INDEX

WELCOME

A very warm welcome to the Gold Coast! We hope that you will enjoy the program of this year's ADIPS ASM. We have strived to have diversity in topics that all have diabetes in pregnancy in common and presentations will range from clinical management in other forms of diabetes, the microbiome, growth and development of the baby in GDM to complications of diabetes in pregnancy.

We would like to thank all the speakers for sharing their knowledge. We received many outstanding abstracts, which certainly is a reflection of all the hard work that is going on in the area of Diabetes in Pregnancy. We strongly encourage you to join the poster session on Friday afternoon where many interesting research projects are presented.

Thank you also to the members of the organizing committee and ASN team members for your hard work, and also to our sponsors. Also thank you to those of you who assisted with reviewing abstracts, judging oral and poster presentations, selecting a case for presentation and chairing sessions.

Please feel invited to interact, discuss and ask questions. We hope you leave the meeting inspired.

Marloes Dekker Nitert
On behalf of the joint ADIPS Organising Committee

CONFERENCE ORGANISING COMMITTEE

Dr Marloes Dekker Nitert – School of Medicine and UQ Centre for Clinical Research, The University of Queensland

Dr Helen Barret – RBWH, School of Medicine and UQ Centre for Clinical Research, The University of Queensland

Dr Katherine Griffin – Gold Coast University Hospital

Renata Basile – Gold Coast University Hospital

Alison Barry – Mater Health Services

Suzie Neylon - Australasian Diabetes in Pregnancy Society

Linda Valenzisi - Australasian Diabetes in Pregnancy Society

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DELEGATE INFORMATION

VENUE

Gold Coast Convention and Exhibition Centre
2684 -2690 Gold Coast Highway
Broadbeach, Queensland 4218
AUSTRALIA
Phone: +61 7 5504 4000
Fax: +61 7 5504 4001
www.gccec.com.au

REGISTRATION DESK – ASN EVENTS

The registration desk will be located on the Ground floor at main reception.

The registration desk will be open:
Thursday 25th August from 4:00 PM to 5:00 PM
Friday 26th August from 8:00 AM to 5:00 PM
Saturday 27th August from 8:00 AM to 2:00 PM

WHAT YOUR REGISTRATION INCLUDES

Delegate and student registrations include:

- Access to sessions of your choice for nominated days of attendance
- Morning tea, lunch and afternoon tea on days of nominated attendance
- Conference satchel including conference material
- Delegate abstract proceedings
- GST

SOCIAL PROGRAM

ADIPS Conference Dinner
Friday 26th August
6:00 PM - 10:30 PM
Valentinos Italian Resturant Pizzeria

SPEAKER PREPARATION

Presentations are to be loaded direct to PC in the room in which the speaker is presenting. Please make sure you have loaded your presention well in advance of your session. You should bring your talk on a USB, saved in a format for display on a PC. Please note there are no Macintosh computers in the presentation rooms.

DISPLAYING YOUR POSTER

Posters can be displayed for the duration of the conference but will need to be removed before 12:00pm on Saturday 27th August.

ADIPS Poster Presentations
Friday 26th August
4:00pm - 5:00pm
Rooms 6 & 7

Please locate your abstract number on page 24 for correct positioning. The maximum size allowed is 1 m wide by 1.2 m high. The approved method for attaching your poster is Velcro. Please visit the registration desk for additional supplies.

NAME BADGES

Delegates and registered partners are required to wear their name tags to all scientific and catered sessions. Name tags and registration materials should be collected from the registration desk on arrival.

SMOKING

Smoking is not permitted in the venue.

INSURANCE

The hosts and organisers are not responsible for personal accidents, any travel costs, or the loss of private property, and will not be liable for any claims. Delegates requiring insurance should make their own arrangements.

DISCLAIMER

The hosts, organisers and participating societies are not responsible for, or represented by, the opinions expressed by participants in either the sessions or their written abstracts.

GOLD COAST, QUEENSLAND

From the iconic Surfers Paradise beach to the dining precincts of Main Beach and Broadbeach and out to the lush, green hinterland, there's a new experience waiting for you at every turn on the Gold Coast. Theme parks, world-renowned beaches and year-round sunshine are just a few of the reasons 10.5 million visitors flock to this vibrant city each year.

GETTING AROUND THE GOLD COAST

City of Gold Coast works in partnership with TransLink to provide public transport options including scheduled bus, train and tram services.

Get to Know Your Network: Planning Your Journey

The **TransLink Journey Planner** will help you to plan your trip and provides fare and timetable information.

Use a go card electronic ticket to travel on all bus, train, tram and ferry services in South East Queensland. It entitles you to travel savings and discounts. Transferring between modes involves touching on and off at the beginning and end of each trip with your go card.
Passengers can also access South East Queensland's public transport network via Google Transit.

Buses
There are more than 60 bus routes in the city including turn up and go services, 700, 704, 705, 709, 740, 750 and 777 that operate every 15 minutes or better, seven days a week.

Trains
Queensland Rail trains connect major centres on the Gold Coast including Helensvale, Nerang, Robina and Varsity Lakes and also serve Ormeau and Coomera. Trains run at regular intervals to and from Brisbane with bus connections to Surfers Paradise, Southport and Broadbeach. Timetable information is available through TransLink.

Trams
The new G:link light rail system operates from 5am to midnight on weekdays and throughout weekends. The route links Gold Coast University Hospital, Southport, Surfers Paradise and Broadbeach with a 7.5 minute service between 7am and 7pm weekdays.

INVITED SPEAKERS

RENATA BASILE

Diabetes Centre, Gold Coast University Hospital

Renata was born in Brazil and came to Australia 20 years ago. She has been a Dietitian for 13 years, graduating from Griffith University and has completed a Master of Nutrition and Dietetics. She has been trained on the DAFNE course and she has also completed a post graduation in diabetes education and management. Her clinical interests include Diabetes in pregnancy, Type 1 Diabetes and Insulin pump therapy. She actively participates at Camp Diabetes for children age 0-18.

She is also a member of the Statewide Diabetes Clinical Network. She is also involved in nutrition and Diabetes education to Medical, Nursing and Dietetics students.

HELEN BARRETT

RBWH, School of Medicine and UQ Centre for Clinical Research, The University of Queensland

Dr Helen Barrett is an Obstetric Physician and Endocrinologist at Royal Brisbane and Women's Hospital, Brisbane and a Clinical Academic in the School of Medicine, The University of Queensland. She undertook her endocrinology and obstetric medicine training in Sydney and Brisbane and has recently completed her PhD through the School of Medicine at The University of Queensland. Helen has a strong interest in improving the outcomes of complicated pregnancy and her PhD studies focussed on the role of lipids in maternal diabetes and preeclampsia. She is currently involved in the SPRING study, examining the use of probiotic supplementation to prevent GDM.

ANDREW COTTERILL

Children's Health Queensland

Dr Andrew Cotterill graduated from London University, trained in Paediatric Endocrinology in London and Sydney. He moved to Brisbane in 1996 to establish the Paediatric Endocrinology Department at the Mater Children's Hospital. In 2014 this Department will join with the Royal Children's Hospital's Department to form a new Paediatric Endocrinology Department in the new Queensland Children's Hospital. He has built a multidisciplinary team for the care of diabetes and endocrinology, as well as an outreach program across Queensland. Dr Cotterill has developed a large clinic base of children with diabetes (600) and endocrine disorders (500). This has formed the recruitment base for a number of National and International studies. Dr Cotterill also hosts two annual meetings for education of paediatric and health professionals in diabetes and endocrinology. Dr Cotterill is the immediate past-president of A.P.E.G.

MARLOES DEKKER NITERT

School of Medicine and UQ Centre for Clinical Research, The University of Queensland

Dr Marloes Dekker Nitert is a Senior Research Fellow at The University of Queensland. Marloes is a biomedical researcher with a PhD from Lund University in Sweden. Her research focuses on the role of metabolism in complications of pregnancy. She currently heads a laboratory research group at UQ studying the role of the gut microbiome in pregnancy, the role of food additives on placental function and placental gene expression and epigenetic markers in pregnancy complications. Marloes works closely together with clinician-scientists and clinicians at the Royal Brisbane and Women's Hospital. She is part of the SPRING RCT team, which assesses if probiotics can prevent gestational diabetes mellitus in overweight and obese women

JODIE DODD

Women's and Children's Hospital

Professor Jodie Dodd is a maternal fetal medicine specialist at the Women's and Children's Hospital and clinical researcher, and NHMRC Practitioner Fellow at the University of Adelaide. She leads a multidisciplinary research group, with a focus on optimizing nutrition and weight management interventions during pregnancy, with a particular interest in obesity during pregnancy, and early life approaches to obesity prevention.

She has been awarded more than 30 national and international (including 1 NIH, 1 JDRF and 2 CIHR) competitive research grants, totaling in excess of $23million, with almost $18million in funding awarded in the past 5 years. She has received fellowship support from NHMRC (Neil Hamilton Fairley Fellowship, followed by 2 successive Practitioner Fellowships). Professor Dodd is the author of more than 120 publications; has been editor with the Cochrane Pregnancy and Childbirth Review Group (since 2008); and associate editor with the Australian and New Zealand Journal Obstetrics and Gynaecology (2008-2013). In addition, she regularly provides peer review for general medical and specialty journals, and national and international grant reviewing bodies.

