 2-4 mins apart. Length of labour and decision to perform a CD for FTP was calculated from the chart.

Results:

The length of active labor before CD for failure to progress is not affected by BMI and severity of obesity. Mean cervical dilatation at the time of CD as well as the rate of CD in the second stage of labour do not differ among the BMI classes.

Conclusions:

There is no difference in the latency between active labour and the decision to preform CD for FTP among weight category groups. Mean cervical dilatation at the time of CD as well as the rate of CD in the second stage of labour do not differ among the BMI classes. Obesity is not factored into the decision for CD in the management of labour.

Table 1. Characteristic of population

	n	Age (y)	Pre pregnancy BMI	GWG (kg)	GA at IOL (weeks)	Birthweight (g) >4000 gr (%)	M/F %	Apgar 5'
UW (<18.5)	36	31.2[a]±4.2	17.5±0.8	17.8±6.4	40.7±1.0	3491.6±416.3[a] 1% (4/36)	36/64	9.0±0.2
NW (18.5-24.9)	476	32.8±5.1	21.9±2.1	17.8±5.8	40.6±2.1	3660.4±472.3 2.1%(101/476)	45/55	8.9±0.6
OW (25-29.9)	198	32.4±4.7	27.1±1.4	16.9±5.9	40.3[b]±1.3	3679.8±522.6 2.5%(49/198)	43/57	8.9±0.3
Obese (≥30)	156	31.9±5.5	35.9±6.2	15.4[c]±8.0	40.0[c]±1.3	3621.8±544.0 2.4%(37/156)	50/50	8.9±0.3
Class 1 (30-34.9)	87	32.4±5.5	31.9±1.4	15.4±7.0	40.0±1.4	3569.8±561.9 2.1%(18/87)	48/52	8.9±0.4
Class 2 (35-39.9)	40	31.5±5.7	36.9±1.3	14.5±7.4	39.8±1.3	3619.1±542.2 2.5%(10/40)	60/40	9.0±0.3
Class 3 (≥40)	29	31.3±5.6	46.7±6.1	16.5±11.1	38.2[d]±1.1	3781.4±484.4 3.1%(9/20)	41/59	9.0±0.2

Abbreviations: BMI, body mass index; F, female sex; GA, gestational age, GWG, gestational weight gain; IOL, induction of labor; M, male sex; NW, normal weight; OW, overweight; UW underweight.
Note: Data are expressed as mean ±standard deviation.
[a] p<0.04 vs NW; [b] p<0.001 vs NW; [c] p<0.001 vs NW; [d] p<0.01 vs Class 1

Table 2: Cervical dilatation at admission (CDA) according to BMI classes and obesity classes

	Mean CDA (cm)	CDA 0	CDA 1	CDA 2	CDA 3
UW (<18.5)	0.6±0.8	55.6% (20/36)	30.6% (11/36)	11.1% (4/36)	2.8% (1/36)
NW (18.5-24.9)	0.8±1.0	51.3% (244/476)	23.5% (112/476)	17.4% (83/476)	7.8% (37/476)
OW (25-29.9)	0.7±0.9	58.6% 116/198	21.2% (42/198)	14.6% (29/198)	5.6% (11/198)
Obese (≥30)	0.6[a]±0.9	61.5[a]% (96/156)	21.2% (33/156)	10.9% (17/156)	6.4 (10/156)
Class 1 (30-34.9)	0.7±1.0	57.5% (50/87)	21.8% (19/87)	12.6% (11/87)	8% (7/87)
Class 2 (35-39.9)	0.6±0.8	62.5% (25/40)	25.0% (10/40)	7.5% (3/40)	5% (2/40)
Class 3 (≥40)	0.4±0.8	72.4% (21/29)	13.8% (4/29)	10.3% (3/29)	3.4% (1/29)

Abbreviations: CDA, cervical dilatation at admission; NW, normal weight; OW, overweight; UW underweight.
Note: data are presented as % (n)
[a] p<0.02 vs NW

Table 3 Indications for induction of labor in BMI classes and obese classes

	Fetal	Maternal	Postdates	Others
UW (<18.5)	30.6[a]% (11/36)	8.3% (3/36)	47.2% (17/36)	13.9% (5/36)
NW (18.5-24.9)	11.1% (53/476)	21.0% (100/476)	61.8% (294/476)	6.1% (29/476)
OW (25-29.9)	10.1% (20/198)	34.3[b]%(68/198)	52.5[c]%(104/198)	3.0% (6/198)
Obese (≥30)	7.1% (11/156)	48.7[b]% (76/156)	37.2[b]% (58/156)	7.1% (11/156)
Class 1 (30-34.9)	5.7% (5/87)	49.4% (43/87)	36.8% (32/87)	8.0% (7/87)
Class 2 (35-39.9)	12.5% (5/40)	52.5% (21/40)	27.5% (11/40)	7.5% (3/40)
Class 3 (≥40)	3.4% (1/29)	41.4% (12/29)	51.7% (15/29)	3.4% (1/29)

Abbreviations: NW, normal weight; OW, overweight; UW underweight.
Note: data are presented as % (n)
[a] p<0.001 vs NW; [b] p<0.0001 vs NW; [c] p<0.03 vs NW

Table 4: Length of labor before cesarean delivery for failure to progress in the first or second stage of labor

Length of labor (hr:min)	UW	NW n=476	OW n=198	Obese n=156	Class 1 n=87	Class 2 n=40	Class 3 n=29
CDA 0 cm	14:24 (04:16)	14:29 (5:16)	14:31 (05:17)	15:31 (05:17)	14:29 (06:19)	15:32 (04:12)	15:33 (06:19)
CDA 1 cm	15:22 (04:11)	15:28 (05:18)	13:31 (05:17)	14:32 (04:13)	14:33 (05:14)	15:31 (05:18)	11:31 (07:06)
CDA 2cm	15:26 (05:18)	14:31 (05:18)	14:30 (05:18)	14:30 (04:19)	14:28 (04:19)	14:29 (05:18)	17:23 (05:19)
CDA 3 cm	-	14:25 (04:16)	12:30 (05:19)	12:27 (05:18)	13:24 (05:19)	09:30 (06:12)	-
overall	14:24 (04:15)	15:29 (05:17)	14:31 (05:17)	14:31 (05:17)	14:30 (05:18)	14:33 (04:13)	14:32 (06:18)

Abbreviations: CDA, cervical dilatation at admission; NW, normal weight; OW, overweight; UW underweight

Poster 304

POST-RESUSCITATION DOXYCYCLINE ALLEVIATES RENAL INJURY THROUGH MMP INHIBITION IN ASPHYXIATED NEWBORN PIGLETS

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Background:

Asphyxiated neonates often have multi-organ failure with renal dysfunction. Oliguric renal failure in asphyxiated neonates is associated with neonatal encephalopathy and adverse neurodevelopmental outcome. We previously demonstrated that doxycycline (DOX) improved cardio-renal function in an acute swine model of neonatal hypoxia-reoxygenation (HR).

Objective:

We aimed to examine whether DOX had renal protection in a surviving model of neonatal HR.

Methods:

Newborn piglets were instrumented for hemodynamic monitoring and administration of fluids and medications. Piglets were subjected to 1 hour of hypoxia followed by reoxygenation with 21-25% oxygen and observed for 4 days. An iv bolus of DOX (30 mg/kg) or normal saline (control) was given at 5 minutes of reoxygenation in a blinded, block-randomized fashion (n=8/group). Sham-operated piglets (n=6) received no HR. Renal injury was investigated by measuring plasma creatinine, urinary N-acetyl-D-glucosaminidase (NAG) levels and renal tissue lactate. Both renal MMP-2 and 9 activities were also studied by gelatin zymography. Differences between groups were compared with ANOVA as appropriate and correlation was analyzed by Pearson Moment test, with p value <0.05 indicating significance.

Results:

Both HR groups received similar hypoxia (PaO_2 21[SEM3] mmHg) with severe lactate acidosis (pH 7.06[0.05]; lactate 13 [1] mmol/L). Five HR animals died, with 2 and 3 in control and DOX groups, respectively. There were no differences in heart rate, systemic arterial pressure, and neurologic scoring between HR groups over 4 days of recovery. DOX-treated piglets had higher urine output than those of controls over 4 days. Renal MMP-2 activity, urine NAG/Cr ratio and plasma creatinine of the DOX group were significantly lower than those of the control group, and there were all negatively correlated with total urine output. The renal tissue MMP-9 and lactate were not different between HR groups.

Conclusions:

In newborn piglets surviving HR, post-resuscitation administration of DOX may attenuate renal injury through MMP inhibition.

Poster 305

DISORDERED EATING IN PREGNANCY: MATERNAL PHYSICAL AND MENTAL HEALTH OUTCOMES

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Background:

Eating disorders (ED) have a pervasive impact on individuals and families. Pettersson, and colleagues (2016) estimated the prevalence rates of ED in an obstetric population as approximately 5.3% at 10-12 weeks' gestation, and 12.7% at 6-8 months postpartum. However, relatively little is known about maternal health outcomes in this population. The minimal literature that has investigated ED in pregnancy has been limited to clinical samples.

Objective:

To fill this gap, the present study investigated the birth and health outcomes of mothers one-year post-partum in a community sample. It was hypothesized that mothers with elevated ED symptoms would experience adverse health problems in the prenatal period, but also one-year postpartum.

Methods:

Participants were from the Alberta Pregnancy Outcomes and Nutrition (APrON) study, an ongoing, prospective cohort study investigating the association between factors such as maternal nutrition, mental health, and birth, obstetric, and child outcomes. Pre-and post-natal health outcomes in women with clinically elevated second trimester ED symptoms will be compared to women with subclinical ED symptoms; women will be matched for comparison on age, parity, and SES.

Results:

Preliminary regression analyses revealed that elevated prenatal ED symptoms were significantly related to adverse maternal physical health outcomes (e.g., prenatal hypertension, $R^2 = 0.33$, $F(1,380) = 41.47$, $p < .001$; $\beta = .314$, $p < .001$). Additional analyses will be performed to investigate whether women with elevated prenatal ED symptoms significantly differ from women with subclinical ED symptoms on other pre-and post-natal health outcomes including depression, anxiety, and preeclampsia.

Conclusions:

Elevated ED symptoms occurring in pregnancy may be associated with increased maternal health risk. Little research has examined the effects of prenatal ED on maternal health outcomes. The proposed study will determine whether clinical ED symptoms in the prenatal period increases the risk for adverse maternal health outcomes during these critical periods of pregnancy and postpartum.

Poster 309

MATERNAL AND NEONATAL MORTALITY AND SEVERE MORBIDITY ASSOCIATED WITH NEONATAL ABSTINENCE SYNDROME IN CANADA

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Background:

While opioid use is rapidly increasing, Canadian data on the incidence of neonatal abstinence syndrome (NAS) and associated birth outcomes are lacking.

Objective:

To examine temporal trends and regional variation in the incidence of NAS and associated severe maternal and neonatal morbidity in Canada.

Methods:

Information on all singleton hospital live births in Canada (excl. Quebec), 2004-2015, was obtained from the Canadian Institute for Health Information (N=3,128,364); including ICD-10 codes for diagnoses and interventions during birth hospitalization. NAS, neonatal and maternal morbidity was identified by ICD-10 codes. Neonatal and maternal mortality was defined as death before discharge. Severe neonatal morbidity included intraventricular haemorrhage, periventricular leukomalacia, retinopathy of prematurity, necrotizing enterocolitis, sepsis, convulsions, bronchopulmonary dysplasia, and respiratory distress syndrome. Severe maternal morbidity included all conditions identified as severe morbidity by the Canadian Perinatal Surveillance System (e.g., obstetric embolism, renal failure, or sepsis). The Cochran-Armitage test was used to assess temporal trends. Logistic regression was used to obtain adjusted odd ratios (AOR) adjusted for maternal age, gestational age, rural/urban residence, infant sex, year of birth, and socio-economic status; and 95% confidence intervals (CI) .

Results:

The incidence of NAS was 0.33%, and increased from 0.17% in 2004 to 0.51% in 2015; among mothers aged 15-24 years from 0.32% to 0.91%, among 25-34 years old from 0.12% to 0.47%, and among mothers aged >34 years from 0.16% to 0.34%, all $p<0.001$. Provincial variation ranged between 0.16% and 1.58%. Neonatal mortality was 0.12% vs 0.19% among infants with and without NAS; neonatal mortality/severe morbidity was 6.37% vs 1.74%, respectively (AOR=2.24, 95% CI: 2.04-2.46). The rates of mortality/severe morbidity were 2.00% in NAS group vs 0.99% in women without NAS (AOR=1.64, 95% CI: 1.39-1.94).

Conclusions:

The incidence of NAS increased in Canada between 2004 and 2015. NAS is associated with elevated risk of severe neonatal morbidity, maternal mortality/severe morbidity.

Poster 310

FIRST TRIMESTER MATERNAL VISCERAL ADIPOSE TISSUE THICKNESS IS ASSOCIATED WITH POSTPARTUM VISCERAL ADIPOSITY

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Background:

Postpartum visceral adiposity is a major risk factor for future obesity and cardiovascular risk. Visceral adiposity can be measured in early pregnancy by trans-abdominal ultrasound. Quantification of visceral adiposity can enable recognition of populations at risk. Previously it has been shown that first trimester weight gain is more strongly associated with postpartum weight retention than weight gain during the second and third trimesters.

Objective:

The purpose of this study was to determine how visceral adiposity thickness, as measured by ultrasound in the first trimester of pregnancy, is associated with residual adiposity at 6 weeks postpartum.