JONATHAN HYETT

Royal Prince Alfred Hospital/University of Sydney

Jon Hyett is the Head of High Risk Obstetrics and a Senior Staff Specialist in Obstetrics and Maternal and Fetal Medicine at the Royal Prince Alfred Hospital, Sydney. He is also Clinical Professor in the Discipline of Obstetrics, Gynaecology and Neonatology at the University of Sydney. Jon's primary research interests include predictive modelling and preventative interventions for adverse obstetric outcomes.

DR IRENA IDEL

Eastern Health

Irena graduated with honors from Monash University and completed her physician training in nephrology with a fellowship in obstetric medicine in 2011, in Melbourne, Australia. She was instrumental in setting up the Obstetric Medicine Service at Eastern Health in Melbourne, which looks after 5,000 deliveries annually across 2 hospitals, and currently acts as its Clinical Lead. The service is a multidisciplinary and academic team of health professionals caring for women with all medical conditions, from pre-conception care to post-partum follow up, with a focus on empowering patients to participate in a preventative approach to maternal and fetal wellbeing, aiming for improved 'whole-of-life' health outcomes. Academically, Irena is actively involved in obstetric medicine teaching, training and clinical research. Her other current role is as a nephrologist with the Integrated Renal Service at Eastern Health.

FRASER IMRIE

Queensland Health

Dr Fraser Imrie is a general ophthalmologist with a special interest in medical retinal diseases. He has particular expertise in treating age related macular degeneration, diabetic retinopathy, retinal vein occlusions and uveitis. He completed his ophthalmology training in Scotland before undertaking a fellowship in medical retina at the Bristol Eye Hospital. He moved to the Gold Coast in 2010 and is currently the medical director of ophthalmology at the Gold Coast University Hospital, where he supervises registrar and medical student training. He is a member of the Australian and New Zealand Society of Retinal Specialists and has published numerous articles on retinal diseases and cataract surgery.

ELISABETH MATHIESEN

Department of Endocrinology

Elisabeth Mathiesen is Head of Diabetes Treatment at the Copenhagen Centre for Pregnant Women with Diabetes, working with women who have pre-gestational diabetes or gestational diabetes mellitus (GDM). She is also Professor of Endocrinology at the University of Copenhagen where she researches type 1 and type 2 diabetes in pregnant women, focusing on the prevention of fetal overgrowth, preeclampsia and pre-term delivery. Prof Mathiesen's research interests include diet recommendations and the beneficial effects of strict metabolic control, and the use of insulin analogues, pumps and continuous glucose monitoring in pregnancy. She has been involved in long-term follow-up studies of women with previous GDM and their offspring, regarding the risk of developing diabetes and metabolic syndrome. Prof Mathiesen has published more than 214 scientific papers. She is a member of the European Association for the Study of Diabetes, and a previous chair of the European Diabetes in Pregnancy Study Group.

MARK MORRISON

The University of Queensland Diamantina Institute

I am trained as a microbiologist with a specific interest in the role that microbes play in affecting the health and well-being of humans and animals. After nearly 20 years within US academia, I returned to Australia in 2006 initially as a Science Leader within CSIRO, and now as Chair and Group Leader in Microbial Biology and Metagenomics at The University of Queensland Diamantina Institute. My work since returning to Australia has emphasized the use of "omics" technologies to produce new insights into the microbial world, and from which, improved methods for monitoring and adjustment of the gut microbiota might be achieved; with the goal of improving host animal health, nutrition and the environment.

GLYNIS ROSS

Royal Prince Alfred Hosptial

A/Prof Glynis Ross is a Visiting Endocrinologist at Royal Prince Alfred Hospital, Sydney, where she has been in charge of the Diabetes team in the Diabetes and Pregnancy Service for over 25 years. She is also a part-time Senior Staff Endocrinologist at Bankstown-Lidcombe Hospital, Sydney. Her major interests are Diabetes in Pregnancy, Type 1 Diabetes, Insulin Pump Therapy and In-patient Diabetes Management. A/Prof Ross has been on the Council of the Australian Diabetes Society (ADS) since 2012, and is now on the ADS Executive as Secretary. She was President of ADIPS (Australasian Diabetes in Pregnancy Society) 2008-10 and on ADIPS Council from 1991-98 and 2002-12. She is a member of the state based ACI (Agency for Clinical Innovation) Endocrine Executive and the Co-Chair of the ACI Diabetes in Pregnancy Working Party. A/Prof Ross has been serving on other state, national and international Diabetes Working Parties particularly in the area of diabetes and pregnancy.

PETER SCHMIDT

Gold Coast University Hospital

JEANETTE TYLER

Department of Health

Jeanette Tyler is a Clinical Nurse Consultant, Midwife and International Board Certified Lactation Consultant. Her current position is Service Improvement Officer within Women's and Newborn Services at the Royal Brisbane and Women's Hospital (RBWH). Jeanette established the RBWH Lactation Service in 2003 and concurrently established a successful private lactation consultancy practice. During this time she presented at and had papers published for both international and national breastfeeding conferences. She is a member of the International Lactation Consultants Association (ILCA) and the Lactation Consultants of Australia and New Zealand (LCANZ).

More recently in 2015/16 Jeanette coordinated a successful Baby Friendly Health Initiative (BFHI) reaccreditation for the RBWH and worked with the Queensland Clinical Guidelines Program to lead the review of the statewide maternity and neonatal clinical guideline: Establishing breastfeeding. Jeanette is passionate

about supporting women to achieve their infant feeding goals. In recognition of her dedication to the care of woman and babies, this year Jeanette was awarded the RBWH Sir Ian McFarlane Award for Excellence in Clinical Practice, and plans to use the proceeds of this award to further develop her leadership skills in order to maximise the impact of her experience and knowledge.

PETER WEIN

Freemasons Medical Centre and Mercy Hospital for Women

Dr Peter Wein is a consultant obstetrician at the Mercy Hospital for Women in Melbourne, as well as being in private obstetric practice. He has previously been head of the Diabetes Unit at the Royal Women's Hospital in Melbourne, as well as Director of Birth Suites there.

Peter was born in Melbourne many years ago. His father was also an obstetrician. Peter trained at the Royal Women's Hospital, Melbourne, and was finished off at Leicester Royal Infirmary (go Foxes). He was introduced to gestational diabetes by the late Professor Norman Beischer z"l when he took up his first consultant post at the Mercy Hospital for Women, and subsequently this became his major research and clinical interest. Peter has been on the council of ADIPS for 2 terms, having served one sentence as secretary. He has also been an examiner for RANZCOG, having at one time been responsible for the MCQ component of the written examination.

Peter is married with 2 sons (one a medical student), 1 daughter and a Nova Scotia Duck Tolling Retriever. Outside work, he is interested in Jewish women's health, cooking and politics, and is a Carlton supporter.

PROGRAM

FRIDAY 26TH AUGUST 2016

Welcome Address
8:45am - 9:00am — Central Room C

SESSION 1 - OTHER FORMS OF DIABETES
9:00am - 11:00am — Central Room C
Chairs: Robert Moses & Renata Basile

9:00 AM **Glynis Ross**
MODY (Maturity Onset Diabetes of the Young) and Pregnancy *abs# 1*

9:30 AM **Helen Barrett**
Challenges of cystic fibrosis in pregnancy *abs# 2*

9:55 AM **Renata Basile**
Diets for Diabetes: are they all the same? *abs# 3*

*10:20 AM **Hui Yi Ng**
Is there a seasonal variation in Hba1c? *abs# 4*

*10:30 AM **Suja Padmanabhan**
Falling insulin requirements in women with pre-existing diabetes during pregnancy – investigating the cause and consequences through a multicentre prospective study *abs# 5*

*10:40 AM **Michele Bardin**
Changes in insulin requirement and glycaemic control during the third trimester in women with type 1 diabetes on insulin pump therapy. *abs# 6*

*10:50 AM **Eddy J Tabet**
The Diagnosis of Gestational Diabetes Mellitus after Bariatric Surgery: Are we off target? *abs# 7*

Morning Tea
11:00am - 11:30am — Rooms 6 & 7

SESSION 2 - ADS/ADIPS NOVO NORDISK SKIP MARTIN PLENARY LECTURES **Proudly Sponsored by**
11:30am - 1:00pm — Central Room A
Chairs: Leonie Callaway & Glynis Ross

11:30 AM **Elisabeth Mathiesen**
Pregnancy Outcomes in Women with Diabetes – Lessons Learned from Clinical Research *abs# 8*

12:15 PM **Helen Murphy**
Artificial Pancreas during Type 1 Diabetes Pregnancy *abs# 9*

Lunch
1:00pm - 2:00pm — Rooms 6 & 7

SESSION 3 - CASE DISCUSSION
2:00pm - 3:00pm — Central Room C
Panel Renuka Sekar, Alison Barry, Victoria Ealey, Renata Basile, Catherine Marnoch

SESSION 4 - DEBATE ASPIRIN TO PREVENT PREECLAMPSIA
3:00pm - 4:00pm — Central Room C
Chair: David McIntyre
Aspirin to Prevent Preeclampsia
Peter Wein - Against *abs# 10*
Jonathan Hyett - For *abs# 11*