Methods:

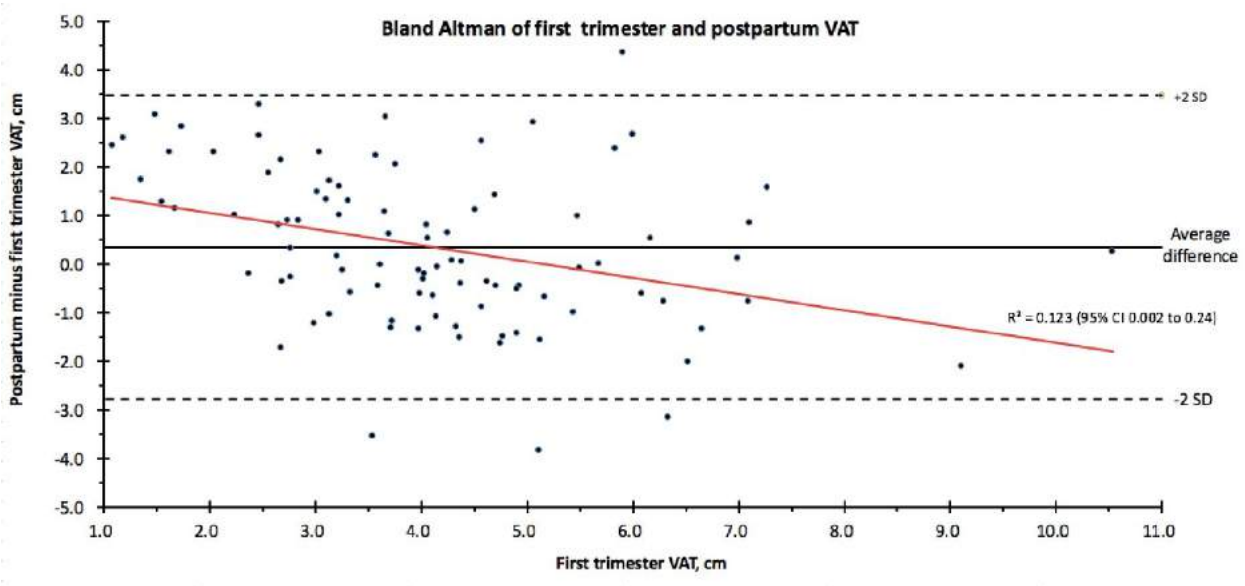
A prospective study of 97 pregnant women whose visceral adipose thickness (VAT) was measured by ultrasound at 11 to 14 weeks' gestation and again at 6-13 weeks postpartum. The relationship between antepartum and postpartum visceral adiposity was studied.

Results:

Ninety seven women were recruited for the study. The mean first trimester VAT measured was 4.1(±1.7) cm and the mean postpartum VAT measured 4.5 (±1.8) cm. BMI increased from a mean of 25.5 (±4.9) to 26.6 (±4.6). There was a significant correlation between first trimester VAT and 6 weeks postpartum VAT, with an r of 0.64 (95% CI 0.22-0.52). Bland Altman curves demonstrated a correlation between first trimester VAT and VAT gain (VAT postpartum minus 1st trimester VAT) with an r of 0.36 (95% CI 0.002-0.24). Women with higher first trimester visceral adiposity were less likely to maintain the gained VAT in the postpartum period.

Conclusions:

First trimester visceral adiposity contributes 36% to postpartum adiposity. Measurement of this compartment by ultrasound can assist in risk stratification of cardiovascular disease postpartum. Future studies to assess the correlation between VAT and metabolic parameters are needed.



Poster 313

MATERNAL VITAMIN D STATUS AND OFFSPRING'S GROWTH AND TYPE 1 DIABETES: A SYSTEMATIC REVIEW

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Background:

Low maternal vitamin D status is common during pregnancy and is associated with adverse pregnancy outcomes. However, it is unclear whether maternal vitamin D status affect offspring growth and metabolic health.

Objective:

To estimate the associations between maternal vitamin D status and offspring growth and metabolic health.

Methods:

This was a Systematic Review and Meta-Analysis. Studies were selected according to their methodological quality and outcomes of interest (anthropometry and diabetes in the offspring). The inverse variance method was used to calculate the mean difference (MD) with a confidence interval of 95% for continuous outcomes, and the Mantel-Haenszel method was used to calculate the odds ratio (OR) with a confidence interval of 95% for dichotomous outcome.

Results:

Thirty observational studies involving 34 280 mother-offspring pairs were included. Vitamin D status was evaluated by circulating 25-hydroxyvitamin D [25(OH)D] level. Low prenatal vitamin D levels were associated with lower birth weight (g) [MD -103.53, 95% CI (-165.17, -41.90)], increased risk of small-for-gestational-age (SGA) [OR 1.53, 95% CI (1.15, 2.05)] and an elevated weight (g) in infant at age 9 months (g) [MD 119.75, 95% CI (32.97, 206.52)]. No associations were observed between prenatal vitamin D status and newborn length (cm) and head circumference (cm), length (cm) at 9 months, growth in infant at one-year-old (weight-for-age z-score, head-circumference-for-age z-score, height-for-age z-score), and diabetes type 1 in children.

Conclusions:

Prenatal low vitamin D status was associated with lower birth weight and an increased risk of SGA and an elevated weight in infant. There was no association between prenatal vitamin D status and offspring type 1 diabetes. The effects of prenatal vitamin D on child long-term outcomes warrant future studies.

Poster 314

LONG TERM SAFETY OUTCOME OF LINEZOLID IN PREMATURE INFANTS

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Background:

Staphylococcus epidermidis (Coagulase-negative staphylococci (CoNS)) is a leading cause of bloodstream infections in Neonatal Intensive Care Units (NICU). Vancomycin is used as first-line antimicrobial therapy in neonatal late onset-sepsis (LOS). At CHU Sainte-Justine Hospital NICU in Montreal, Canada, vancomycin-intermediate heteroresistant *Staphylococcus epidermidis* has emerged and linezolid has therefore become an alternative drug to treat CoNS sepsis. Possible long-term effects of linezolid include peripheral or optic neuropathies in adults and children. To our knowledge, no data concerning long-term outcomes of premature infants treated with linezolid for LOS have been reported.

Objective:

The aim of this study is to describe the long-term safety profile of linezolid for preterm infants with LOS.

Methods:

We will conduct an observational retrospective study between Janyary 2012-December 2016, including preterm infants born at ≤28 weeks of gestational age (GA), hospitalized in one of the NICUs participating in the Canadian Neonatal Network (CNN), diagnosed with a CoNS sepsis (of ≥1 positive hemoculture with CoNS). The exposed group will consist of infants treated with linezolid (in CHU Sainte-Justine NICU). The non-exposed group will consist of infants who were not exposed to linezolid (other Canadian NICUs). We will compare mortality or neurodevelopmental impairment (NDI) at 18-21 months of corrected age in exposed versus non exposed preterm infants, using a multivariable logistic regression, after adjustment for some covariates.

Results:

We expect that preterm infants treated with linezolid will have similar long-term outcomes at 18-21 months of corrected age, compared to preterm infants treated with other antibiotics.

Conclusions:

Considering the burden of LOS in neonatal population and the emergence of antibiotic resistance, linezolid use may increase in the future and safety data concerning its use in premature infants might be useful to neonatologists and infectious disease specialists.

Poster 318

PERINATAL SHIPMENT STRESS PERMANENTLY PROGRAMS BRAIN METABOLISM AND LEADS TO INCREASED ANXIETY-LIKE BEHAVIOUR IN MICE

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Background:

Laboratory animals are often shipped between facilities for use in scientific research. During shipping, animals are frequently exposed to extreme temperature changes, food and water deprivation, vibrations, noises and changes in the light-dark cycle. Many of these variables are often independently utilized as stressors in studies of perinatal stress. Therefore, the transportation of laboratory animals represents a multidimensional stressor that we predict may act as a confound in studies dependent upon the shipment of animals for their results.

Objective:

Here, we used ^{1}H NMR spectroscopy to determine whether postnatal shipment stress (PSS) altered metabolic profiles in adulthood.

Methods:

We compared the metabolites present in the postnatal day (P)50 tissues of mice shipped from P12-13 with those of animals bred within our facility for at least three generations. Anxiety-like behaviour was assessed in adolescence using the open field (P20) and elevated plus maze (P25).

Results:

Our findings indicate that PSS results in long-term metabolic changes in the brain that persist into adulthood. These metabolic differences between treatment groups were most pronounced in the forebrain, although there were also significant metabolic differences between PSS and non-shipped animals in the cerebellum. Furthermore, these metabolic alterations are associated with increased anxiety-like behaviour on the elevated plus maze and open field. Specifically, PSS animals spent significantly more time in the closed arms of the elevated plus maze ($P < 0.0001$) and entered significantly fewer total squares ($P < 0.01$) and total novel squares ($P < 0.05$) than did non-shipped controls.

Conclusions:

Perinatal shipment stress results in persistent metabolic and behavioural changes. Thus, shipment stress represents a significant confound in the life sciences, and should be taken into consideration by future studies using animal models. Furthermore, we propose that shipment stress may serve as an animal model of migration in human populations.

Poster 319

A META-ANALYSIS OF MATERNAL PRENATAL DEPRESSION ON CHILDREN'S SOCIOEMOTIONAL DEVELOPMENT

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Background:

Associations between maternal prenatal stress and children's socioemotional development have varied widely in the literature.

Objective:

The objective of the current study was to provide a synthesis of studies examining the association between maternal prenatal depression and their children's socio-emotional development.

Methods:

Eligible studies through to June 2017 were identified utilizing a comprehensive search strategy. Included studies examined the association between maternal prenatal depression and future development of socioemotional development (e.g., difficult temperament, behavioral dysregulation) in their children up to 18 years later. Two independent coders extracted relevant data. Random-effects meta-analyses were used to derive mean effect sizes and test for study-level Moderators.

Results:

Thirty-seven samples were included in the synthesis, examining child outcomes for maternal prenatal depression. The mean effect size was OR = 1.86 (95% CI: 1.64-2.11). Moderator analyses indicated that depression severity and sociodemographic risk explained between-study heterogeneity of effect sizes. High depression severity had a greater mean effect size of OR = 3.29 (95% CI: 2.34-4.61), compared to low severity OR = 1.74 (95% CI: 1.54-1.97). In addition, sociodemographic risk had a greater mean effect size of OR = 2.98 (95% CI: 2.11-4.20), compared to no sociodemographic risk OR = 1.75 (95% CI: 1.55-1.98).

Conclusions:

Findings suggest maternal prenatal depression is associated with children's poor socioemotional development. Therefore, mitigating stress and mental health difficulties in mothers during pregnancy may be an effective strategy for reducing behavioral difficulties in their offspring, especially in groups with high social risk and greater severity of mental health difficulties.

Table 1

Results of Moderator Analyses for the Association between Maternal Prenatal Depression and Child Socioemotional Development

Categorical Moderators	***k***	***OR***	***95% CI***	***Homogeneity Q***	***P-value***
Syndromal-Level Symptoms				11.8	.001
No	30	1.74***	1.54-1.97		
Yes	7	3.29***	2.34-4.61		
Socio-Demographic Risk				8.21	.01
No	32	1.75***	1.55-1.98		
Yes	5	2.98***	2.11-4.20		
Type of Child Measure				0.83	.37
Temperament	17	1.74***	1.43-2.12		
Behavioral Dysregulation	20	1.96***	1.66-2.31		
Method of Assessing Child Behavior				0.34	.85
Questionnaire	28	1.83***	1.60-2.0		
Structured Measure	5	2.08**	1.31-3.3		
Observation	4	2.00+	0.98-4.08		

Continuous Moderator	***k***	***Slope***	***Standard Error***	***Z-value***	***P-value***
Pregnancy Time Point	34	-.007	.012	-0.60	.55
Maternal Age	36	-.010	.021	-0.46	.64
Child age	37	-.001	.001	-0.66	.51
Percent of Males in Sample	37	-.002	.003	-0.50	.62

$^{+}p < .10$; $^{**}p < .01$; $^{***}p < .001$

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EARLY USE OF INOTROPES IS ASSOCIATED WITH HIGHER RISK OF DEATH OR SEVERE BRAIN INJURY IN EXTREME PREMATURE INFANTS

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Background:

Extreme premature neonates are susceptible to fluctuations in cerebral blood. Volume expanders and inotropes could cause rapid changes to systemic blood pressure and cerebral blood flow especially within the first 72hours which carries the greatest risk of intracranial hemorrhage

Objective:

To evaluates the prevalence of death and/or severe brain injury in extreme preterm infants treated with the inotropes in the first 72 hours of age

Methods:

A retrospective cohort study of all infants with gestational age (GA) < 29 weeks admitted between January 2013 and December 2016. Severe brain injury was defined based on head ultrasound as presence of: Grade 3 or 4 intraventricular hemorrhage (IVH), post hemorrhagic ventricular dilatation (PHVD), or Cystic Periventricular Leukomalacia (cPVL). Logistic regression was done to examine the association between use of inotropes and death and/or severe brain injury controlling for predefined confounding factors

Results:

Of the total of 498 infants, 95 (19%) received inotropes within 72 hours of age. Infants who received inotropes were of lower birth weight (744± 210g vs 901± 233g), lower GA (25.1±1.59 wk vs 26.4±1.45), had lower 5 minutes Apgar scores, and were less likely to received Natural cord clamping (15% vs 42%). Overall, the prevalence of any IVH and severe brain injury was significantly increased in infants treated with inotrope (any IVH 47% vs 19%, severe IVH 26% vs 6% $p < 0.001$) Logistic regression analysis adjusting for GA, antenatal steroid, gender, SGA, outborn, Apgar score revealed that early inotrope use was associated with higher odds of composite outcome of death/severe brain injury (aOR 4.89; 95% CI 2.51, 9.53)

Conclusions:

Early use of inotropes was associated with higher risk of death or severe brain injury. Strategies to minimise hypotension and fluctuations in cerebral blood flow should be implemented in the early postnatal care of infants susceptible to developing severe IVH

Poster 323

PRE-PREGNANCY BODY MASS INDEX AND PREGNANCY WEIGHT GAIN AS RISK FACTORS OF LOW MATERNAL-FETAL VITAMIN D TRANSFER: A COHORT FROM THE MONTREAL REGION

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Background:

Many infants are born with vitamin D insufficiency, which may impact normal growth and development. It is thought that women who gain excess weight in pregnancy may sequester vitamin D in adipose tissue and do not transfer enough to the fetus.