POSTER SESSION

4:00pm - 5:00pm Rooms 6 & 7

Chairs: Helen Barrett & Karin Lust

Conference Dinner at Valentinos

6:00pm - 11:00pm

SATURDAY 27TH AUGUST 2016

SESSION 5 - MICROBIOME IN PREGNANCY

9:00am - 10:45am Rooms 5 & 6

Chairs: Ruth Hughes & Glynis Ross

9:00 AM **Mark Morrison**
The microbiome and pregnancy: basic concepts about a functional interface relevant to mother-child-midwife-obstetrician relationships *abs# 12*

9:30 AM **Marloes Dekker Nitert**
The gut microbiome in pregnancy *abs# 13*

9:50 AM **Andrew Cotterill**
ENDIA – the microbiome during pregnancy as possible link to development of Type 1 Diabetes (T1D) autoimmunity *abs# 14*

*10:20 AM **Marloes Dekker Nitert**
Antibiotic exposure during pregnancy affects the oral microbiota in newborn infants *abs# 15*

ADIPS AGM X 2

10:30am - 10:50am Room 3

Morning Tea

10:30am - 11:15am Rooms 7 & 8

SESSION 6 - GROWTH AND DEVELOPMENT OF OFFSPRING

11:15am - 1:05pm Rooms 5 & 6

Chairs: Katherine Griffin & Marloes Dekker

11:15 AM **Jodie Dodd**
Obesity and Gestational Diabetes in Pregnancy: Impact on Fetal Growth *abs# 16*

11:40 AM **Peter Schmidt**
Content not available at time of print *abs# 17*

12:00 PM **Jeanette Tyler**
Milk and Sugar *abs# 18*

*12:20 PM **Marrwah Ahmadzai**
Continuous glucose monitoring in pregnancy for diagnosis of gestational diabetes: a pilot study *abs# 19*

*12:30 PM **Lili Yuen**
Testing for gestational diabetes mellitus with self-monitored blood glucose levels in women who have hypoglycaemia on oral glucose tolerance testing during pregnancy *abs# 20*

*12:40 PM **Arianne N Sweeting**
The impact of ethnicity on predictive biomarkers for gestational diabetes mellitus *abs# 21*

*12:50 PM **William Lau**
A reduction in neonatal hypoglycaemia with new diagnostic criteria and treatment targets for gestational diabetes *abs# 22*

Lunch

1:05pm - 2:00pm Rooms 7 & 8

SESSION 7 - COMPLICATIONS IN WOMEN WITH DIABETES IN PREGNANCY

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Medtronic

2:00pm - 3:45pm Rooms 5 & 6

Chairs: Leonie Callaway & Tang Wong

2:00 PM **Elisabeth Mathiesen**
Late diabetic complications in diabetic pregnancy *abs# 23*

2:30 PM **Irena Idel**
Renal pregnancy complications in women with pre-existing diabetes *abs# 24*

3:00 PM **Fraser Imrie**
Diabetic eye disease in pregnancy *abs# 25*

*****3:20 PM **Amina Khambalia**
High ferritin concentrations are associated with inflammation and increased risk of gestational diabetes mellitus but offer no clinical value as a diagnostic test. *abs# 26*

*3:30 PM **Robert Moses**
The incidence of diabetes after gestational diabetes: an Australian perspective *abs# 27*

*3:40 PM **Jas-mine Seah**
Short and mid term renal function in patients with Type 1 and Type 2 Diabetes during and post Pregnancy *abs# 28*

*3:50 PM **Ruth Hughes**
Antenatal HbA1c centiles by gestational week in a multi-ethnic population: does one size fit all? *abs# 29*

AWARD CEREMONY AND CLOSE

4:00pm - 4:15pm Rooms 5 & 6

Key

* Free communication, Speaker selected from abstract**.**

ABSTRACTS

ORALS

1

MODY (Maturity Onset Diabetes of the Young) and Pregnancy

Glynis Ross[1]

1. Royal Prince Alfred Hospital / Bankstown-Lidcombe Hospital, Ashfield, NSW, Australia

Diabetes in pregnancy is generally classified as either hyperglycaemia in pregnancy (gestational diabetes or DM in pregnancy) or pre-gestational (type 1 or type 2) diabetes. However up to 5% diabetes in pregnancy may be a different subtype and only detected if atypical features are noted through careful history taking and examination.

Maturity Onset Diabetes of the Young (MODY) accounts for 1-2% of diabetes in the whole population. It is a heterogeneous group of disorders caused by mutations in genes important in beta cell development. The clinical course, complications as well as implications for pregnancy vary depending on the underlying molecular problem. MODY is often misclassified as type 1 or type 2 diabetes. Correctly identifying MODY has important implications for pregnancy as well as longterm surveillance and potentially for affected family members.

As it is recommended that all women (without pre-gestational diabetes) have their glucose tolerance assessed during pregnancy, this is a time when MODY may be first detected. Atypical features for type 1 (pancreatic autoantibodies absent, no history of ketoacidosis) or type 2 diabetes (lack of obesity, or metabolic syndrome features) and diabetes in 2 or more consecutive generations should prompt consideration of MODY.

GCK-MODY (MODY-2) accounts for 0.1% of diabetes in the general population but 1-2% of women with gestational diabetes. It leads to stable lifelong mild hyperglycaemia. Diagnosing GCK-MODY before or during pregnancy will alter the management approach in pregnancy with serial ultrasounds guiding the decision for commencement of insulin.

Sulphonylureas rather than insulin may be indicated if **HNF1A (MODY-3)** or **HNF4A (MODY-1)** is present.

Insulin is needed in women with **HNF1B (MODY-5)** which may be associated with renal or genital tract abnormalities. Metformin should be avoided in women with **MIDD** (''maternal inherited diabetes and deafness'') due to possible risk of lactic acidosis.

2

Challenges of cystic fibrosis in pregnancy

Helen Barrett[1]

1. Royal Brisbane and Women's Hospital, Herston, QLD, Australia

Content not available at time of print

3

Diets for Diabetes: are they all the same?

Renata Basile[1]

1. Gold Coast Hospital, Mudgeeraba, QLD, Australia

While all forms of Diabetes Mellitus (DM) are characterized by hyperglycaemia, the pathophysiology of the now multiple known forms of DM is diverse and the subsequent metabolic consequences are often variable.

When these consequences are manifest in addition to a host of associated other pathologies that may co-exist with the DM, there may be significant nutritional consequence.

What is not widely known is whether the varying forms of DM require adjustment of their dietary advice and if so - is this is due to the pathophysiology of the hyperglycaemia, or rather the associated illness and its multiple other manifestations.
This discussion will present current available evidence for dietetic intervention across the various forms of Diabetes Mellitus and aim to provide a principled approach to dietetic intervention for all forms of DM.

4

Is there a seasonal variation in Hba1c?

Hui Yi Ng[1], **Rowena Hockings**[2], **Garry Morris**[3], **Fernando San Gil**[4], **Robert Moses**[1]

1. Endocrinology, Wollongong Hospital, Wollongong, NSW, Australia

2. Research Central, Wollongong Hospital, Wollongong, NSW, Australia

3. Southern IML Pathology, Wollongong, NSW, Australia

4. SEALS pathology, Wollongong, NSW, Australia

Objective: The glucose tolerance test (GTT) is still the preferred and recommended test for gestational diabetes mellitus (GDM).[1] However, the prevalence of GDM has a significant seasonal variation. In a temperate climate and with a nationally representative population, the prevalence of GDM is 29% higher in summer and 27% lower in winter compared with the median.[2] The HbA1c has been proposed as an alternate diagnostic method.[3] However, numerous reports indicate that in the northern hemisphere the HbA1c is higher in winter.[4-6] The aim of this study was to assess if there was a seasonal variation in the HbA1c in the southern hemisphere and in a temperate climate.

Methods: Southern IML Pathology (SIML) is the major provider of pathology services in Wollongong and surrounding areas. De-identified HbA1c data were obtained for 5 years from SIML (January 2011 to December 2015). The data included the date of collection, date of birth, gender and HbA1c result.

Results: A total of 203,170 HbA1c results was available for analysis. These results were from all people with diabetes. The median HbA1c for each season was 6.6% (48 mmol/mol). The median HbA1c (IQR) for summer was 6.6% (48 mmol/mol) (1.6), autumn 6.6% (48 mmol/mol) (1.6), winter 6.6% (48 mmol/mol) (1.8) and spring 6.6% (48 mmol/mol) (1.7). While these differences were deemed statistically significant (due to the large numbers used for analysis), it was felt unlikely to be of clinical significance.

Conclusions: Whereas in the northern hemisphere the HbA1c does exhibit seasonal variation[4-6], this was most likely due to reduced exercise and the coincidence of the festive seasons with winter. No clinically significant differences were apparent in a temperate climate. Specific data are required for pregnancy. HbA1c could be considered as an alternative diagnostic test during pregnancy to potentially overcome the changes in prevalence with seasons with GTT.