Objective:

The aim of this study was to test if pre-pregnancy body mass index (BMI) and/or gestational weight gain (GWG) in pregnant women is adversely associated with vitamin D status in otherwise healthy neonates.

Methods:

Healthy mother-infant pairs (n=642) were screened at the Lakeshore General Hospital, QC (March 2016 to October 2017). Mothers' ethnicity, family income, lifestyle and supplement use were surveyed. Obstetric history was collected from medical charts. Capillary blood was sampled in infants < 36 h of birth for serum 25-hydroxyvitamin D (25(OH)D; Liaison, Diasorin Inc.). Statistical analyses (SAS University Edition) mixed model ANOVA, with Tukey-Kramer post-hoc testing ($p<0.05$, adjusted).

Results:

Infants (n=642) were appropriate-weight-for-gestational-age, term born with 57% of deliveries in the summer-fall period and 66% had 25(OH)D below 50 nmol/L of (Table 1). Supplemental vitamin D was taken before (44%) and during (93%) pregnancy. Based on pre-pregnancy BMI, 41% of mothers exceeded GWG recommendations for pregnancy (Table 2). Infant vitamin D status was not related to pre-pregnancy BMI ($p=0.55$), GWG ($p=0.41$) or sex ($p=0.56$); however, an interaction ($p=0.01$) between GWG (exceeded, adequate, below) and multivitamin supplementation during pregnancy was observed. Women below GWG recommendations and using multivitamins had newborns with higher 25(OH)D concentrations compared to women with adequate GWG without multivitamin use during pregnancy (42.0 ± 2.0 and 29.8 ± 3.9, respectively; Δ 12.2 ± 4.1 mmol/L, $p=0.03$).

Conclusions:

Future research should investigate the impact of vitamin D supplementation and intake in mothers during gestation and according to GWG to improve maternal-fetal transfer of vitamin D in support of child health and development.

Table 1 – Lifestyle, sociodemographic and other characteristics of mothers and infants (n=642)

Parameter	Mean ± SD or n (%)
Mothers	
Age at delivery (y)	32.2 ± 4.6
Ethnicity by skin color: White	398 (62%)
Maternal education, ≥ University	376 (59%)
Oral nutrient supplementation 3 mo before pregnancy	
Vitamin D[1]	281 (44%)
Oral nutrient supplementation during pregnancy	
Multivitamin[2]	596 (93%)
Family income, > $70,000	342 (53%)
Not disclosed	117 (18%)
Season of delivery	
Winter-spring[3]	279 (43%)
Summer-fall[4]	363 (57%)
Infants	
Gestational age (wk)	39.6 ± 1.1
Body weight at birth (kg)	3.4 ± 0.4
Male	324 (50%)
Serum 25(OH)D (nmol/L)	43.1 ± 19.0
< 50 nmol/L	427 (67%)

[1] Vitamin D supplement with or without multivitamin supplement.
[2] Pregnancy multivitamins: Pregvit regular/5, Nestle Materna, Prenatal Kirkland or Generic, Women's Prenatal and others. Common multivitamins: Centrum Women Complete Multivitamin, Centrum Adults Forte Essentials and others.
[3] Winter-spring was between November and May.
[4] Summer-fall was between June and October.

Table 2 – Maternal pre-pregnancy body mass index (BMI) and recommendations for gestational weight gain during pregnancy (n=642)

Parameter	Mean ± SD or n (%)
Pre-pregnancy BMI (kg/m^2)	24.9 ± 5.0
< 18.5	24 (4%)
18.5-24.9	377 (57%)
25-29.9	164 (25%)
≥ 30.0	93 (14%)
Gestational weight gain according to pre-pregnancy BMI[1]	
Below	153 (23%)
Exceeded	276 (41%)
Adequate	222 (33%)

[1] Healthy gestational weight gain for pre-pregnancy BMI (kg/m^2) category: <18.5: 12.5-18 kg; 18.5-24.9: 11.5-16 kg; 25.0-29.9: 7-11.5 kg; ≥ 30.0: 5-9 kg. (Institute of Medicine, 2009).

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LIPID SCREENING AFTER HYPERTENSIVE DISORDERS OF PREGNANCY

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Background:

Hypertensive disorders of pregnancy (HDP), comprising preeclampsia (PE) and gestational hypertension (GHTN), are risk factors for future maternal cardiovascular disease (CVD). Current guidelines recommend postpartum follow-up of cardiovascular risk factors (e.g., lipids) in these women.

Objective:

This study aimed to assess the current state of postpartum follow-up of lipid profiles among women with PE, GHTN, and normal blood pressure.

Methods:

The Discharge Abstract Database was used to identify women hospitalized for a delivery in Alberta, Canada between January 2010 and December 2012 (N=27,526). It was linked with the Calgary Laboratory Services database (lipid profiles) and the Pharmaceutical Information Network (lipid medication prescriptions) over the first 4 years postpartum. Logistic regression was used to compare lipids screening rates adjusted by maternal age and parity.

Results:

By four years postpartum, women with HDP had significantly higher lipids screening rates (PE: 39.0%, aOR 1.57, 95% CI 1.25-1.96; GHTN: 36.0%, aOR 1.37, 95%CI 1.22-1.54) than normotensive women (28.6%). Lipid screen rate amongst women with PE was significantly higher in the first year postpartum but similar with other groups afterwards. The baseline low density lipoprotein levels (mmol/L) were significantly higher amongst women with HDP than normal controls (PE: 2.81±0.91, GHTN: 2.62±0.78, vs. Normal: 2.51±0.75; $p<0.05$). Similar patterns were detected with higher levels of serum total cholesterol, triglycerides and non-high density lipoproteins and lower high density lipoproteins. Within four years postpartum, 23.8% women with PE developed lipid levels corresponding to intermediate CVD risk, 14.2% in GHTN and 10.4% in normotensive women ($p<0.01$).

Conclusions:

The majority of women with HDP did not have postpartum lipid screening. Amongst those screened, women with HDP showed atherogenic lipid profiles as early as one year postpartum. Early postpartum lipid screening offers an opportunity to identify women at intermediate CVD risk requiring primary CVD prevention strategies.

Poster 328

OVERVIEW OF SYSTEMATIC REVIEWS AND PANORAMIC META-ANALYSES OF THE RELATIONSHIP BETWEEN PRETERM BIRTH AND RISK OF ASTHMA IN CHILDHOOD AND ADULTHOOD

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Background:

Asthma is the most common chronic respiratory disease in childhood and adult life. Systematic reviews (SRs) and meta-analyses (MA) have evaluated the relationship between birth (PTB) and asthma, with variations in primary study designs, populations and outcomes.

Objective:

This overview synthesizes the evidence from SRs on the magnitude and direction of the association between PTB and the risk of asthma and wheezing in childhood and adulthood.

Methods:

Comprehensive searches were conducted in four electronic databases up to July 2017. Two independent reviewers independently identified systematic reviews with at least one MA of categorical data on the association between PTB (defined as < 37 weeks gestation) and asthma/wheezing in children and adult populations. Risk of bias of SRs was independently assessed using the ROBIS tool. Panoramic, random-effects model meta-analyses were conducted using the generic inverse variance to pool both MA summary estimates and data from non-overlapping primary studies included in the SRs.

Results:

Of 1,479 records identified by the searches, three SRs were included. Data pooling of three MA showed that PTB was significantly associated with an increased risk of asthma/wheezing (pooled OR [pOR]: 1.49; 95% confidence interval [CI]: 1.26, 1.75). A panoramic MA of data from 1'499,697 participants included in 54 individual studies yielded similar results (pOR: 1.39; 95% CI 1.34, 1.45). Subgroup analyses showed that the magnitude of the PTB effect is greater in children (pOR: 1.40; 95% CI 1.24, 1.57) than in adults (pOR: 1.04 (95% CI: 1.04, 1.05), and larger for wheezing (pOR: 2.55; 95% CI: 1.36, 1.76) compared to asthma diagnosis (pOR: 1.38; 95% CI: 1.33, 1.44).

Conclusions:

PTB is an important early life risk factor for the development of asthma and wheezing in children and adults. The effect of PTB on the risk of asthma is strongest in young age and decreases later in life.

Poster 330

TEN EPIQ STEPS TO IMPROVING CARE AND OUTCOMES IN RURAL TANZANIA

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Background:

Maternal and child health (MCH) remains a priority globally; in Mwanza Region, Tanzania, under-five mortality exceeds 100/1000 live births. Quality Improvement (QI) promotion at health facilities, including equipping bedside providers with basic QI skills, is critical to enhancing MCH service delivery. The 'Evidence-based Practice for Improving Quality (EPIQ)' approach targets providers and in Canada documented newborn improvements.

Objective:

To adapt, pilot and evaluate an EPIQ workshop for rural Tanzania.

Methods:

The 10-step EPIQ workshop is hands-on simulation. Canadian EPIQ experts with African partnership experience adapted the EPIQ package for Tanzania. They then facilitated a one-day EPIQ training-of-trainers to Tanzanian faculty and health managers. The new facilitators then trained selected local health providers. Facilitators and providers completed (1) pre/post QI-focused knowledge tests, (2) pre/post QI confidence surveys and (3) post-workshop satisfaction surveys. Semi-structured group interviews collected facilitator feedback on workshop content and format. Tests/surveys were analyzed using descriptive statistics; semi-structured interview notes were reviewed for key themes and recommendations.

Results:

Workshop materials including flipcharts, workbooks and locally-relevant cases were prepared. In Mwanza, 16 facilitators and 29 providers were trained. Post-workshop, overall knowledge scores increased +7.6% (facilitators) and +2.1% (providers). Aggregate confidence scores (5-point Likert) increased for both groups by a median of +1 (20%). Participant workshop satisfaction scores averaged 4.7/5. Interviews suggested content was relevant though certain terminology was challenging given the language setting; small group, hands-on format encouraged skill development and EPIQ tools fostered critical thinking and problem solving. It was recommended to increase workshop length to two days.

Conclusions:

A clinically-focused, participatory EPIQ training was feasible and well-received in this setting. Despite self-reported confidence increase, a lacking associated knowledge increase may reflect complex content, limited workshop duration or poor knowledge test face validity. Future considerations should include revised content and/or knowledge testing tool, extended length, and post-workshop implementation follow-up to document MCH improvement.

Poster 336

MISOPROSTOL AND FEVER - IS CHORIOAMNIONITIS TO BLAME?

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Background:

Misoprostol is used in obstetrics for labor induction, mainly for second and third trimester termination of pregnancy. One of its important adverse effects, fever, is often thought to be the result of chorioamnionitis. This diagnosis may lead to unnecessary laboratory tests and broad-spectrum antibiotic use.

Objective:

To assess risk factors for fever in labor and histological chorioamnionitis in women induced with misoprostol. To compare the rate of histological chorioamnionitis in women induced with misoprostol, according to the presence or not of fever in labor.

Methods:

This is a retrospective cohort study, conducted at the Centre Hospitalier Universitaire Sainte-Justine, a Canadian tertiary care center in Montreal, Quebec. We reviewed the charts and the samples of placental pathology of 109 women who were induced with misoprostol for pregnancy termination or stillbirth during the second (≥18 weeks) and third trimesters of pregnancy, without evidence of chorioamnionitis before the induction. The clinical protocol included antibioprophylaxis by cefazolin or clindamycin. Histological chorioamnionitis was defined using standardized diagnostic criteria.

Results:

63 women (58%) experienced fever during labor and 25 (23%) had histological chorioamnionitis. Women with fever had significantly higher gestational age (23.4 vs 21.2 wks, p=0.001) and were less often smokers (12.5 vs 33.5%, p=0.045). Histological chorioamnionitis was significantly less frequent in nulliparous compared to multiparous women (16 vs 32%, p=0.05), but was not significantly associated with the number of doses of misoprostol (4 vs 4.5, p=0.604) or with labor length (14 vs 17 hours, p=0.366). Fever was significantly more associated with the clinical diagnosis of chorioamnionitis, but was not significantly associated with histological chorioamnionitis (17.5% vs 30.4%, p=0.112), nor with maternal or fetal inflammatory response as per placental pathological evaluation.

Conclusions:

Our findings suggest that in a context of induction by misoprostol for pregnancy termination, fever is common and should not always be considered a sign of chorioamnionitis.

Poster 337

PLACENTAL GROWTH FACTOR THERAPY IN NEONATAL PGF-/- MICE MODIFIES FETAL DEFICIENCY-INDUCED BEHAVIOURAL AND BRAIN STRUCTURAL AND VASCULAR ALTERATIONS.

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Background:

Children born to preeclamptic pregnancies have cognitive alterations and higher risk of stroke later in life. Placental growth factor (PGF) is known to be deficient in preeclampsia. Adult *Pgf*$^{-/-}$ mice have altered behaviour, brain structure and brain vascularization, indicating PGF influences brain development. We hypothesized that the neonatal period of brain plasticity is a potential window for PGF supplementation of infants born to PGF-deficient mothers to reduce long-term preeclampsia consequences.

Objective:

To assess behavioural, brain structural, and cerebrovascular changes in adulthood after treatment of neonatal *Pgf*$^{-/-}$ mice with PGF

Methods:

Neonatal C57BL/6-*Pgf*$^{-/-}$ mice 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 1-10. As adults, mice underwent behavioural testing including the Tail Suspension Test (TST), Y-maze Spontaneous Alternation Test (Y-maze) and Open Field Test (OFT). Subsequently, mice were perfused with gadolinium contrast for magnetic resonance imaging or with Microfil for micro-computed tomography imaging. One-way ANOVAs or Kruskal-Wallis tests were used to compare groups. Two-way ANOVAs were used to examine sex-dependent differences.