1. American Diabetes Association. Gestational Diabetes Mellitus. Diabetes Care 2003 Jan; 26(suppl 1): s103-s105
2. Moses RG, Wong VCK, Lambert K, Morris GJ, San Gil F. Seasonal changes in the prevalence of gestational diabetes mellitus. Diabetes Care May 2016.
3. Hughes RCE, Rowan J, Florkowski CM. Is there a Role for Hba1c in Pregnancy? Curr Diab Rep (2016) 16:5.
4. Gikas A, Siotiropoulos A, Pastromas V, Papazafiropoulou A, Apostolou O, Pappas S. Seasonal variation in fasting glucose and HbA1c in patients with type 2 diabetes. Primary care diabetes 3 (2009) 111-114.
5. Tseng CL, Brimacombe M, Xie M, Rajan M, Wang H, Kolassa J, Crystal S, Chen TC, Pogach L, Safford M. Seasonal patterns in monthly haemoglobin A1c values. Am J Epidemiol 2005; 161:565-574.
6. Pereira MT, Lira D, Bacelar C, Oliveria JC, de Carvalho A. Seasonal variation of haemoglobin A1c in a Portuguese adult population. Arch Endocrinol Metab. 2015;59(3)231-5.

5

Falling insulin requirements in women with pre-existing diabetes during pregnancy – investigating the cause and consequences through a multicentre prospective study

Suja Padmanabhan[1, 2], Vincent Lee[2, 3], Mark Mclean[1, 4, 5], Neil Athayde[6], Valeria Lanzarone[7], Qemer Khoshnow[7], Michael J Peek[8], Wah N Cheung[1, 2]

1. Diabetes and Endocrinology, Westmead Hospital, Sydney, NSW, Australia

2. School of Medicine, University of Sydney, Sydney, NSW, Australia

3. Renal Medicine, Westmead Hospital, Sydney, NSW, Australia

4. Diabetes and Endocrinology, Blacktown Hospital, Sydney, NSW, Australia

5. Western Sydney University, Sydney, NSW, Australia

6. Obstetric Medicine, Westmead Hospital, Sydney, NSW, Australia

7. Obstetric Medicine, Nepean Hospital, Sydney, NSW, Australia

8. College of Medicine, Biology and Environment, The Australian National University, Canberra, Australia

Introduction: It is unclear whether falling insulin requirements (FIR), in late pregnancy, are a sign of placental dysfunction.

Objective: To investigate the association of FIR with maternal biomarkers and adverse obstetric outcomes, amongst women with pre-existing diabetes in pregnancy.

Methods: A multicentre prospective cohort study, including 41 women with Type 1 and 117 with Type 2 diabetes, was conducted. Women with FIR of ≥15% from the peak total daily dose after 20 weeks gestation, were considered cases (n=32). The primary outcome was a composite of clinical markers of placental dysfunction (pre-eclampsia, small for gestational age (<5%), stillbirth (>20 weeks), premature delivery (<30 weeks) and placental abruption). Maternal circulating angiogenic markers (placental growth factor (PlGF), soluble fms-like tyrosine kinase 1 (sFlt-1), placental hormones (human placental lactogen, progesterone, TNF-α) and HbA_{1c} were studied serially during pregnancy.

Results: FIR ≥15% was associated with an increased risk of the composite primary outcome (OR:4.38,CI 1.9-10.3,p<0.001), pre-eclampsia (OR:6.76,CI 2.7-16.7,p<0.001) and was more common amongst women with type 1 diabetes (36.6 vs. 14.5%,p=0.002). There was no difference in HbA_{1c} between groups. The ratio of sFlt-1:PlGF was significantly higher amongst women with FIR at 25, 30 and 36wks (p<0.01). To account for the effect of pre-eclampsia, the cohort was divided into subgroups: no pre-eclampsia and no FIR (1), no pre-eclampsia and FIR (2), pre-eclampsia and no FIR (3) and pre-eclampsia and FIR (4). There was a significant correlation between increasing sFlt-1:PlGF levels at 36 weeks as the subgroups increased from 1-4 respectively suggesting increasing underlying placental dysfunction (r=0.357,p<0.001). There was no difference in placental hormones between the groups.

Conclusion: This is the first prospective study to associate FIR with altered expression of placental anti-angiogenic factors and pre-eclampsia. FIR is an important clinical sign, amongst women with pre-existing diabetes, which should alert the clinician to investigate underlying placental dysfunction.

6

Changes in insulin requirement and glycaemic control during the third trimester in women with type 1 diabetes on insulin pump therapy.

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Background: Increase in insulin requirements across gestation occurs in maternal Type 1 diabetes (T1DM), predominantly secondary to increased bolus insulin(1). However, towards end of gestation, some women on multiple daily injections have a fall in insulin requirements potentially related to altered placental function or foetal draw(2).

Aim: To examine changes in insulin requirements in maternal T1DM patients on Insulin Pump Therapy.

Methods: We analysed data in pregnant women with T1DM who received antenatal care at Mercy Health, 2010-2016. Weekly averages of total, basal, and bolus insulin, carbohydrate intake, blood glucose (BGLs), and episodes of BGL <3.9mmol/L were recorded in the 1st(T1), 2nd and the 3rd(T3) trimester at 29,31,33,35,36,37 weeks. T3 time-points were classified as week(s) prior (1, 2-3, 5 and 7 weeks) to delivery to account for variable gestations. Differences were analysed by repeated measures ANOVA.

Results: Seventeen patients' pump data have been analysed. Gestation at delivery: 36.7±1.3 weeks, booking BMI 24.2±8kg/m^2. There was increased total insulin between 7 and 5 weeks pre-delivery (55.05±14.86 vs 62.26±17.1 units; p=0.01), no change thereafter. Carbohydrate intake remained constant with no difference in basal insulin (35.43±18.3 vs 31.9±19.5units;p=0.11) and bolus insulin (38.8±18.6 vs 33.1±18.9units p=0.19); weeks 1 vs 7. Reduced average BGL occurred before delivery (7.4±1.2mmol/L vs 8.4±1.7; p=0.03; weeks 1 vs 5). The percentage of BGL <3.9mmol/L was greater towards the end of gestation (9.2% vs 4.8%; p=0.036; week 1 vs 5). 10 of 17 patients showed some degree of decline in total insulin in the final gestational week (66.77±18.52 vs 63.01±17.94 units;p=0.003;weeks2 or 3 vs 1) translating to an average 6% insulin reduction (0.7 –14.3%).

Conclusion: T3 is a dynamic time of change of insulin requirements and glycaemic control, seemingly unrelated to change in carbohydrate intake. Better characterisation of these parameters could assist in the management of maternal T1DM.

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The Diagnosis of Gestational Diabetes Mellitus after Bariatric Surgery: Are we off target?

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Background: Bariatric surgery (BS) is an effective treatment increasingly chosen by obese women seeking pregnancy. No guidelines exist for screening and diagnosis of GDM in women after BS. Oral glucose tolerance test (OGTT) profiles differ in BS patients, frequently resulting in reactive hypoglycaemia (1) and may not be tolerated. Hence the utility of the OGTT for GDM diagnosis after BS requires validation and reconsideration.

Aims: To determine from the literature what alternative methods (if any) for GDM diagnosis in BS patients have been used.To explore current approaches to GDM diagnosis in Australian women post BS by surveying diabetes centre members of NADC and ADIPS members.

Methods: A literature review identified 12 studies reporting GDM prevalence after BS. Each was assessed regarding GDM diagnostic criteria used. A one-page questionnaire was sent to NADC and ADIPS members to ascertain local experience in antenatal glucose tolerance assessment of BS-treated women exploring diagnostic methods and criteria used for GDM diagnosis.

Results: GDM data were mostly published following LAGB and RYGB (table 1). Over 50% of studies did not specify the criteria applied to diagnose GDM. Most studies that did, applied OGTT criteria equally for BS women and non-BS women. 15 surveys were returned Australia-wide (table 2). Although few BS cases were managed antenatally, LAGB was the procedure most commonly reported. Most sites use the OGTT and apply ADIPS criteria equally in women with/without a BS history.

Table 1: Summary of clinical trials reporting GDM data after bariatric surgery

Studies reporting on GDM after BS, n=	Types of BS reported in the studies, n=	Studies specifying GTT and diagnostic criteria (75g/100g OGTT) n=	Studies using alternative criteria to diagnose GDM n=	Studies not specifying GDM diagnostic criteria n=
12	LAGB 9 SG 1 RYGB 9 Other 3	4	Fasting + 2hr post-prandial BGL - 2 HbA1c - 1 CGM - 0	7
LAGB: Laparoscopic adjusted gastric banding; SG: Sleeve gastrectomy; RYGB: Roux-en-Y gastric bypass; CGM: Continuous glucose monitoring				

Table 2: Survey results - GDM diagnosis after bariatric surgery in Australia

Survey responses (Australia-wide), n=	BS patients treated, n=	Type of BS encountered, n=	ADIPS Diagnostic criteria for GDM (75g OGTT), n=	Alternative diagnostic GDM approach, n=	Type of diagnostic strategy, n=
15	85	LAGB 40 SG 22 RYGB 8 NS 15	9	6	Fasting BGL 1 HbA1c 0 SMBG 2 Combination 3
BGL: Blood glucose level; SMGB: Self-monitored blood glucose; NS Not specified					

Conclusion: Limitations of the OGTT in GDM diagnosis after BS are under-recognised. OGTT is still the most widely utilised diagnostic test in this context. Examples of alternatives include CGM (2), fasting and 2-hour post-prandial glucose levels (3), HbA1c (4) or a combination at 24-28 weeks gestation. These methods are yet to be tested in clinical trials or endorsed.