Results:

In the TST, time to immobility showed a sex-specific, dose-dependent increase and was significantly higher in 700 pg/g treated females (41.7 +/- 31.6 in 700 pg/g females versus 9.0 +/- 7.6 in PBS females, $p<0.0001$). Total time immobile was not different between the groups. There was no difference in performance on Y-maze. In the OFT, 10 pg/g-treated mice exhibited significantly decreased time moving ($p<0.0001$), total distance travelled ($p=0.0033$) and percent of time spent in the centre ($p=0.0003$) in both males and females. Image analyses are continuing.

Conclusions:

PGF replacement altered some adult behaviours with decreases in depressive-like and exploratory behaviours in a dose dependent fashion.

Supported by awards from NSERC (BAC) and a CIHR training stipend (VRK)

Poster 338

UPSTREAM REGULATION OF MTORC1 VIA AMPK MODULATES IGFBP1

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Background:

Impairment of fetal oxygen levels and nutrient delivery contributes to fetal growth restriction (FGR), which affects 20% of pregnancies. Such hypoxia induces hepatic Insulin-like Growth Factor Binding Protein 1 phosphorylation (pIGFBP1), which sequesters Insulin-like Growth Factor 1 (IGFI) and markedly reduces fetal growth signaling. The phosphorylation of IGFBP1 in hypoxia is mediated through the mTOR nutrient-sensing signalling pathway. Hypoxia stimulates upstream mTORC1 regulators, AMPK and REDD1. These factors are well-established upstream regulators of one of the two mTOR complexes, mTORC1. The molecular mechanisms by which upstream mTORC1-driven processes regulate pIGFBP1 in hypoxia are unknown.

Objective:

We will determine that AMPK controls pIGFBP1 by modulating mTORC1 signaling due to hypoxia – a key factor in the development of reduced fetal growth *in utero*.

Methods:

Using AMPK activators (AICAR, Aspirin) and inhibitors (Dorsomorphin) with hypoxia (1% pO_2) and normoxia (21% pO_2) for 24 hours, we examined AMPK control of IGFBP1 phosphorylation in human HepG2 cells. Immunoblot analysis (cell lysate) validated AMPK and mTOR activation/inhibition. The IGFBP1 phosphorylation levels were determined via immunoblotting of IGFBP1 phosphosites Ser 101/119/169. Functional significance for hypoxia-induced IGFBP-1 phosphorylation was confirmed by reduced IGFI bioavailability and IGFI signaling activity.

Results:

Activation of AMPK via AICAR/Aspirin resulted in a 1.5-fold increase of IGFBP1 phosphorylation at Ser101, 119, 169 and 50% reduction in mTORC1 activity in normoxia, while inhibition via Dorsomorphin decreased IGFBP1 phosphorylation by 2-fold. In hypoxia, AMPK activation resulted in similar levels of IGFBP1 phosphorylation as seen with either AICAR or hypoxia alone and 50% reduction of mTORC1 activity. Inhibition of AMPK in hypoxia limited pIGFBP1, blocking hypoxic inhibition of mTORC1 and limiting decreases in IGF-I bioactivity.

Conclusions:

Upstream mTORC1 regulation via AMPK modulates IGFI signaling activity in hypoxia through IGFBP1 phosphorylation. Further study of upstream mTORC1 regulators may provide greater insight on IGFBP1 regulation and the pathophysiology of FGR.

Poster 339

REGULATION OF CYTOSKELETAL DYNAMICS IN TROPHOBLASTIC CELL BY LOW OXYGEN CONDITIONS.

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Background:

Successful human pregnancy is dependent on the orchestrated proliferation, differentiation and invasion of maternal endometrium by the cytotrophoblast cells. These processes require a dynamic cytoskeleton and may be dysregulated under low oxygen conditions. However, the mechanism by which trophoblast cells respond to oxygen levels are still poorly understood.

Objective:

The aim of this study was to evaluate structural and functional properties of BeWo cells grown at low-oxygen (3 and 8% O_2) compared to *culture* in *traditional* room air conditions (20% O_2).

Methods:

Cytotrophoblast and syncytiotrophoblast (BeWo undifferentiated/differentiated cell state respectively) were used for experiments. Cytotrophoblast differentiation was stimulated with 8-Bromo cAMP and cells were maintained at 37 °C in either 3%, 8% or 20% O_2 for 72 H and then collected for western blotting and IHC determinations. Cell morphology and actin filament organization were visualized by phalloidin staining. Trophoblast differentiation was evaluated by hCG protein level and cellular hypoxic response was confirmed by expression of HIF-1α.

Results:

Immunohistological analysis revealed that altering oxygen tension results in a profound change of cytotrophoblast morphology. At 20% O_2 BeWo cells were triangular and elongated (fibroblast-like phenotype) whereas at low-oxygen levels (3 and 8% O_2) cells were polygonal and grew as colonies with well organized cell borders (epithelial-like phenotype). BeWo cells cultured at 8 and 20% O_2 expressed hCG after 72 H stimulation, however no hCG was detected in cells cultured at 3% O_2. HIF-1α protein was significantly increased in cells cultured at 3% O_2 (7 fold increase) and slightly increased at 8% O_2 (2 fold increase) when compared to 20% O_2.

Conclusions:

Our study provides evidence that low-oxygen levels (3 and 8% O_2) induce a dynamic remodeling of actin organization in cytotrophoblast. In the future, we seek to better understand the impact of oxygen levels on trophoblast metabolism to develop potential novel strategies.

Poster 340

WELCOME TO PARENTHOOD™: COMBINING NEUROSCIENCE AND MENTORSHIP TO IMPROVE MATERNAL PERINATAL PSYCHOSOCIAL HEALTH

Karen M Benzies, University of Calgary; **Melody Loewen**, University of Calgary

Background:

Nearly one third of kindergarten children in Alberta are at risk of developmental delay. In many cases, the risk of delay can be mitigated by providing simple, science-based supports to strengthen the child's early life environment through supports for parents.

Objective:

The objective of this study was to design and evaluate *Welcome to Parenthood*™, which is a three-component, community-based intervention to support first-time parents in the transition into early parenthood.

Methods:

We recruited 555 mother/infant dyads and 543 mentors through Parent Link Centres at 11 sites in Alberta. At 32 weeks gestation, mothers, fathers, and mentors participated in a 2-hour class that included: (1) neuroscience-based parenting education, (2) mentorship from a member of the families' social network, and (3) an engagement tool (bassinet-sized box with evidence-informed essentials for mothers and newborns). We measured maternal depressive symptoms and adverse childhood experiences at recruitment, and depressive symptoms at 2 and 6 months postpartum.

Results:

Between 32 weeks gestation and 6 months postpartum, maternal depressive symptoms decreased. However, when we controlled for maternal adverse childhood experiences, this relationship was no longer significant. That is, more adverse childhood experiences decreased the likelihood that *Welcome to Parenthood*™ would improve maternal perinatal psychosocial health.

Conclusions:

Mothers with adverse childhood experiences may need more intensive supports during the transition from pregnancy to early parenthood. Similar to recommendations in the 2017 Australian practice guideline, symptom-based assessment of psychosocial health in all women during the perinatal period is important to optimize early identification and treatment.

Poster 342

THE HEALTH CARE SYSTEM IS MAKING "TOO MUCH NOISE" TO PROVIDE FAMILY CENTRED CARE: HEALTH CARE PROVIDER PERSPECTIVES

Meredith Brockway, University of Calgary; **Karen Benzies**, University of Calgary; **Esther Suter**, University of Calgary; **Vibhuti Shah**, University of Toronto; **Khalid Aziz**, University of Alberta; **Abhay Lodha**, University of Calgary; **Renee Misfeldt**, Health Services Evidence and Evaluation, Alberta Health Services

Background:

Family centred care (FCC) is the recommended philosophical approach to health care, particularly for hospitalized infants and young children, and may improve outcomes for both children and parents. Philosophically aligned with the principles of FCC, intentionally integrating families into the care of their preterm infant in the neonatal intensive care unit (NICU) is emerging as a new model of care. Yet, most health care providers (HCP) do not receive specialized training to provide FCC and evidence of the effectiveness of FCC initiatives is limited.

Objective:

The objective of this study was to understand, from the perspective of HCP, the facilitators and barriers to providing FCC.

Methods:

We purposive sampled HCP from ten level II NICUs, and conducted semi-structured telephone interviews to explore their perspective about care on their unit. We used thematic data analysis.

Results:

The 34 participants were nurses (n = 20), physicians (n = 8); and allied healthcare disciplines (n = 6). Seventeen themes emerged, of which, only four were related to FCC: (1) communication and information sharing, (2) parenting education, (3) family support, and (4) outcomes of care. The remaining themes focused on workplace challenges such as: (1) staff workload and turnover; (2) insufficient time, resources and training to provide quality care; (3) multi-disciplinary team conflict; (4) inadequately defined models of care; (5) physical constraints in the NICU; and (6) outdated or missing policies and procedures. An overarching theme emerged: the health care system is making "too much noise" to provide family centred care.

Conclusions:

Although HCP are passionate and committed to caring for infants and their families in NICU, they are distracted by the requirements of the health care system, which creates a barrier to providing family centred care.

Poster 345

PROGRAMMING BY ANCESTRAL STRESS RESULTS IN SEX-SPECIFIC ANXIETY AND INFLAMMATORY RESPONSES IN AGING RATS

Mirela Ambeskovic, University of Lethbridge; **Han Lee**, University of Alberta; **Jamshid Faraji**, University of Lethbridge; **David M Olson**, University of Alberta; **Gerlinde A.S Metz**, University of Lethbridge

Background:

Exposure to stress early in life is associated with increased inflammation and anxiety-like behaviours in adulthood. In particular, severe prenatal stress can result in elevated levels of interleukin-1B (IL-1B), a pro-inflammatory marker linked to accelerated aging processes and declining mental health. Recent studies showed that biological signatures induced by prenatal stress may be transferred across multiple generations to compromise mental health throughout the lifespan in unexposed offspring.

Objective:

Here we investigated age-dependent changes in anxiety-like behaviours and inflammatory response in ancestrally stressed rats.

Methods:

In this study, F4 generation male and female rat offspring were derived from a lineage in which their ancestral mothers (F0-F3) were stressed by social isolation either once (transgenerational stress) or across multiple (multigenerational stress) generations. The offspring were assessed for anxiety-like behaviours at the age of 6 (young), 12 (middle aged) and 18 (aged) months using an elevated plus maze task. Behavioural outcomes were related to plasma levels of IL-1B, which was measured using a Bio-Plex Pro cytokine assay.

Results:

The findings indicate that aging increases risk of anxiety-like behaviours along with circulating plasma IL-1B levels. Different types of ancestral stress, however, induced sex-specific effects. Transgenerationally stressed males were most anxious while multigenerationally stressed females showed the highest levels of anxiety when compared to other groups. Transgenerationally stressed males at middle age showed reduced IL-1B levels followed by a substantial increase later in life, whereas multigenerationally stressed females showed increased IL-1B levels only at 18 months of age.

Conclusions:

These findings suggest that ancestral programming of inflammatory activity is associated with mental wellbeing, and that different types of ancestral stress exert sex-specific effects. IL-1B may represent a predictive biomarker of age-related emotional well-being.

Poster 346

CHOLESTEROL MODULATES THE FUNCTION OF THE CHEMOSENSORY BITTER TASTE RECEPTOR 14 (T2R14) IN HUMAN AIRWAY SMOOTH MUSCLE CELLS

Feroz Ahmed Shaik, University of Manitoba

Background:

Bitter taste receptor 14 (T2R14) has been implicated in mediating brochodilatory and antimitogenic responses in human airway smooth muscle. Cholesterol, a structural component of human airway smooth muscle cell (HASMC) membrane plays a modulatory role in various cell membrane receptor mediated signaling events.

Objective:

This led to our current hypothesis that cholesterol plays a regulatory role mediating T2R14 function in HASMCs.

Methods:

Pharmacological characterization of three GPCRs (two Class A and T2R14) that signal through calcium was carried out using fluorescence based calcium mobilization assays. Membrane cholesterol availability to the receptors was modulated by treating the cells with methyl-ß-cyclodextrin. Enzymatic determination of membrane cholesterol content was carried out using commercially available kits. Immunoblotting was used to characterize protein expression.

Results:

The expression of T2R14 and other Gq coupled class A GPCRs, Angiotensin II Type 1 receptor (AT1R) and Thromboxane A2 receptor (TP) in HASMCs was confirmed using western blot. Cholesterol depletion leads to impairment of AT1R and TP receptor signaling. Strikingly, cholesterol depletion leads to an increase in T2R14 agonist (Diphenhydramine or Flufenamic acid) induced signaling compared to the control group (assessed by the EC_{50} shifts for the corresponding agonists). The effect of cholesterol depletion on the GPCR mediated responses of T2R14, AT1R and TP was restored to control levels in cholesterol-replenished groups. The role of specific cholesterol recognition motifs in T2R14 is being investigated by site-directed mutagenesis.

Conclusions:

This study demonstrates that T2R14 function in HASMCs is sensitive to membrane cholesterol. Cholesterol may play a regulatory role in T2R14 signaling by forming specific interactions with the receptor. In view of the emerging role of T2Rs as novel targets in obstructive airway diseases, these results provide novel insights on innate mechanisms influencing T2R signaling in airways.

Poster 349

DEVELOPING A NOVEL SCREENING TOOL FOR PRETERM BIRTH: DETECTING CHANGES OF THE EXTRACELLULAR MATRIX IN THE MURINE CERVIX BY BIOCHEMICAL ANALYSES AND MAGNETIC RESONANCE IMAGING (MRI) DURING TERM AND PRETERM LABOR.

Antara Chatterjee, Lunenfeld-Tanenbaum Research Institute; **John Sled**, SickKids Hospital; **Stephen Lye**, Lunenfeld-Tanenbaum Research Insitute; **Oksana Shynlova**, Lunenfeld-Tanenbaum Research Institute

Background:

Preterm birth (PTB) rates are increasing worldwide while current methods of its prediction and prevention are inadequate. Premature dilation of the cervix, due to cervical insufficiency, leads to PTB.

Objective:

To assess whether cervical changes observed during term labor (TL) are similar during preterm labor (PTL), and to combine biochemical analyses of the extracellular matrix (ECM) and magnetic resonance imaging (MRI) of the cervix with the goal of developing a sensitive screening tool for PTB.

Methods:

Cervical tissues were collected from non-pregnant and pregnant CD-1 mice at gestational day (GD) 15, 17, 18, 19.5 and during TL (n=4/GD). To mimic idiopathic or infection-induced PTL, mice were injected with progesterone receptor antagonist RU486 or lipopolysaccharide (LPS) on GD15 (n=4/group) and sacrificed during PTL. RT-qPCR was used to evaluate gene expression of structural proteins (*Col1* and *Col3*), proteins involved in ECM synthesis (*Has2),* degradation (*Mmp2, Mmp9, Timp1* and *Timp2*) and maturation (*Bmp1*, *Adamts2*, *Adamts14*, *Lox, Loxl1, Loxl2*). One-way ANOVA and t-tests were used for statistical analyses. A T2-weighted MRI sequence was applied using a 7-tesla scanner to assess structural changes in the mouse cervix across gestation.

Results:

mRNA levels of major ECM proteins (*Col1, Col3, Adamts2, Adamts14, Bmp1, Mmp2, Mmp9, Timp1*, *Timp2, Lox, Loxl1,* and *Loxl2*) were significantly ($p<0.05$) downregulated in the mouse cervix during TL and LPS-induced PTL. Cervical *Has2* was significantly ($p<0.05$) upregulated during TL, but was not induced in the PTB models. MRI studies on mice showed reduced cervical length across term gestation

Conclusions:

Decreased rigidity of the murine cervix is caused by changes in the ECM composition in preparation for TL, providing a molecular basis for the structural changes seen in MRI. Similar cervical changes can be seen in the PTB models thus showing the potential of combining biochemical analyses and MRI as a novel screening tool for PTB prediction.

Poster 350

SEX-SPECIFIC EFFECTS OF ANCESTRAL STRESS ON CORTICAL NEURONAL DENSITY IN AGING RATS

Carson D Turner, University of Lethbridge; **Mirela Ambeskovic**, University of Lethbridge; **Sorina Truica**, University of Lethbridge; **Keiko J McCreary**, University of Lethbridge; **Gerlinde A.S. Metz**, University of Lethbridge

Background:

Evidence-based studies have concluded that there are many adverse effects of stress on brain development and overall health. Specifically, stress during pregnancy may lead to permanent morphological alterations in the offspring brain and potentially even subsequent generations.

Objective:

Our experiment was designed to analyze the changes in neuronal density in the prefrontal cortex across the lifespan of rats whose ancestors were prenatally stressed.

Methods:

The study involved offspring born to three different lineages of rats: F4 generation transgenerationally stressed offspring whose pregnant great-grand mothers were stressed during pregnancy, multi generationally stressed offspring with the mothers being stressed across three consecutive generations, and non-stressed controls. Their brains were examined at 6, 12 and 18 months of age using magnetic resonance imaging (MRI), images acquired with a 4.7T Oxford preclinical magnet. An ROI based analysis was performed on the T2 structural images using ImageJ software to measure mean grey value of the prefrontal cortex.

Results:

Age overall had the most profound influence of neuronal density. Across the lifespan, mean grey value decreased in all groups. This decrease was most prominent between 6 months and 12 months in both males and females. Males started with a higher average mean grey value, and decreased to a lower average than female counterparts. Clear differences were observed between transgenerationally stressed males and females at 18 months. Thus, the changes were more profound in males than females. In addition, multigenerational stress generally reduced the mean grey value compared to transgenerational stress.

Conclusions:

These findings reveal sex-specific morphological consequences of ancestral stress in the prefrontal cortex of aging rats. Aging *per se* represents a significant determinant of neuronal density and its effects are exacerbated by ancestral stress. Cortical tissue in females seems more resilient to stress over generations than in their male counterparts.

Poster 353

URBAN-RURAL VARIATIONS IN THE PREVALENCE OF MATERNAL RISK FACTORS FOR PRETERM BIRTH AND SMALL FOR GESTATIONAL AGE IN ALBERTA (2006-2012)

Jesus Serrano-Lomelin, University of Alberta; **Maria Ospina**, University of Alberta; **Charlene Nielsen**, University of Alberta; **Manoj Kumar**, University of Alberta; **Alvaro Osornio-Vargas**, University of Alberta

Background:

Spontaneous preterm birth (sPTB) and small for gestational age (SGA) are recognized multifactorial health outcomes.

Objective:

We aimed to understand the regional and temporal variations of known maternal risk factors of sPTB and SGA in urban-rural Alberta (Canada).

Methods:

We conducted a population-based retrospective cohort study of mothers with live-born singletons in Alberta (2006-2012). We estimated the annual and period prevalence (PP) of sPTB, SGA and smoking/substance use during pregnancy, pre-pregnancy overweight (>91kg), gestational hypertension/diabetes, in urban and rural regions according to three maternal age groups (<20; 20-34, and >34 years old). Two-samples proportion tests and linear regression trends were applied.

Results:

We studied a total of 330,957 records. Key results showed: (i) the PP of sPTB was statistically similar between urban and rural settings (ranged from 5 to 8% across age groups); (ii) the urban PP of SGA was significantly higher (9.5%) than rural (6.9%) and its annual prevalence increased over time in the older maternal age group; (iii) the PP of substance use during pregnancy was consistently 2% higher in each age group in rural *vs*. urban; (iv) the rural PP of smoking during pregnancy was about 8% higher than the urban in mothers <20 years old; (v) the urban PP of gestational diabetes was higher than rural, particularly in older mothers (10.2% *vs.*7.4%, respectively); (vi) the rural PP of overweight (10.5%) was significantly higher than urban (8%); and (vii) the annual prevalence of gestational hypertension decreased over time (≈5%) only in the urban young and the 20-34 age group mothers.

Conclusions:

We identified clear different patterns in the prevalence of SGA and maternal risk factors for sPTB and SGA in urban and rural Alberta. These findings suggest that regionally targeted interventions could help to mitigate the impact of those risk factors on sPTB and SGA in Alberta.

Poster 355

DESCRIBING YAP EXPRESSION DURING NORMAL LUNG AND NITROFEN-INDUCED HYPOPLASTIC LUNG DEVELOPMENT AND CONGENITAL DIAPHRAGMATIC HERNIA.

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Background:

Hippo signaling is essential for controlling the development of organ size by regulating cell proliferation, cell death, and stem cell self-renewal. Core to the Hippo pathway is a kinase cascade, transcription co-activator Yes-associated protein (Yap). Recent data showed that Yap is essential for airway branching in normal lung development.

Objective:

We hypothesize that disrupted expression of Yap is associated with abnormal lung development in the nitrofen rat model of congenital diaphragmatic hernia (CDH).

Methods:

We induced abnormal lung development and CDH by gavaging nitrofen - a herbicide - to dams on embryonic day (E) 9. Lungs were isolated at E15 and E21 and processed for immunofluorescence and Western blotting with an antibody for YAP (1:100). We used a Zeiss epi-florescent microscope and confocal microscopy to visualize the localization of Yap.

Results:

We found that in E15 control rat lungs, Yap is expressed in the nuclei of mesenchymal cells and airway epithelium. In E15 nitrofen-induced hypoplastic lungs, Yap is expressed in the cytoplasm of the airways. In E21 control rat lungs, Yap was mostly expressed in the cytoplasm of the airway epithelium. In these lungs, Yap was also expressed in the nuclei of the mesenchymal cells and airway epithelium.

Conclusions:

When the Hippo pathway is not activated, Yap is dephosphorylated by a kinase called LATS1 or LATS2. Upon activation, phosphorylated Yap will translocate to the nucleus and regulate gene expression by binding to transcription factors. Our results suggest that Yap is not active during early nitrofen-induced hypoplastic lung development. This might explain observed decreased proliferation in these lungs. Later in lung development, Yap is activated, but this seems to be too late for nitrofen-induced hypoplastic lung development.

Poster 356

VITAMIN A: A KEY FACTOR IN THE FORMATION OF CONGENITAL DIAPHRAGMATIC HERNIA

Ayanna Rocke, University of Alberta; **Tim Dalmer**, University of Alberta; **Tianna Clarke**, University of Alberta; **Robin Clugston**, University of Alberta

Background:

Congenital Diaphragmatic Hernia (CDH), a birth defect that occurs in approximately 1 in every 3,000 births, arises when the diaphragm fails to form properly during fetal development. CDH is known to cause breathing problems in newborns and is a significant cause of perinatal mortality. The cause of CDH is poorly understood. Retinoic acid is an active metabolite of dietary vitamin A, and it has been proposed that abnormal retinoic acid signaling plays a substantial role in the development of CDH.

Objective:

The goal of this study was to test the hypothesis that maternal Vitamin A status influences the development of teratogen-induced CDH in a mouse model.

Methods:

We induced CDH in the offspring of mice treated with a combination of nitrofen (2,4-Dichlorophenyl 4-nitrophenyl ether) and bisdiamine (N,N'-bis (dichloroacetyl)-1,8-octamethylenediamine). Offspring were collected via dissection and the effect of the teratogen on the incidence and severity of CDH were recorded. Maternal vitamin A status was manipulated by feeding mice diets with marginal, sufficient or excess-vitamin A content. Vitamin A status was confirmed in maternal and fetal tissues by HPLC.

Results:

We have established a teratogenic model of CDH in mice, and determined that 0.5 g/kg of teratogen is optimal for the induction of CDH. Next, we have shown that manipulating dietary vitamin A content of female mice changes their vitamin A status, which we validated by HPLC. Continuing studies are investigating the impact of altered maternal vitamin A status on teratogen-induced CDH.

Conclusions:

Teratogen treatment induces CDH in mice, and ongoing studies are examining the effect of maternal vitamin A status on this phenomenon. This research provides new insight into the etiology of CDH, and highlights the need for future studies on the role of Vitamin A and its derivatives on diaphragm development.

Poster 358

TRENDS IN PRENATAL EDUCATION AND PROVIDER PREFERENCE IN ALBERTA: ARE THEY ALIGNED WITH THE READY OR NOT CAMPAIGN ON PREGNANCY PREPAREDNESS? RESULTS FROM THE ALL OUR BABIES PREGNANCY COHORT.

Dhwani Debjani Paul, School of Public Policy, University of Calgary; **Shainur Premji**, School of Public Policy, University of Calgary; **Sheila McDonald**, Alberta Health Services, University of Calgary; **Jennifer Zwicker**, School of Public Policy, University of Calgary

Background:

Prenatal education is an important aspect of pregnancy care. Women have choice in selecting what healthcare provider they see for their first prenatal visit. To offer more comprehensive and consistent prenatal education for Albertans, the province launched a novel family planning and pregnancy preparedness campaign, *Ready or Not,* designed to provide prenatal education through an Internet-based platform.

Objective:

The purpose of this study was to investigate factors that influenced the selection of a medical doctor or registered midwife for the first prenatal visit, and variations in prenatal education by provider type.

Methods:

Data was drawn from the Albertan *All Our Babies* community based pregnancy cohort (n=3200). Preconception and prenatal education topics included those covered in the *Ready or Not* campaign such as nutrition, vitamin and mineral intake, weight management, exercise and active living, working during pregnancy, and consumption of non-/prescription drugs, tobacco and alcohol. Bivariate analysis was conducted using Chi-square test.

Results:

Demographic characteristics that were significantly ($p<0.01$) associated with the receipt of any prenatal advice from a healthcare provider included birth/residence in Canada for >5years, higher education and income, being white/Caucasian and nulliparity. Women whose pregnancies were unplanned were less likely to receive family planning information from a healthcare provider. Those who saw a registered midwife were more likely to receive prenatal education on nutrition, vitamins and mineral supplements intake, exercise and active living and working during pregnancy from the *Ready or Not* campaign's topics.

Conclusions:

This study renders important insights on the role of demographic characteristics and the decision-making process of selecting a medical doctor or a registered midwife for an initial prenatal care visit, and the type of prenatal education received by women at this visit. These findings can further inform current public preconception health campaigns such as *Ready or Not* and future health promotion projects.

Population Characteristics and Receipt of Prenatal Information

Table 1. Population characteristics based on receiving information about becoming pregnant or pregnancy planning from a healthcare provider (n=3351).

	Received information n= 1251	**Did not receive information n= 1882**	**p-value**
Time in Canada	**n (%)**		
Born in Canada/lived here >5 years	1159 (41.2%)	1655 (58.8%)	<0.000
Lived in Canada <5 years	89 (29.1%)	217 (70.9%)	
Education			
High school or less	94 (27.9%)	243 (72.1%)	<0.000
Some or complete uni/college	925 (40.3%)	1371 (59.7%)	
Some or complete graduate school	232 (47.1%)	261 (52.9%)	
Ethnicity			
Other	236 (35.3%)	433 (64.7%)	0.005
White/Caucasian	1015 (41.3%)	1442 (58.7%)	
Total income, before taxes and deductions			
$39,999 or less	60 (21.4%)	220 (78.6%)	<0.000
$40,000-$79,999	227 (34.3%)	434 (65.7%)	
$80,000 or more	928 (44.5%)	1158 (55.5%)	
Parity			
No previous birth to a fetus <24 months	710 (46.6%)	815 (53.4%)	<0.000
Previous birth to a fetus <24 months	539 (33.9%)	1051 (66.1%)	

Table 4. Bivariate analyses examining the association between health care provider pregnancy planning information receipt and various birth control practices.