Acknowledgements: We wish to thank the National Association of Diabetes Centres and the Australasian Diabetes in Pregnancy Society who emailed our questionnaire and a follow-up reminder to their members, and all those who responded.

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Pregnancy Outcomes in Women with Diabetes – Lessons Learned from Clinical Research

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Among the diabetic pregnant women the worst pregnancy outcome is seen in the subgroup of women with diabetic nephropathy. Development of signs of severe preeclampsia very early in pregnancy leading to very early preterm delivery is frequent. The study of pathophysiologic mechanisms for the development of preeclampsia is covered and observational studies supporting the beneficial of antihypertensive treatment to pregnant women with microalbuminuria or diabetic nephropathy in preventing preeclampsia and early preterm delivery are presented.

Aiming for strict glycemic control to prevent preterm delivery, the cornerstone is treatment with diet and insulin, but this treatment is associated with a high prevalence of severe hypoglycemia. Pathophysiological mechanisms of the increased risk of hypoglycaemia during pregnancy are explored and studies evaluating the use of insulin analogues, insulin pumps and continuous glucose monitoring to improve pregnancy outcome and reduce the risk of severe hypoglycaemia in pregnant women with type 1 diabetes are reported.

In addition to strict glycaemic control other factors involved in fetal overgrowth are explored and restricting maternal gestational weight gain is a promising candidate. The optimal carbohydrate content in the diet is discussed.

In summary, the lessons learned from this clinical research are that, both glycemic control, gestational weight gain and antihypertensive treatment are of importance for improving pregnancy outcome in pregnant women with pre-existing diabetes. An example of using the app–technology for sharing the recent evidence based clinical recommendations to pregnant diabetic women or those planning pregnancy are given.

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Artificial Pancreas during Type 1 Diabetes Pregnancy

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Content not available at time of print

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Universal screening for pre-eclampsia and treatment with aspirin – the negative

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A good test for predicting women who will develop preeclampsia should be simple, rapid, noninvasive, inexpensive, easy to perform, and should not expose the patient to discomfort or risk The technology should be widely available and the results reproducible and reliable, with a high likelihood ratio for a positive test (>15) and a low likelihood ratio for a negative result (<0.1) and good sensitivity and specificity. Ideally, it should provide an opportunity for intervention to prevent development of the disease, or at least result in better maternal and/or fetal outcomes.

Currently, there are no clinically available tests that perform well according to these guidelines in distinguishing women who will develop preeclampsia from those who will not.

Even if there were such a test, for it to be useful there would have to be some proven intervention that would produce clinically important benefits. Whilst the meta-analyses of antiplatelet agents suggest small benefits, these are biased by small old trials on selected patients. The package of prediction and prevention in order to produce a meaningful benefit has not been subjected to large RCTs.

Aspirin has been suggested as the panacea. However, there is no evidence that it significantly reduces perinatal mortality, and there remains a possibility of rare but serious adverse effects. The optimal dose and timing of administration remain unclear. The current Australian practice of 100 mg in the morning is probably not enough and not at the right time.

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ADIPS Debate: All women should have first trimester screening for pre-eclampsia and, if high risk, be offered Aspirin as a preventative intervention. (for the motion).

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Early onset pre-eclampsia (ePET) requiring delivery, on maternal grounds, before 34 weeks' gestation is common, affecting 0.5% of pregnancies. Whilst this represents only 10% of the spectrum of disease, this includes the majority of neonatal admissions and a disproportionate amount of maternal mortality and morbidity (>30% of maternal ITU admissions) related to hypertensive disease. The phenotype of ePET is related to placenta insufficiency that results from poor implantation of the trophoblast. The hypoxic placenta produces local hormones and tissue mediators that impact the maternal vascular

endothelium leading to peripheral vasoconstriction (hypertension) and end organ damage. This two-stage disease process can be interrupted and this is the basis of screening for prevention of disease.

Women are already routinely screened at 12 weeks and this test provides the foundation of screening for ePET. Women already attend, trained sonographers that produce quality assured measurements are available, biochemical assays that reflect trophoblast function are already in place and the complex mechanism of risk analysis, allowing for population differences in test characteristics have been defined. Screening for ePET requires measurement of two additional parameters; uterine artery PI (by ultrasound) and mean arterial pressure. A UK based screening algorithm that has 90% sensitivity and 90% specificity for ePET has been validated in an Australian population.[1] Addition of the biochemical marker PlGF would allow further improvement in efficacy to specificity of 95%. The performance of this test is vastly superior to that of traditional screening (based on maternal history): [ROC AUC Hx 0.748; ROC AUC RPA algorithm 0.919; p=0.0002].

Prophylactic administration of aspirin is effective in reducing the risk of pre-eclampsia. Early intervention is important being associated with 50% reduction in the prevalence of severe/preterm disease. In our own cohort study, including 5,700 women, we prescribed 150mg Aspirin (nocte) to those deemed to be at high risk of ePET using the first trimester multivariate algorithm. The prevalence of disease was reduced by 90%.[2] 280 women were screened and 28 women treated to prevent one case of ePET. None of the women treated with aspirin had a placental abruption. The cost savings, primarily through reduced neonatal care, within a unit delivering 5,000 women a year, have been conservatively estimated to be $1,000,000 per year. National adoption of this strategy could prevent 1,200 cases of ePET a year with 67,000 fewer neonatal bed days per year.

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The microbiome and pregnancy: basic concepts about a functional interface relevant to mother-child-midwife-obstetrician relationships

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The last decade has seen the emergence of "microbiome" research, which seeks to define the interactions and processes inherent to a **microbial community** (micro-), placed in context with the physiochemical attributes of their **surrounding environment** (-biome). Technological advances, and in particular, DNA/RNA sequencing and computational biology have enabled this field of research to rapidly expand, alleviated of the restrictions historically imposed by cultivation-based microbiological techniques. Many clinical and small animal studies have now established that variations in the microbiome affect host phenotype and responses to many non-communicable diseases. Microbiota transplants have also now been shown to transfer either "pathogenic" or "protective" responses to naïve hosts, further establishing the links between the microbiome and disease course. This presentation will address some of the basic concepts inherent to emergence and evolution of microbiome research, with specific reference to our collaborative projects involving clinical and nutritional studies of diabetes and pregnancy. The talk will also emphasize two principal concepts: how the field of environmental microbiology offers new insights into the role of the microbiome in health and disease; as well the needs and opportunities that can and will arise from a "return" to classical microbiology techniques, for the translation of microbiomes to medicine.

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The gut microbiome in pregnancy

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In recent years, the role of the gut microbiome—the composite of bacteria present in the gastrointestinal tract—in regulating metabolism, inflammation and behaviour of the host has come to light. The composition of the gut microbiome is altered in many diseases, including diabetes and hypertension, and generally consists of fewer different bacterial species. During the course of pregnancy, the gut microbiome also becomes less diverse.

In this presentation, the role of the gut microbiome in pregnancy will be discussed, with some evidence from recent studies indicating that the composition of the gut microbiome in early pregnancy is correlated with changes in metabolic hormones and blood pressure. Probiotics, which are defined as bacteria with a known beneficial effect on the host, could help in preventing pregnancy complications. The effects of probiotic supplementation in pregnancy to alter gut microbiome composition and thereby metabolism will also be briefly discussed.

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ENDIA – the microbiome during pregnancy as possible link to development of Type 1 Diabetes (T1D) autoimmunity

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ENDIA is a unique prospective study of putative environmental triggers of T1D in first degree relatives followed from the second trimester of pregnancy. The incidence of T1D has increased progressively in the last 50 years. The genotype pattern has changed somewhat in that the high risk patterns are seen in the younger children presenting with T1D whilst lower risk patterns now are prevalent in the older onset group. Thus there is an interaction with genotypic risk profile and the environment, which is evolving. The changes in incidence seem to link to environmental changes that mirror the modern western lifestyle. The various human microbiomes interact with the immune system and metabolism. The current pro-inflammatory environment is changing these microbiomes and appears to be contributing to the rapid rise of non-communicable disease. In ENDIA the children presenting with T1D are <18 y and 80% of these children will already have had detectable islet autoantibodies by 3 years of age. Analysis of cord blood in high-risk genotype subjects predicts which children will progress to the onset of T1D. Thus the origins of T1D have developed prior to the age of 3y and this points to the presence of triggers occurring during pregnancy and early life. The ENDIA project is examining changes in the microbiome of the mother that links to development of T1D autoimmunity in an at risk population.

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Antibiotic exposure during pregnancy affects the oral microbiota in newborn infants

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Background: Microorganisms residing in the oral cavity are important determinants of health and disease. The first microbial colonizers alter the environment and can shape the mature oral microbiota. It is not clear which factors dictate which bacteria are the first to colonize the infant's oral cavity. The aim of this study was to characterise the newborn's oral microbiota and to elucidate plausible factors affecting early oral microbial colonization.

Methods: Oral microbiome profiles from mother-baby dyads participating in the SPRING trial (n=78) were determined by 16S rRNA sequencing. Data files were processed using QIIME software. To investigate the contribution of maternal oral microbiota, a Bayesian approach for bacterial source tracking (SourceTracker v 1.0) was used. The diversity of the infant's oral microbiota was evaluated according to: mode of delivery, BMI, infant body composition, infant gender, gestational age and antibiotic intake throughout pregnancy. FDR-corrected P values are presented.

Results: Bacterial source-tracking analysis revealed in half of the newborns, the oral microbiota resembled that of their mothers (mean similarity 92.9% ± 23.2%). The oral microbiota of the other half of newborns showed little similarity to that of their mothers (mean similarity 22.0 ± 27.7%). Bacterial community composition was significantly different between the two groups (p=0.001). In infants with high similarity, the families *Streptococcaceae* (p= 0.002) and *Gemellaceae* (p= 0.03) were significantly enriched while bacteria belonging to phylum Proteobacteria, which is often associated with an inflammatory environment, dominated the oral microbiota of those with low similarity. Antibiotic treatment in pregnancy was associated with an oral microbiota of low similarity to the maternal oral microbiota (p= 0. 029).

Conclusions: These results suggest that the bacteria colonizing the infant's oral microbiome may be of maternal origin. Maternal antibiotic intake in pregnancy may alter which bacteria colonize the oral cavity of their infants.

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Obesity and Gestational Diabetes in Pregnancy: Impact on Fetal Growth

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Obesity is a significant health issue for women during pregnancy and childbirth, with approximately 50% of women entering pregnancy with BMI >25kg/m^2. Increasing maternal BMI is a recognised risk factor for the development of gestational diabetes, the two conditions sharing a similar metabolic environment associated with hyperinsulinaemia, hyperglycaemia, hyperlipidaemia and low-grade chronic inflammation. The developmental over-nutrition hypothesis was developed in the 1950's to attempt to explain the relationship between maternal diabetes in pregnancy and fetal overgrowth. More recently, the hypothesis has been expanded to account for the potential impact of maternal obesity.

While maternal obesity is associated with an increased risk of fetal macrosomia, relatively few studies have assessed its impact on ultrasound determined measures of fetal growth and adiposity. This presentation will present some of the findings from the LIMIT randomised trial relating to fetal growth.

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CONTENT NOT AVAILABLE

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Content not available at time of print

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Milk and Sugar

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Breastfeeding is important for the health of women and babies.

Rates of breastfeeding intention, initiation and duration are lower among women who are overweight or obese. Women with diabetes in pregnancy have lower rates of breastfeeding than women without diabetes.

Their babies are at an increased risk for poor health outcomes and are less likely to receive the only nutrition that offers them some protection. In women, breastfeeding resets the temporary metabolic syndrome induced by pregnancy. Women who breastfeed are reported to have a lower postmenopausal BMI and are less likely to develop type 2 diabetes mellitus.

Women with pre-existing type 1 diabetes who breastfeed have significantly reduced insulin requirements postpartum and may even experience a brief 'honeymoon' phase when no insulin is required.

Breastfed babies are afforded some protection from overweight and obesity; type 1 and type 2 diabetes mellitus.

In this presentation I will summarise the proposed mechanisms by which overweight/obesity and diabetes effects breastfeeding. Barriers to breastfeeding that are imposed once a diagnosis of overweight/obese and/or diabetes is made will also be highlighted. As supportive management is critical to successful lactation in these women, care strategies will be outlined and the patient experience incorporated to enable the audience to appreciate the issues and provide breastfeeding support for those who need it most.

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Continuous glucose monitoring in pregnancy for diagnosis of gestational diabetes: a pilot study

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Introduction: Continuous glucose monitoring (CGM) is an emergent technology in the management of gestational diabetes mellitus (GDM). It records a complete glycaemic profile and hence reveals glucose fluctuations and trends otherwise undetected by standard monitoring. This information has shown to improve glycaemic control and pregnancy outcomes. An important knowledge gap in the utility of CGM is its use in predicting GDM and hence the aim of this study was to explore the potential use of CGM as a screening tool.

Methods: A prospective observational study was conducted at the Royal Hospital for Women between May-August 2015. Pregnant women who were diagnosed with GDM or were willing to have CGM before their glucose tolerance test (OGTT) were recruited. The glycaemic reports generated by CGM for each patient were analysed to calculate measures of glycaemic variability. Acceptability of CGM was measured using a questionnaire. Accuracy of CGM was assessed in comparison to the OGTT.

Results: 37 women completed CGM and of these, 28 were diabetic and 9 were normoglycaemic. Women with GDM had a significantly higher mean ($p = 0.045$), standard deviation ($p = 0.02$), mean amplitude of glycaemic excursions ($p = 0.046$) and mean of daily differences ($p = 0.003$) than the normoglycaemic women.

CGM was acceptable, safe and well tolerated among all women. It was accurate, displaying a strong positive correlation with the OGTT which was statistically significant, ($r_s = 0.92$, $p<0.0001$). Additionally, CGM revealed otherwise undetected glucose aberrations in 7 of 9 women who were deemed normoglycaemic by the OGTT.

Conclusion: The results of this pilot study highlight the promise of CGM in screening for GDM. Further study is required to explore these findings.

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Testing for gestational diabetes mellitus with self-monitored blood glucose levels in women who have hypoglycaemia on oral glucose tolerance testing during pregnancy

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Introduction: The 75g oral glucose tolerance test (OGTT) is used in pregnancy to diagnose gestational diabetes mellitus (GDM). Results below reference range at 2 hours (<3.5mmol/L) could indicate supersensitivity to insulin[1] and/or a delayed second stage release of insulin[2], both of which are pathognomonic of impaired glucose tolerance. Whether these women may have undiagnosed GDM is unknown.
Objective: We sought to investigate whether women who experience hypoglycaemia on routine OGTT without meeting the recognised diagnostic cut-offs have evidence of GDM based on self-monitoring of blood glucose levels (SMBG).
Method: Between March 2015 to May 2016 we identified pregnant women attending Liverpool Hospital antenatal clinic who experienced hypoglycaemia on routine OGTT screening. These women were asked to perform 14 days of SMBG. We classified women as having GDM if they had >20% of capillary blood glucose levels (BGL) above targets suggested by the Australian Diabetes in Pregnancy Society (ADIPS)[3], and the current[4] and past South Western Sydney Local Health District (SWSLHD) guidelines.
Results: 46 out of 60 identified women performed SMBG. Of these 46 women, mean age was 29.9 (SD+5.4), The women were predominantly of Caucasian (21 women or 46%) or Middle Eastern (15 women or 33%) ethnicity. The mean HbA1c was 4.8% (SD±0.96), pre-pregnancy BMI 25.9 (SD±5.5). 19 women (41%) had a family history of diabetes and 2 (4%) had previous history of GDM. 15 women (33%) were diagnosed with GDM based on elevated SMBG levels according to the ADIPS, 6 (13%) current SWSLHD and 3 (7%) past SWSLHD targets. Fasting BGLs were the most commonly elevated BGLs.
Conclusion: A significant proportion of women who have hypoglycaemia on screening OGTT have GDM based on elevated SMBG levels particularly using the ADIPS targets. Without further testing these women may be at risk of the complications of undiagnosed GDM.

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The impact of ethnicity on predictive biomarkers for gestational diabetes mellitus

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Introduction: Biomarker-predictors may improve the early detection of gestational diabetes (GDM) when combined with maternal clinical risk factors[1], but the degree to which their predictive utility is modified by ethnicity is unknown.

Aim: To assess the performance of several potential GDM biomarker-predictors in a large multi-ethnic Australian population and determine whether GDM can be predicted in the first trimester.

Methods: Routine biomarkers (PAPP-A, free β-HCG) were measured in serum prospectively at 11-13^{+6} weeks' gestation in 224 women who developed GDM (ADIPS 1998 diagnostic criteria[2]) and 718 controls (n=942), undertaken at Royal Prince Alfred Hospital, Sydney. Novel biomarkers (adiponectin, leptin, PAI-2, lipocalin-2, triglycerides) were measured on retrieved samples. The relationship between biomarker-multiples-of-the-median (MoM) and GDM (1) overall and (2) stratified by ethnicity (Caucasian, East and South Asian) was examined with logistic regression. A multivariate GDM-prediction model was developed and evaluated using areas under the receiver-operating characteristic (AUROC) curve.

Results: Overall, PAPP-A- and adiponectin-MoM values were lower, and triglyceride-, leptin- and lipocalin-2-MoM values were higher, in women with GDM versus controls, respectively. Leptin- and lipocalin-2-MoM values were highest in Caucasians with GDM at 1.18, 1.25, respectively, compared to 1.04, 1.07 (East Asian-GDM) and 1.07, 1.04 (South Asian-GDM). PAPP-A-MoM was lowest in South and East Asians with GDM, at 0.69 and 0.81 respectively, compared to 0.88 (Caucasian-GDM). In contrast, differences in adiponectin- and triglyceride-MoM values between GDM and controls were consistent across ethnicity. The best performing GDM-prediction model overall combined clinical factors (age, BMI, ethnicity, mean arterial pressure), PAPP-A, triglycerides and lipocalin-2, achieving an AUROC of 0.93.

Conclusion: GDM can be accurately predicted in early pregnancy by combining novel and routine biomarkers to maternal clinical parameters. Biomarker performance varied by ethnicity, suggesting underlying differences in pathophysiology. The performance and validation of GDM-prediction models using biomarker-predictors will be influenced by the ethnic distribution of the local population.

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A reduction in neonatal hypoglycaemia with new diagnostic criteria and treatment targets for gestational diabetes

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Background: Recent changes to the diagnosis and management of gestational diabetes (GDM) has led to an increase in the number of women being diagnosed with and treated for GDM as well as tighter glycaemic targets. However, the effect of these changes on pregnancy outcomes has not been systematically tested.