	Received info n=1251	**Did not receive info n=1882**	**p-value**
Were you or your partner keeping from getting pregnant?	**n (%)**		
All or most of the time	155 (27.1%)	417 (72.9%)	<0.000
Some, a little or none of the time	962 (44.5%)	1199 (55.5%)	

Type of Healthcare Provider Chosen and Receipt of Prenatal Information

Table 6. Bivariate analyses examining the association between the type of healthcare provider consulted (a medical doctor such as a walk-in clinic physician, family physician, physician in a low-risk maternity clinic or obstetrician versus a midwife) and the likelihood of receiving prenatal advice and education on nutrition, vitamin or supplements, alcohol consumption, exercise or active living, appropriate amount of weight gain, working during pregnancy, non-/prescription drug use, cigarette smoking and second-hand smoke.

	Saw a medical doctor n= 2968	**Saw a midwife n= 156**	**p-value**	**Crude OR (95% CI)**
	n (%)			
During your prenatal visit, have you received advice on nutrition?				
No	888 (98.6%)	13 (1.4%)	<0.000	4.96 (2.81, 8.87)
Yes	1901 (93.2%)	139 (6.8%)		
During your prenatal visit, have you received advice on taking vitamins or mineral supplements?				
No	400 (98.0%)	8 (2.0%)	0.002	3.01 (1.47, 6.19)
Yes	2389 (94.3%)	144 (5.7%)		
During your prenatal visit, have you received advice on alcohol consumption during pregnancy?				
No	1423 (95.2%)	72 (4.8%)	0.380	1.16 (0.84, 1.61)
Yes	1366 (94.5%)	80 (5.5%)		
During your prenatal visit, have you received advice on exercise or active living during pregnancy?				
No	1056 (97.3%)	29 (2.7%)	<0.000	2.58 (1.71, 3.90)
Yes	1733 (93.4%)	123 (6.6%)		
During your prenatal visit, have you received advice on appropriate amount of weight gain?				
No	944 (95.9%)	40 (4.1%)	0.055	1.44 (0.99, 2.07)

Yes	1845 (94.3%)	112 (5.7%)		
During your prenatal visit, have you received advice on working during pregnancy?				
No	1418 (95.8%)	62 (4.2%)	0.016	1.50 (1.08, 2.09)
Yes	1371 (93.8%)	90 (6.2%)		
During your prenatal visit, have you received advice on non-/prescription drugs during pregnancy?				
No	1078 (94.3%)	65 (5.7%)	0.311	0.84 (0.61, 1.17)
Yes	1711 (95.2%)	87 (4.8%)		
During your prenatal visit, have you received advice on cigarette smoking and second-hand smoke?				
No	1631 (95.0%)	86 (5.0%)	0.643	1.08 (0.78, 1.50)
Yes	1158 (94.6%)	66 (5.4%)		

Poster 359

ASSOCIATION BETWEEN INTRAVENTRICULAR HEMORRHAGE (IVH) AND THE TREATMENT OF PATENT DUCTUS ARTERIOSUS (PDA) IN EXTREME PRETERM INFANTS

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Background:

The medical literature regarding the impact of PDA treatment on the incidence of IVH is contradicting

Objective:

To determine the prevalence of IVH among neonates who received treatment for PDA closure in the first 72 hours of life and beyond

Methods:

We performed a retrospective cohort study examining all infants born at a gestational age of less than 29 weeks and admitted to the Neonatal Intensive Care Unit at Foothills Medical Centre in Calgary, Canada, between January 1, 2013 and December 31, 2016 with at least one head ultrasound performed in the first week of life. The decision to treat a PDA was used as a marker of its clinical significance. The secondary analysis examined the subset of these neonates who had an echocardiogram or Targeted Neonatal Echocardiogram (TNE) to detect a hemodynamically significant PDA (HsPDA) in the first 72 hours of life. The tests used were two-sided and significance was defined as p-value < 0.05.

Results:

Of the 495 neonates in the primary analysis, 24% had IVH of any grade and 10% had severe IVH. The group with IVH had more treated PDAs than the group without IVH (59% vs. 34%, p<0.001). We did not detect a significant difference in IVH between neonates with early treatment of PDA compared to late treatment (33% vs. 37%, p = 0.6). We performed a secondary analysis of 200 neonates with cardiac imaging in the first 72 hours of life. Of these, 61 (31%) had a HsPDA and 23 (12%) had severe IVH. However, of those with severe IVH, only 22% had a HsPDA (p = 0.37) (Table 1).

Conclusions:

We did not detect a difference in the incidence of IVH in neonates who received PDA treatment in the first 72 hours of life or had HsPDA on early imaging

Table 1: PDA status and IVH

	Total cohort with available PDA data n = 495		p-value	Early Echo group n = 200		p-value
	No PDA treatment n = 297	Any PDA treatment n = 198		No HDsPDA n = 139	HDsPDA n = 61	
Any IVH, n (%)	50 (17%)	71 (36%)	<0.001	43 (31%)	19 (31%)	0.86
Severe IVH, n (%)	27 (9%)	22 (11%)	0.46	18 (13%)	5 (8.2%)	0.37

PDA: patent ductus arteriosus
IVH: intraventricular hemorrhage
HDsPDA: hemodynamically significant PDA. A PDA was deemed to be "hemodynamically significant" if the transductal diameter measured at its narrowest dimension was >1.5 mm, with a peak systolic velocity <1.5m/s, as well as either predominantly or complete left to right shunting.

Poster 360

STUDY OF PERSONAL AND TRANSGENERATIONAL STRESS ON MATERNAL AND FETAL HEALTH IN PFORZHEIM

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Background:

Chronic and accumulated stress has a lasting impact on a body, which can lead to physical and psychological problems. Research shows that biological signatures of chronic stress can be transferred to subsequent generations and influence adult complex disease risk. This study is designed to determine the effects of personal and transgenerational stress and its outcome on maternal and offspring health in the City of Pforzheim, Germany. Pforzheim is uniquely suited for this investigation due to severe destruction during World War II affecting the F2-F3 generations, and a large migrant population with potentially adverse experiences in generations F0-F1.

Objective:

We hypothesize that personal and transgenerational stress lead to negative pregnancy outcomes, such as preeclampsia, premature labor, and premature birth.

Methods:

An epidemiological, nested case-control study is planned for 300 woman-child dyads from the City of Pforzheim at their first presentation at a doctor with and without influencing factors, comparable sociodemographic and somatic factors. Lifestyle, stress and transgenerational stress, as well as protective and moderating factors will be discussed. Omics biomarkers linked to higher risk of adverse pregnancy and neurodevelopmental outcomes will be assessed in relation to pre- and postnatal medical records to identify new predictive and diagnostic signatures. Outcomes will be linked to lifetime and ancestral stress, such as war trauma, migration and other adverse life events.

Results:

Preliminary data shows that Pforzheim has higher rates of low/very low birth weight per 1000 births compared to the rest of Germany. Children obesity rates for ages 4 to 5 are higher than the national average; and male suicide rates are significantly higher than the national average.

Conclusions:

We anticipate that personal and ancestral adverse experiences introduced biological signatures of chronic stress that significantly determine health outcomes in the population of Pforzheim. This study will suggest tools to increase stress resilience and support maternal and fetal health.

Poster 361

RISK OF CARDIOVASCULAR DISEASE AFTER PREECLAMPSIA, HELLP AND OTHER HYPERTENSIVE DISORDERS OF PREGNANCY: A SYSTEMATIC REVIEW AND META-ANALYSIS

Emily Walker, The Ottawa Hospital; **Rony Lahoud**, University of Vermont Medical Centre; **Darine El-Chaar**, The Ottawa Hospital

Background:

Hypertensive disorders during pregnancy has been purported to be associated with longterm cardiovascular risk. There lacks specific systematic reviews and meta-analysis of literature of the risk of premenopausal cardiovascular disease in parous women who had HDP.

Objective:

Conduct a meta-analysis using systematic review methods for evaluating HDP-induced cardiovascular risk evidence, which will be used to provide recommendations for long term post-partum follow up.

Methods:

Literature searches using MEDLINE and EMBASE, supplemented by hand search. Literature search revealed 4,162 articles and abstracts after combining both PubMed and Embase. 461 were excluded as duplicates and 3611 were excluded for irrelevance. The remaining 90 studies were reviewed for full text for eligibility criteria and 10 studies were included in systematic review and only 7 were included in the quantitative analysis. A PRISMA diagram demonstrating the flow of study selection and causes of exclusion of studies. Studies need to include patients with hypertensive disorder of pregnancy (preeclampsia, eclampsia, HELLP, all other related hypertensive disorders). The outcomes included must include either 1) Ischemia, 2) Angina, 3) Myocardial infarction, 4) Ischemic death and 5) Cardiovascular death. Participants, and interventions: Pregnant women with hypertensive disorders of pregnancy. No specific intervention studied. Study appraisal and synthesis: Study screening was performed through Covidence using two independent teams of reviewers and consensus process was then used. Data was extracted from each study using two independent reviewers. Data synthesis was performed to generate measure of association between HDP and the risk of ischemic heart disease and cardiac mortality, with the analysis generated using STATA. Registration: PROSPERO (CRD42016048087).

Results:

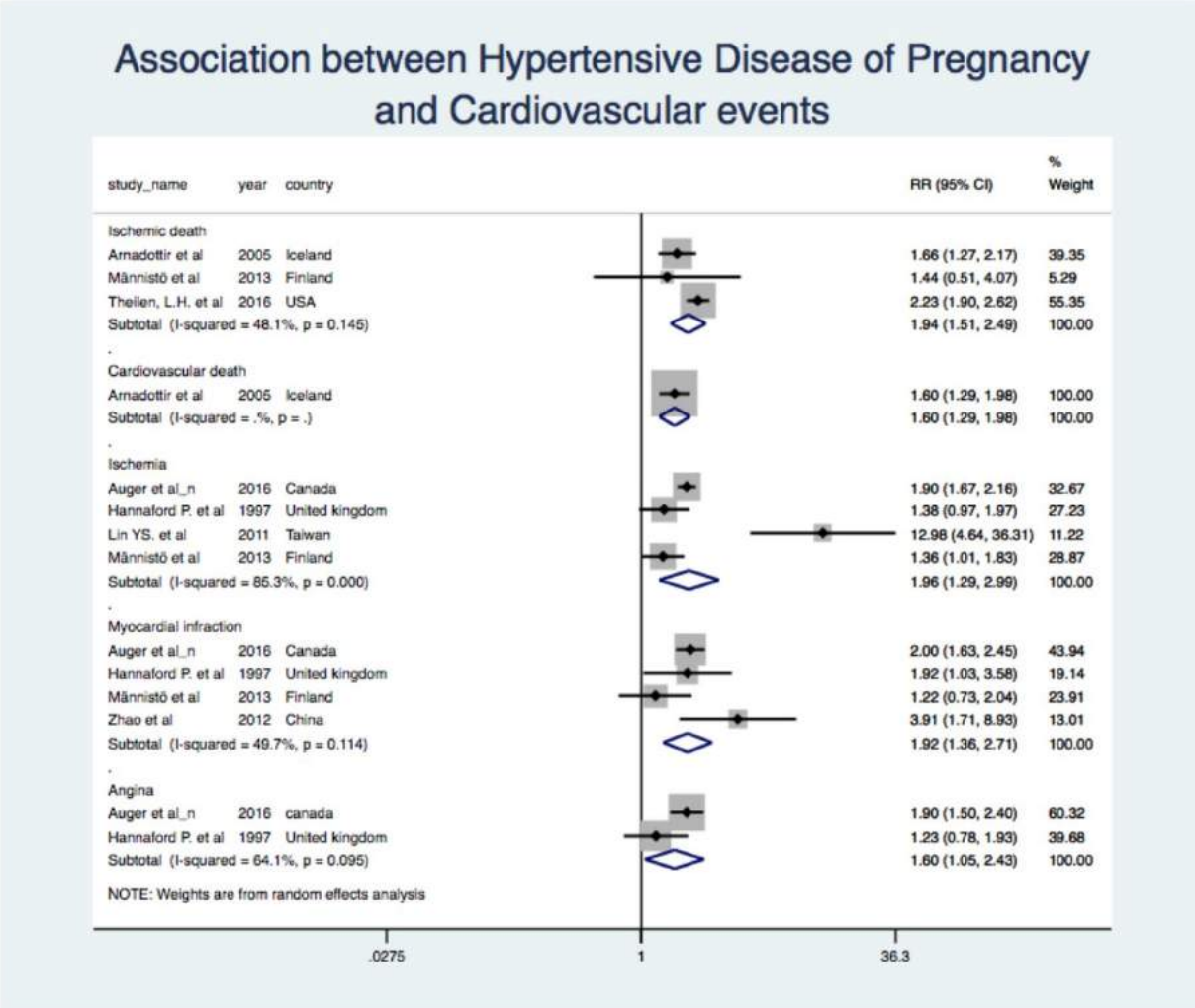
History of HDP increases the risk of cardiovascular complications following pregnancies. (Meta-analysis table)

Conclusions:

The analysis finds supportive evidence for increased cardiovascular risk associated with a history of HDP. A potential implication would be closer follow-up postpartum for women with HDP to help minimize such risk.

Forest plot for hypertensive disease of pregnancy and cardiovascular events

Auger et al study presented in figure 1 is for association between non-recurrent hypertensive disease of pregnancy and cardiovascular events in two deliveries or more compared to normotensive women



Poster 362

EFFECTS OF OXYGEN TENSION ON FIRST TRIMESTER INVASIVE TROPHOBLAST BIOLOGY USING PLACENTAL EXPLANT MODELS

Jenna Elizabeth Treissman, British Columbia Children's Hospital Research Institute; **Alexander Guillermo Beristain**, British Columbia Children's Hospital Research Institute

Background:

Oxygen is essential to sustain life, but it can be toxic at inappropriate concentrations. Research has demonstrated that oxygen tension is involved in regulating essential processes for the development of the placenta, such as trophoblast invasion into the maternal decidua and spiral artery remodelling. Importantly, improper trophoblast invasion and impaired remodelling of the maternal arterioles during first trimester of pregnancy can result in a predisposition to placental dysfunction and pregnancy complications such as placenta accreta, fetal growth restriction, and preeclampsia.

Objective:

The goal of this study is to characterize how changes in oxygen concentration might affect trophoblast migration and invasion. We hypothesized that hypoxic conditions will promote more aggressive trophoblast migration and column outgrowth.

Methods:

To accomplish this goal, we isolated placental villi (N=25) donated by consenting women between 6 and 12 weeks gestation who were undergoing selective abortion at the British Columbia Women's Hospital CARE clinic. Villi were embedded in Matrigel matrix and cultured in 1%, 5% and 20% oxygen environments for 48 hours at 37°C. Villi were imaged at zero and 48-hour time points and column outgrowth length and area were measured using ImageJ software. Outgrowth at zero and 48 hours were compared for each group, and a one-way ANOVA was conducted to determine statistical significance.

Results:

A low oxygen environment (1%) promoted a significant increase in explant outgrowth length ($p<0.05$) and area ($p<0.01$) after 48 hours of culture when compared to 5% and 20% oxygen environments. Outgrowth area differences were more significant than length differences. We did not observe significant differences in outgrowth between 5% and 20% oxygen conditions.

Conclusions:

Our results indicate that low oxygen levels promote trophoblast anchoring column outgrowth. These findings suggest that low oxygen tension may be involved in the pathophysiology of pregnancy complications characterized by excessive placental invasion, such as placenta accreta.

Poster 364

FETAL SCALP LACTATE SAMPLING: EDUCATIONAL TOOLS FOR THE DEVELOPMENT AND VALIDATION OF A PHYSICIANS AND RESIDENTS SATISFACTION

Noor Amily, The Ottawa Hospital; **Julie Shaw**, The Ottawa Hospital; **Darine El-Chaar**, The Ottawa Hospital

Background:

Electronic fetal monitoring (EFM) with non-stress testing (NST) is widely practiced in hospital based maternity care in an attempt to predict fetal hypoxia. Intrapartum NST has a high sensitivity to detect fetal heart rate abnormalities, however has poor specificity for predicting fetal acidaemia. Fetal blood sampling (FBS) is a reliable diagnostic tool and clinically useful adjunct to guide clinicians when EFM is suspicious of fetal acidosis. Increased intervention rates, which are associated with EFM can be reduced by reassuring FBS results and therefore aid intrapartum care.

Objective:

Our primary goal is to develop teaching tools and resources for residents and staff physicians to ensure that this innovation reaches its maximum potential. This study will determine acceptance of the fetal scalp lactate sampling technique by physicians and residents based on perceived usefulness; ease of use; compatibility; basic knowledge; and trust before use.

Methods:

TEACHING AUDIENCE:

- Residents and staff physicians at the TOH who practice in labour and delivery departments at both General and Civic sites
- Prepare a teaching workshop to introduce the device, and educate on use of the tool. Assess knowledge uptake by surveys and questionnaires.

PRIMARY ENDPOINT:

- This study will determine acceptance of the fetal scalp lactate sampling technique by physicians and residents based on perceived usefulness; ease of use; compatibility; basic knowledge; and trust before use.

Results:

Work in progress, will have results of teaching curriculum and survey by date of conference. Results analysis: Survey Likert scale, average score of participant in educational workshop in post test for knowledge uptake.

Conclusions:

Our hypothesis is that from a healthcare provider point of view, implementation of this device would help in clinical decision making in labor and delivery at the Ottawa Hospital.

Poster 367

RISK FACTORS FOR CLINICAL DEPRESSION IN PREGNANCY: CHILDHOOD ADVERSITY, SOCIODEMOGRAPHIC RISK, AND POOR RELATIONAL SUPPORT

Katie Zumwalt, University of Calgary; **Nicole Racine**, University of Calgary; **Rochelle Hengtes**, University of Calgary; **Sheila McDonald**, Alberta Health Services; **Suzanne Tough**, University of Calgary; **Sheri madigan**, University of Calgary

Background:

Research has shown a strong positive association between the number of Adverse Childhood Experiences (ACEs) and the risk of later clinical depression specifically, and mental health more broadly. Considerably less research has examined whether ACEs are a risk factor for clinical depression in pregnancy, and if so, whether ACEs uniquely contribute to prenatal depression over and above concurrent psychosocial and economic supports.

Objective:

To determine: (1) whether ACEs predicts clinical depression in pregnancy in a low-risk, community-based pregnancy cohort; and (2) to test the relative contribution of ACEs, with other established risks of clinical depression, including sociodemographic risk, and low partner and family relational support. Consistent with previous ACE literature, it was hypothesized that women with 4 or more ACEs would be at highest risk of clinical depression and that ACEs would contribute to clinical depression in pregnancy over and above previously established psychosocial and economic risks.

Methods:

Data from 1,994 women (mean age= 30.87yrs) and their infant were collected from a prospective longitudinal cohort. Pregnant women completed questionnaires related to adverse experiences prior to the age of 18, depression, income, family support, and perception of partner support towards pregnancy. Adverse childhood experiences included physical, emotional, and sexual abuse, as well as exposure to household dysfunction.

Results:

Logistic regression demonstrated that, consistent with our hypothesis, ACEs was associated with clinical depression (OR= 1.17, $p<0.05$). However, contrary to hypotheses, ACEs did not predict clinical depression in this low risk sample, after accounting for low income (OR= 0.84, $p<0.05$), as well as low family (OR=1.77 $p<0.05$), and partner support (OR=2.05, $p<0.05$) during pregnancy.

Conclusions:

The current study demonstrates that concurrent psychosocial and economic risks, are strong predictors of mood difficulties in pregnancy. These findings further the current understanding of the types of risk factors that may instigate or exacerbate clinical depression in pregnancy.

Poster 371

ASSOCIATION OF MATERNAL RISK FACTORS WITH THE RECENT RISE OF NEURAL TUBE DEFECTS IN CANADA

Shiliang Liu, Public Health Agency of Canada; **Jay Onysko**, Public Health Agency of Canada; **Amanda MacFarlane**, Health Canada; **Jane Evans**, University of Manitoba; **Julian Little**, University of Ottawa; **Michael S Kramer**, McGill University; **K. S Joseph**, University of British Columbia; **Cande V Ananth**, Columbia University

Background:

Previous studies in Canada have shown that food fortification with folic acid resulted in a substantial reduction in the birth prevalence of neural tube defects (NTDs).

Objective:

We sought to assess the recent trend in NTD prevalence at birth, and to identify the maternal risk factors associated with that trend.

Methods:

We carried out a population-based study (N=3 439 356) of all live births and stillbirths (including terminated pregnancies) delivered at hospitals in Canada (except Quebec) from 2004 to 2015. We examined the NTD birth prevalence according to infant's birth year, age at conception, multiple pregnancy, parity, pre-gestational diabetes mellitus, other chronic illnesses, and problematic use of illicit drugs. Poisson regression analysis was used to quantify the association of NTD birth with maternal characteristics, infant's birth year and risk factors for spina bifida and for anenecephaly/encephalocele.

Results:

A total of 1543 NTD births were identified, yielding an overall birth prevalence of 4.5 per 10 000. NTD prevalence rose from 3.7 in 2004 to 4.8 per 10 000 in 2015 ($p=0.035$ for trend). Among NTD subtypes, only spina bifida showed a significant increase ($p=0.032$ for trend). Birth prevalence varied with maternal age: declining from 7.0 per 10 000 births to mothers <20 years to 3.7 per 10 000 in mothers >35 years ($p<0.0001$), and with specific maternal conditions for spina bifida versus anenecephaly/encephalocele. Risk factors such as pre-gestational type 2 diabetes, problematic use of illicit drugs and other chronic illness collectively explained for the increasing prevalence trend (i.e., from approximately 3% in 2010 to 9% of spina bifida cases in 2015).

Conclusions:

Maternal risk factors including folate insensitive conditions (e.g., use of illicit drugs, type 2 diabetes) were associated with the recent rise in the prevalence of NTDs in Canada, in particular with spina bifida cases.

Poster 372

EARLY EMBRYONIC ALCOHOL EXPOSURE LEADS TO PERMANENT DNA METHYLATION ALTERATIONS IN MOUSE BRAIN AND PLACENTA

Serge McGraw, Centre de Recherche du CHU Sainte-Justine, Montréal, Canada; **Lisa-Marie Legault**, Centre de Recherche du CHU Sainte-Justine, Montréal, Canada; **Alba Urena Guzman**, Centre de Recherche du CHU Sainte-Justine, Montréal, Canada; **Mélanie Breton-Larrivée**, Centre de Recherche du CHU Sainte-Justine, Montréal, Canada; **Virginie Betrand-Lehouillier**, Centre de Recherche du CHU Sainte-Justine, Montréal, Canada; **Maxime Caron**, Centre de Recherche du CHU Sainte-Justine, Montréal, Canada; **Daniel Sinnett**, Centre de Recherche du CHU Sainte-Justine, Montréal, Canada

Background:

Prenatal alcohol exposure (PAE) is known to altered epigenetic profiles in cells during brain development and be part of the molecular basis underpinning Fetal Alcohol Spectrum Disorders (FASD) etiology. However, the consequences of a PAE during very early embryonic life on the future epigenetic landscape of embryonic and extraembryonic tissues remain unknown.

Objective:

Our research hypothesis is that a PAE during pre-implantation will initiate DNA methylation dysregulation that will later be observable in the developing conceptus. We believe that these original epigenetic alterations will be perpetuated and amplified in the developing brain as well as in the placental tissue.

Methods:

To test this, we instigated FASD in mouse 8-cell embryos by injecting ethanol at 2.5 days of pregnancy (E2.5). We collected FASD (ethanol) and control (saline) E10.5 embryos and placentas. We then established genome-wide quantitative DNA methylation profiles of forebrains and placentas Reduced Representation Bisulfite Sequencing.

Results:

Bioinformatic analyses of FASD samples (n=12) vs controls samples (n=8) revealed 686 and 2942 differentially methylated tiles (DMTs) in forebrain and placenta samples respectively. Unexpectedly, we highlighted sex-specific DNA methylation perturbations in response to ethanol exposure. Interestingly, we also uncovered 21 specific regions abnormally methylated in both FASD forebrain and placenta samples.

Conclusions:

Our study establishes for the first time that early embryonic PAE can cause epigenetic dysregulations that leads to permanent alteration in the future epigenetic program of brain and placenta cells. The epigenetic dysregulations observed in FASD placental tissues allow us to believe that the placenta could be use for epigenetic FASD screening at birth. Our research will make a significant step toward deciphering the molecular basis underlying early embryonic onset of FASD by determining how alterations in the embryo's epigenetic program ultimately leads to aberrant regulation of gene expression and impaired brain development.

Poster 373

NEUROHORMONAL REGULATION DURING PREGNANCY: A LONGITUDINAL CASE STUDY

Laura M Reyes, University of Alberta; **Charlotte W Usselman**, University of Alberta; **Rachel Skow**, University of Alberta; **Nisha Charkoudian**, U.S Army Research Institute of Environmental Medicine; **Jeffery S Staab**, U.S. Army Research Institute of Environmental Medicine; **Margie H Davenport**, University of Alberta; **Craig D Steinback**, University of Alberta

Background:

The adaptations of sympathetic nerve activity (SNA) during pregnancy remain poorly understood. An increase in blood volume, cardiac output (Q) and SNA with a concomitant drop in total peripheral resistance (TPR), suggest that during pregnancy there is a reduced transduction of SNA into TPR. Additionally, sex hormones and volume regulatory factors such as vasopressin and the renin-angiotensin-aldosterone system have been shown to play a role in the control of sympathetic outflow in non-pregnant women. The role of these factors during pregnancy remains unknown.

Objective:

To determine the role of sex hormones, vasopressin and aldosterone in the changes in SNA along with hemodynamics throughout two healthy pregnancies.

Methods:

We conducted longitudinal assessments of SNA, hemodynamics, plasma sex hormones, vasopressin and aldosterone in two participants before pregnancy; throughout their pregnancies (1^{st}, 2^{nd}, 3^{rd} trimester) and two-months postpartum. Participants were asked to abstain for 12 hours from caffeine, alcohol, and strenuous exercise and arrived at the laboratory at 8 am. Mean arterial pressure (MAP) and Q were used to calculate TPR. SNA was measured using microneurography (peroneal nerve).

Results:

There was a gestational-dependent increase in SNA burst frequency (r^2=0.96, p=0.009). Transduction, however, decreased 53% in both women. Sympathetic hyperactivity was reversed in the postpartum whereas transduction remained lower. We found that there was a positive correlation of the SNA with aldosterone, vasopressin, estrogen and progesterone.

Conclusions:

Pregnancy is characterized by a progressive increase in SNA together with a decrease in transduction. We have identified significant associations between SNA, sex hormones and blood volume regulating factors across gestation that suggest that hormonal surges may be associated with a central sympathetic activation during pregnancy. Further studies to elucidate the mechanisms behind these associations are needed.

Poster 375

ROLE OF MATERNAL INFECTIONS IN THE DEVELOPMENT OF PREECLAMPSIA IN MICHIGAN USA

Abdul Wajid, University of Calgary; **David Todem**, Michigan State University, USA; **Mark Schleiss**, University of Minnesota, USA; **David Colombo**, Spectrum Health Michigan, USA; **Nigel Paneth**, Michigan State University, USA

Background:

Preeclampsia (PE) is a pregnancy-related condition with significant contribution to perinatal morbidity and mortality. No causative factor has been identified. Research suggests a possible role for the past infection with *Helicobacter pylori,* cytomegalovirus and/or *Chlamydophila pneumoniae*.

Objective:

To explore the role of *Helicobacter pylori,* cytomegalovirus and/or *Chlamydophila pneumoniae* in the development of PE.

Methods:

We conducted a nested case-control study in Lansing, MI, USA using the Archive for Child Health (ARCH), a pregnancy cohort of about 900 women. We matched cases of PE to unaffected controls on: maternal age (±3 years), maternal race, parity and gestational age at blood withdrawal. Using conditional logistic regression, we examined the association between immunoglobulins (IgGs) of the three microorganisms and other covariates and PE status.