Methods: Outcomes from all women with GDM attending a tertiary antenatal clinic between September 2011 and August 2013 were analysed retrospectively. An interim analysis of 438 women is presented here. Women in the ''before guideline change" cohort (BGC) were diagnosed with GDM using the previous diagnostic criteria (FPG ≥ 5.5mmol/L or 2-hr PG ≥ 8.0mmol/L) and blood glucose level (BGL) treatment targets were FPG ≤ 5.5mmol/L and 2-hr post-prandial ≤ 7.0mmol/L. Women in the "after guideline change" cohort (AGC) were diagnosed with GDM using the new diagnostic criteria (FPG ≥ 5.1mmol/L or 1-hr PG ≥ 10.0mmol/L or 2-hr PG ≥ 8.5mmol/L) and BGL treatment targets were FPG ≤ 5.0mmol/L and 2-hr post-prandial ≤ 6.7mmol/L

Results: There were no significant differences in baseline characteristics between the two groups apart from maternal weight (BGC 73.9kg vs. AGC 82.5kg; p<0.0001) and BMI (BGC 29.2kg/m^2 vs. AGC 30.82kg/m^2; p=0.02). Insulin use was higher in the AGC group (39.9% vs. 25.6%; p=0.002). Neonatal hypoglycaemia <2.6mmol/L (20.1% vs. 27.6%; p=0.07) and shoulder dystocia (4% vs. 7.9%; p=0.08) were lower in the AGC group compared to BGC group. All other maternal and foetal outcomes were comparable between the two groups.

Conclusion: Our interim analysis demonstrates a trend towards a reduction in neonatal hypoglycaemia and shoulder dystocia with the use of new diagnostic criteria and BGL treatment targets for GDM. We aim to have full data (n=1064) available for the 2016 ADS-ADEA ASM.

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Late diabetic complications in diabetic pregnancy

Elisabeth Mathiesen[1]

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This talk will include clinical information of importance for clinical care during pregnancy of late diabetic complications as diabetic nephropathy, retinopathy and neuropathy.

Among diabetic pregnant women, the worst pregnancy outcome is seen in the subgroup of women with diabetic nephropathy. Development of signs of severe preeclampsia very early in pregnancy, often leading to very early preterm delivery, is frequent. The study of pathophysiologic mechanisms and observational studies support the beneficial of antihypertensive treatment to pregnant women with microalbuminuria or diabetic nephropathy in preventing preeclampsia and early preterm delivery.

Pregnancy is associated with increased risk of progression of retinopathy to sight-threatening retinopathy as proliferative retinopathy or macula edema in both type 1 and type 2 diabetes. The level of both circulating and local growth factors might be involved in the pathophysiology of this deterioration of retinopathy during pregnancy. In early pregnancy, poor glycemic control, elevated blood pressure and presence of moderate to severe retinopathy are associated with the risk of progression to sight-threatening retinopathy. Appropriate tailored screening for progression of retinopathy during pregnancy is needed. Macular edema can be successfully treated with intraocular injection of glucocorticoid during pregnancy.

Persistent nausea and vomiting during pregnancy might be related to diabetic autonom neuropathy and the worst cases can be treated with parental nutrition.

In conclusion, microvascular complications in pregnant women with pre-existing diabetes needs to be, screened for and, treated if necessary.

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Renal pregnancy complications in women with pre-existing diabetes

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Pregnancy is a renal "stress test" as the normal physiology of pregnancy demands increased renal blood flow in parallel with systemic cardiovascular changes, sodium and water retention and changes to the collecting system promoting urine stasis. Diabetes is a common cause of the entire spectrum of kidney disease from persistent albuminuria with normal renal function (Stage 1) to end stage kidney disease (Stage 5) and renal transplantation. In turn, during pregnancy the entire spectrum of kidney disease substantially increases the risk of adverse maternal and fetal outcomes including pre-eclampsia, temporary or permanent decline in renal function, pre-term delivery, fetal growth restriction and fetal death, in a continuous manner that parallels increasing degrees of renal dysfunction. A permanent decline in renal function and progression to end stage renal disease as a result of pregnancy is a very real possibility in women with significant chronic kidney disease. While fertility is impaired in women with advanced renal disease, pregnancy is common in women with mild to moderate degrees of renal dysfunction or a well-functioning renal transplant. Thus, an adequate assessment of renal function, blood pressure and albuminuria/proteinuria followed by preconception counselling is mandatory in women with diabetes who may be considering pregnancy. Occasionally, a renal biopsy or other additional investigations may be needed when other causes of renal disease are suspected. Kidney donation also increases the risk of hypertensive disease of pregnancy in the donor during a subsequent pregnancy, therefore consideration of child bearing plans forms an integral part of live donor assessment for all renal transplant recipients, including women with diabetes.

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Diabetic eye disease in pregnancy

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This lecture will discuss all aspects of diabetic eye diease in pregnancy including: pathophysiology, screening strategies and treatment regimes.

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High ferritin concentrations are associated with inflammation and increased risk of gestational diabetes mellitus but offer no clinical value as a diagnostic test.

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Background: High serum ferritin levels have been associated with gestational diabetes (GDM). Previous studies have been unable to determine whether high ferritin levels result from excess body iron or inflammation or ascertain the clinical relevance of high ferritin in identifying women with GDM.

Objectives: To determine whether high ferritin levels reflect excess body iron or inflammation and its clinical relevance for improved diagnosis of GDM.

Methods: Women with archived first trimester serum samples (2007-2009) were linked to birth and hospital records for data on maternal characteristics and GDM diagnosis. Blood was analysed for iron biomarkers: ferritin, soluble transferrin receptor (sTfR) and hepcidin and inflammatory biomarkers: C-reactive protein (CRP) and interleukin-6 (IL-6). Associations between iron and inflammatory biomarkers and GDM were assessed using multivariate logistic regression. Receiver operating curves (ROC) curves were used to evaluate biomarkers as a diagnostic test for GDM.

Results: Of 10, 844 women, 368 (3.4%) had GDM. Adjusted analyses found risk of GDM was associated with higher ferritin (adjusted odds ratio (AOR): 1.35; 95% CI: 1.16, 1.58) and CRP (AOR 1.29, 95% CI: 1.14, 1.46) but not sTfR (p=0.46), IL-6 (p=0.51) or hepcidin (p=0.09) concentrations. Increased ferritin levels were associated with increased CRP, IL-6 and hepicidin levels and decreased sTfR levels (all tests p<0.0001). All biomarkers had poor diagnostic test accuracy (area under curve ranged from 0.51-0.60).

Conclusions: High ferritin levels in early pregnancy are associated with inflammation and increased risk of GDM but add little clinical value in accurately discriminating between women with and without GDM.

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The incidence of diabetes after gestational diabetes: an Australian perspective

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Introduction

Gestational diabetes mellitus (GDM) is the most common medical problem in pregnancy and a common risk associate for subsequent development of type 2 diabetes (T2DM). Very high rates are reported and cited from international studies which are at variance with clinical experience in Australia1. This study examines the rate of T2DM with up to a 25 year follow up.

Methods: The data used for this study were obtained from women in an ethnically representative population, diagnosed with one criteria and managed by one practitioner. The women were seen with a diagnosis of GDM over a 20 year period, 1991 to 2010. Women contacted were asked whether they had developed diabetes and if not, would they be agreeable to have a HbA1c test. If not known, diabetes was diagnosed if the HbA1c was ≥ 6.5%. If women declined a HbA1C test their self-report of no diabetes was recorded.

Results:From this 20 year period there were 3,266 women referred with GDM of whom 2,510 could be considered for this study and 1,305 (51.9%) could be contacted. Of these women, 729 (55.9%) declared their diabetes status. Diabetes status was determined through self-report or HbA1c testing. 69 women reported that they were diagnosed as having diabetes and an additional 3 were diagnosed with T2DM through HbA1c testing. For women who were diagnosed with GDM in 1991-1995, 1996-2000, 2001-2005 and 2006-2010 respectively, the proportion who developed diabetes between diagnosis of GDM and 2016 was 18.9%,16.7%, 10.6% and 2.3%. The overall proportion of women who developed diabetes during the 25 year follow-up period was 9.9%.

Conclusion:The incidence of T2DM after a pregnancy complicated by GDM ranges from 2.3% 5-10 years after completion to 18.9% 20-25 years later. These figures are far lower than what is frequently cited in the international literature.

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Short and mid term renal function in patients with Type 1 and Type 2 Diabetes during and post Pregnancy

Jas-mine Seah[1, 2, 3], Cara Tanner[2], Ning Mao Kam[2], Lydia Wong[2], Leonid Churilov[3, 4], Alexis Shub[1], Christine Houlihan*[1, 2, 5], Elif I. Ekinci*[2, 5, 3]

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*5. *, Equal Contribution*

Background:

We conducted an exploratory retrospective study at a single tertiary obstetric hospital with an aim to investigate the short and mid term progression of renal function in pregnancies affected by T1DM and T2DM compared to healthy controls. We hypothesized that renal function returns to pre-pregnancy levels slower in women with T1DM and T2DM compared to controls.