Results:

Preeclamptic women had odds of 0.6 of being smoker (mOR: 0.6; 95%CI:0.2-2.0) than controls, while women with pre-pregnancy BMI > 30 had 8 times the odds of developing PE compared to the women with BMI < 25 (mOR:7.9; 95%CI:1.6-39.5). Multivariable conditional analysis found non-significantly increased odds of cases being positive for anti *H. pylori* IgGs (mOR: 2.4; 95% CI: 0.2-32.2), *C. pneumoniae* IgGs (mOR: 2.3; 95% CI: 0.6-9.1), and anti CMV IgGs in cases than controls (mOR: 1.4; 95% CI: 0.3-5.6). All analyses controlled for mother's education, household income and depression.

Conclusions:

Past infection, as determined by presence of IgGs to *H. pylori*, CMV, and *C. pneumoniae* in early pregnancy did not show associations with the development of PE in this study. In the future, such studies should be carried out with a larger sample size especially in populations where the prevalence of these infections is high.

Poster 376

WOMEN WHO PRACTICE PICA

Cynthia Mannion, University of Calgary; **Nilufer Hasanova**, University of Calgary; **MJ Kim**, University of Calgary

Background:

Pica is the intentional consumption of non-nutritive substances not exclusive to soil, clay, cornstarch, chalk, ashes, and ice. It is considered a cultural universal practice as people of all cultures have practiced it over the history of human kind. Depending upon culture and geographical location, pica is accepted as a norm or stigmatized as a physical or psychological illness. In North America women practicing geophagy, can purchase imported clay products in specialty shops or are supplied by relatives who bring clay sticks/stones from home countries. Soil and clay consumption pose health risks to pregnant women as they can contain parasites, and toxins. Health care professionals seldom include questions about pica during prenatal assessment.

Objective:

To explore the experience of women practicing pica during pregnancy.

Methods:

The snowball method is commonly used for stigmatized behaviour but this was unsuccessful. With Ethics' permission we established a Facebook site monitored by two research assistants. In 3 weeks thirty people contacted our site. Volunteers agreed to be interviewed on line using semi-structured questions addressing pica experiences. Three researchers separately studied the down loaded transcripts and together agreed upon emergent themes.

Results:

Thirteen on line participants agreed to have their interviews used but we were unable to validate their demographic information. Emergent themes included Nostalgia, Secrecy, Cravings, and Sensory Appeal. Women who immigrated from other countries felt nostalgic, a bitter sweet homesickness when they ate soil. Women described intense cravings for a particular substance that had a specific attribute such as grittiness or brittleness. A sense of calm was often experienced following the mouth-feel and swallowing of clay and earth. Some women practiced pica only during their pregnancy after which the intense cravings disappeared. All women hid the practice from relatives and friends and health care professionals.

Conclusions:

Women secretly practice pica rendering it an unforseen and unaddressed risk.

Poster 379

ASSOCIATIONS BETWEEN INFANT SHORT SLEEP DURATION AND THE GUT MICROBIOTA COMPOSITION AT 3 MONTHS OF AGE

Brittany A Matenchuk, University of Alberta; **Tedd Konya**, Dalla Lana School of Public Health, University of Toronto; **David S Guttman**, Centre for the Analysis of Genome Evolution and Function, University of Toronto; **Allan B Becker**, Children's Hospital Research Institute of Manitoba; **Malcolm R Sears**, McMaster University; **Stuart E Turvey**, Child & Family Research Institute, BC Children's Hospital, University of British Columbia; **Padmaja Subbarao**, Hospital for Sick Children, University of Toronto; **James A Scott**, Dalla Lana School of Public Health, University of Toronto; **Anita L Kozyrskyj**, University of Alberta; **Piush J Mandhane and the CHILD Study Investigators**, University of Alberta

Background:

In children, sleep and gut microbiota composition are independently linked to future risk for asthma and obesity. The relationship between sleep duration and negative health outcomes may be explained by an altered gut microbiota composition.

Objective:

This study aims to explore the relationship between short sleep duration and gut microbiota composition in the 3-month-old infant.

Methods:

Sleep duration was assessed at 3 months of age by questionnaire in 346 infants whose mothers were enrolled during pregnancy between 2009-2012 in the Sleep, Learning, Education, and Environment Project - Edmonton(SLEEP-E) sub-study of the Canadian Healthy Infant Longitudinal Development (CHILD) study. Gut microbiota were profiled by Illumina 16S rRNA sequencing from faecal samples collected at 3.3(mean) months of age.

Results:

Fifty percent of infants obtained ≤14 hours of sleep per 24-hour period. Median sleep duration was 15.00 hours in vaginally born infants without Intrapartum Antibiotic Prophylaxis(IAP) and 13.50 hours in Emergency Cesarean Section(ECS) born infants. Maternal race/ethnicity, breastfeeding exclusivity, infant antibiotic exposure and solid food intake were not significantly associated with sleep duration. Infants born by ECS whose total sleep time was ≤14 hours had 2.7 times higher odds of a high abundance of Veillonellaceae (Odds Ratio[OR]=2.683, 95% Confidence Interval[CI], 1.135-6.341; P=0.025) compared to infants born vaginally without IAP who slept > 14 hours per 24-hour period. These associations were independent of maternal race/ethnicity, breastfeeding exclusivity, infant antibiotic exposure, and solid food intake.

Conclusions:

Infant total sleep duration below the National Sleep Foundation recommendation of 14-17 hours per day was associated with an increased likelihood of a high abundance of Veillonellaceae. Increased relative abundance of Veillonellaceae has previously been associated with ECS birth. Shorter total sleep duration is associated with an altered gut microbiota composition; furthermore, there is evidence of interaction between sleep duration and birth mode in relation to gut microbiota composition.

Poster 381

OVERNIGHT STAFFING IN CANADIAN LEVEL-3 NEONATAL INTENSIVE CARE UNITS: A NATIONAL SURVEY

Gregory Moore, Children's Hospital of Eastern Ontario; **Kristen Hutchison**, Hospital for Sick Children; **Chris Parshuram**, University of Toronto

Background:

Physicians are a central part of the continuous monitoring and therapy provided in Neonatal Intensive Care Units (NICU).

Objective:

To describe overnight in-house physician staffing in level-3 NICUs in Canada.

Methods:

A cross-sectional survey was designed, tested and administered from March-July of 2017. Eligible respondents were the directors of level-3 NICUs in the Canadian Neonatal Network. The questionnaire described the unit characteristics, physician and advance practice nurse (NP) staffing, and the duration of overnight duty. Staffing in February 2017 was described. Data are presented as median (IQR) or as number and proportion (%).

Results:

The 34(100%) participating NICUs had 1141 beds and 22,039 admissions in 2016. The 29(85%) NICUs with overnight in-house physician staffing had more beds [34(20-50) vs. 18(12-20), $p<0.0001$] and similar numbers of admissions in 2016 [725 (500-950) vs. 530 (350-630), $p=0.10$] than the 5(15%) NICUs without overnight in-house physicians. NP worked in 18(53%) NICUs, including overnight in 7(21%). Physician Assistants (PAs) worked overnight in the 4 NICUs where they worked. Overnight in-house physician staffing occurred in all NICUs with: i) overnight PAs or NPs; ii) surgical (n=17) or cardiac (n=2) patients; and iii) provision of dialysis (n=2) or ECMO (n=1). Trainee physicians working in-house overnight included R1-residents 18(53%), R2 (or more senior) residents 25(74%) and Neonatology trainees 18(53%). The most senior physician in-house overnight was: a staff-physician in 7(21%); an associate 5(15%), a clinical scholar 1(3%), an NICU Fellow 10(29%) or a year-2 or more senior resident in 6(18%). The most frequently reported overnight duty duration was 20-24h.

Conclusions:

Overnight physician staffing in Canadian level-3 NICUs varies significantly. We found 15% of NICUs had no in-house physician whereas 21% had a staff-physician in-house. The impact these staffing decisions have on the care, survival and neurocognitive outcomes of thousands of critically ill newborns in Canada requires further evaluation.

Poster 381

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Methods:

A cross-sectional survey was designed, tested and administered from March-July of 2017. Eligible respondents were the directors of level-3 NICUs in the Canadian Neonatal Network. The questionnaire described the unit characteristics, physician and advance practice nurse (NP) staffing, and the duration of overnight duty. Staffing in February 2017 was described. Data are presented as median (IQR) or as number and proportion (%).

Results:

The 34(100%) participating NICUs had 1141 beds and 22,039 admissions in 2016. The 29(85%) NICUs with overnight in-house physician staffing had more beds [34(20-50) vs. 18(12-20), $p<0.0001$] and similar numbers of admissions in 2016 [725 (500-950) vs. 530 (350-630), $p=0.10$] than the 5(15%) NICUs without overnight in-house physicians. NP worked in 18(53%) NICUs, including overnight in 7(21%). Physician Assistants (PAs) worked overnight in the 4 NICUs where they worked. Overnight in-house physician staffing occurred in all NICUs with: i) overnight PAs or NPs; ii) surgical (n=17) or cardiac (n=2) patients; and iii) provision of dialysis (n=2) or ECMO (n=1). Trainee physicians working in-house overnight included R1-residents 18(53%), R2 (or more senior) residents 25(74%) and Neonatology trainees 18(53%). The most senior physician in-house overnight was: a staff-physician in 7(21%); an associate 5(15%), a clinical scholar 1(3%), an NICU Fellow 10(29%) or a year-2 or more senior resident in 6(18%). The most frequently reported overnight duty duration was 20-24h.

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The Children's Hospital Research Institute of Manitoba (CHRIM) was established in 2001. CHRIM is the research division of the Children's Hospital Foundation of Manitoba. At the Institute, more than 270 world-class pediatric medical researchers, technical staff, students, and support staff are involved in over $10 million of research and clinical trial activity each year. CHRIM is the only research facility dedicated exclusively to pediatric research in the prairie provinces.

CIHR-IHDCYH

The CIHR Institute of Human Development, Child and Youth Health (IHDCYH) invests in research that promotes the best health for all Canadians, from the very start of life. By supporting research to improve reproductive, child, and youth health outcomes, IHDCYH helps young Canadians and families achieve their full potential for ideal growth and development

Canadian Neonatal Brain Platform (CNBP)

The **Canadian Neonatal Brain Platform** brings together a unique, multidisciplinary team of researchers and clinicians to define new strategies to identify causes of brain dysmaturation and to minimize brain injury occurring during the neonatal period. The mission is to provide breakthroughs in robust imaging biomarkers of brain injury, allow the creation of efficient strategies to promote brain development and plasticity, limit neuronal disruptors and create a framework to support prospective multicenter trials.

The DEVOTION Network

The Developmental Origins of Chronic Diseases in Children (DEVOTION) Network accelerates knowledge to action within the area of maternal and child health to promote wellness and prevent chronic disease for Manitobans. Focused on the developmental origins of health and disease, DEVOTION is an interdisciplinary network that integrates stakeholders in the research process.

Lawson Foundation

The Lawson Foundation is a national family foundation that invests in and engages with ideas, people and organizations that contribute to the wellbeing of children and youth and their development as active and engaged members of society.

The Lawson Foundation is nationally recognized for its leadership in supporting diabetes prevention and management programs and services for children, youth and their families.

Mallinckrodt Pharmaceuticals

Mallinckrodt Pharmaceuticals is a global specialty pharmaceutical company focused on our mission: **Managing Complexity. Improving Lives.** We provide medicines to address unmet patient needs, stemming from 150 years of using our unique strengths, experience and expertise to help improve people's lives. Visit Mallinckrodt.ca for more information.

McMaster University

McMaster University consistently ranks within the top 50 universities of the world for medicine and health sciences. Its Faculty of Health Sciences trains physicians, nurses, physiotherapists, occupational therapists, health care researchers, physician assistants and midwives to work together, advancing human and societal health and well-being to create a brighter world.

Mead Johnson Nutrition

Mead Johnson Nutrition is a world leader in pediatric nutrition dedicated to nourishing the world's children for the best start in life. Mead Johnson products are trusted by millions of parents and healthcare professionals around the world.

Methapharm Curosurf

Bringing Hospital & Specialty Products to Market:
Methapharm manages products and drugs in the areas of Neonatology, Respiratory, Hematology-oncology, Organ Transplant, Emergency & Occupational Health and Radiology as well as other Specialties. **Methapharm is committed to providing safe and effective hospital and specialty products to Healthcare Professionals across North America.**

Molly Towell Perinatal Research Foundation

In addition to sponsorship of this meeting, every year the MTPRF funds an annual competition to support one 2-year Fellowship and one 2-year start-up grant in the area of basic biomedical research into perinatal health. Please sign up and log in to our website for more information (MTPRF.org).

OBIX Perinatal Data System

The OBIX® Perinatal Data System is a comprehensive, computerized system for central, bedside, and remote electronic fetal monitoring. It includes archiving, point-of-care charting, single-click management reports, and Internet-based physician access. The OBIX system offers enterprise-wide perinatal data access by interfacing with other hospital systems, enterprise-wide charting solutions, and document repositories.

Prolacta Bioscience

Prolacta Bioscience, Inc. is a life sciences company dedicated to improving quality of life by Advancing the Science of Human Milk®. Using state-of-the-art formulation, pasteurization and filling processes, Prolacta creates specialty formulations made exclusively from human milk for the nutritional needs of premature infants in the NICU.

Research Manitoba

Research Manitoba promotes, supports, and coordinates the funding of, research in the health, natural and social sciences, engineering and the humanities in Manitoba through a number of grants and awards programs and advises the Minister of Growth, Enterprise and Trade on matters related to research. For more information, visit: www.researchmanitoba.ca.

The Society of Obstetrics and Gynecology of Canada (SOGC)

The SOGC promotes excellence in obstetrics and gynaecology and advances the health of women through leadership, advocacy, collaboration, outreach and education. We represent a wide variety of health professionals working in the field of sexual reproductive health.