Methods: Biochemical and clinical characteristics of women with T1DM (n=91), T2DM (n=106) and healthy controls (n=119) were recorded 2 years-pre, at time of, and 2 years-post pregnancy from state-wide pathology services. We examined the relationship between time, diabetes status and the rate of decline in renal function as determined by estimated Glomerular Filtration Rate (eGFR) using the Chronic Kidney Disease Epidemiology Cohort formula utilizing a median regression model. eGFR at 0-6 months pre-pregnancy was considered baseline renal function, with age and duration of diabetes as independent variables.

Results: Women from all three groups developed a rise in renal function during pregnancy, peaking in the second trimester, in keeping with hyperfiltration (graph1). The greatest rise was observed in healthy controls with a median of 25ml/min/1.73m^2 (95%CI18.2, 30.2;p<0.001), which was 16.7ml/min/1.73m^2 (95%CI -24.1,-9.4;p< 0.001) greater than in T1DM and 14.6ml/min/1.73m^2 (95%CI -21.8,-7.4; p<0.001) in T2DM.

Renal function returned to baseline quickest in healthy controls at a median rate of 0.07ml/min/1.73m^2/day (95%CI -0.09,-0.06;p<0.001)) followed by T1DM 0.05ml/min/1.73m^2/day (95%CI -0.07,-0.03;p<0.001)) and T2DM 0.01ml/min/1.73m^2/day (95%CI -0.02,-0.00;p<0.01). Overall, renal function returned to baseline by 2 years in all three groups.

Conclusions:

Acknowledging the limitation of eGFR as a measure of renal function in pregnancy,the degree of hyperfiltration appears to be less in women with pre-existing diabetes. Furthermore, despite a slower recovery in renal function,pregnancy does not appear to be associated with worsening renal function in this cohort of T1DM and T2DM women with relatively preserved renal function.

Graph 1: Renal function trajectory pre, during and post Pregnancy in Women with and without Diabetes

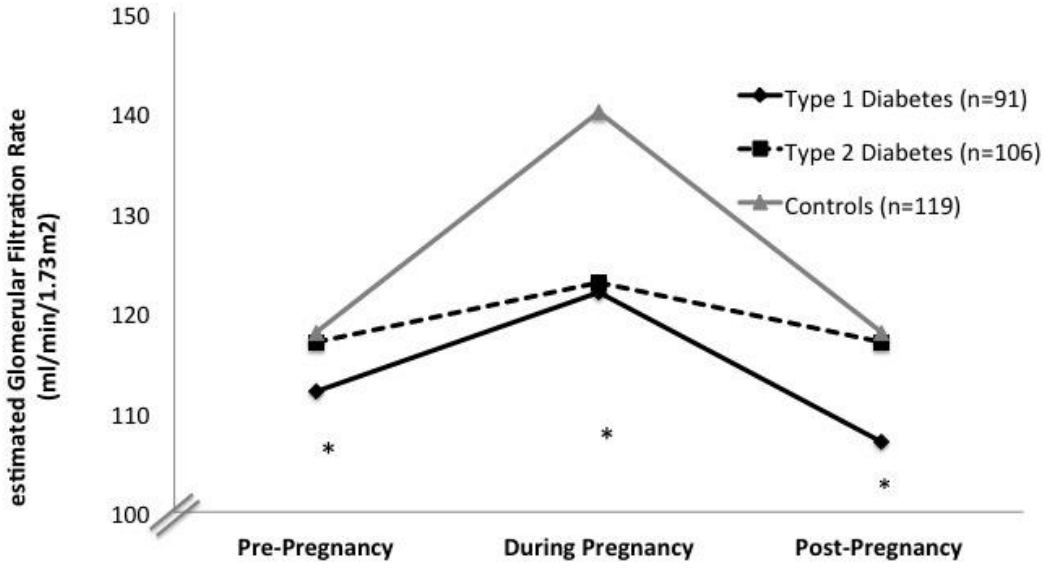

Figure representing 0-6 months pre-pregnancy, during and 18-24 months post pregnancy
Analysis between groups using Kruskall-Wallis test * p-value <0.01

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Antenatal HbA1c centiles by gestational week in a multi-ethnic population: does one size fit all?

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Both the WHO and ADA endorse HbA1c as a screening test for undiagnosed type 2 diabetes in early pregnancy. However, limited pregnancy-specific HbA1c data exist with recommended cut-points based on data from non-pregnant populations. Our aim was to determine pregnancy-specific HbA1c centiles by gestation and by ethnicity.

This is a population-based observational study. Using electronic records, laboratory data were matched to births in Christchurch during 2008-2010. Inclusion criteria were a normal glucose challenge test or 75g glucose tolerance test. Included were 6800 pregnancies, European 80% (5462), Māori 6% (415), Pacific 3% (196), and 11% (727) 'Others' (mostly Asian). HbA1c fell early in pregnancy reaching a nadir at 24 weeks' gestation, thereafter increasing to baseline levels or beyond. The 97.5th centile for HbA1c by gestation in a European woman age 30 years is 5.76% (39.5mmol/mol) at 8+0 weeks', 5.70% (38.8mmol/mol) at 16+0 weeks', 5.66% (38.4mmol/mol) at 24+0 weeks', and 5.99% (42.0mmol/mol) at 32+0 weeks'. Non-European women had higher mean HbA1c than Europeans, the estimated mean (SD) difference in Māori +0.13% (0.05) (1.4mmol/mol (0.5)), Pacific +0.20% (0.03) (2.2mmol/mol (0.3)), 'Others' +0.10% (0.03) (1.1mmol/mol (0.3)). Māori and Pacific women also had higher fasting plasma glucose levels, mean (95% confidence interval) +0.07mmol/L (0.02, 0.12) and +0.19mmol/L (0.13, 0.26) respectively, while 'Others' had higher plasma glucose post glucose load, +0.35mmol/L (0.24, 0.45) at 2-hours, all within the 'normal' range.

In conclusion, our innovative HbA1c centile chart adjusted by gestation is useful to consider when using HbA1c to screen for pre-existing hyperglycaemia in early pregnancy. Ethnicity-specific HbA1c charts may be unnecessary as glycaemia partly accounts for this observed variance. Further study could clarify whether the late pregnancy rise within the higher HbA1c centiles is due to unrecognised gestational diabetes or confounding by iron deficiency.

POSTERS

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A retrospective analysis of the impact of new diagnostic criteria for Gestational Diabetes Mellitus on the Endocrinology service at a tertiary hospital

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Background

The prevalence of gestational diabetes mellitus (GDM) may increase with the implementation of revised diagnostic criteria (as recommended by the International Association of the Diabetes and Pregnancy Study Groups) aimed at identifying pregnancies at increased risk of adverse perinatal outcomes. There are clear implications for health-care services in terms of resources and the associated cost-benefit relationship. Our study analysed the impact on endocrinology clinic visits, the initiation of insulin treatment and fetal and maternal outcomes.

Methods: A retrospective cohort study was conducted. The medical records of patients diagnosed with GDM referred to the Endocrinology Clinic were reviewed, comparing two 12 month periods: March 2012 to February 2013 (period 1) and March 2015 to February 2016 (period 2), before and after implementation of the new criteria. Maternal and fetal outcomes were analysed for six months of each period.

Results:165 GDM patients attended the endocrinology clinic in period 1 vs 323 patients in period 2. Insulin treatment increased significantly in period 2, from 34.2% to 53.1% ($p = 0.002$). The mean number of Endocrinologist consultations (Medicare billed) increased from 3.6 to 4.2 ($p = 0.006$) and with a Diabetic Educator from 1.3 to 1.5 ($p = 0.049$). The rate of caesarean sections (CS) in patients with GDM increased from 31.1% to 47.0% ($p = 0.038$). The number of neonates grouped as 'Small for Gestational Age' (SGA) increased in insulin-treated patients in period 2 vs period 1 (17 vs 0, $p < 0.001$) but the number of 'Large for Gestational Age' neonates was similar (6 vs 5, $p = 1$).

Conclusion:This study has demonstrated that the new GDM diagnostic criteria have impacted on existing health-care resources with a corresponding increase in costs. Hospital systems will need to plan for the increased demands on pregnancy-related diabetes services.

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Adherence to guideline-based early testing for gestational diabetes in a Victorian tertiary centre

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Background: Recent national and international guidelines have recommended screening for maternal dysglycaemia prior to 24 weeks gestation in 'high-risk' women, not previously known to have glucose abnormalities, to improve pregnancy outcomes. We assessed the level of adherence to these guidelines among women subsequently diagnosed with gestational diabetes (GDM) in a Victorian tertiary centre.

Methods: All women with GDM attending a tertiary antenatal clinic between September 2011 and August 2013 were analysed retrospectively. An interim analysis of 438 women is presented here. Women at "high risk" of dysglycaemia were defined as women who had *at least one* high risk factor (previous GDM; previously elevated blood glucose level; maternal age ≥ 40 years; family history of DM; BMI > 35kg/m^2; previous macrosomia; polycystic ovarian syndrome; or use of corticosteroids/antipsychotics) or *two* moderate risk factors (BMI 25-35kg/m^2 and one of the following ethnicity: Asian/Indian/Middle Eastern/African/Aboriginal/Torres Strait Islander/Pacific Islander/Maori).

Results: 360 of 438 (82%) women with GDM had either ≥ 1 major risk factor (306/360) or two moderate risk factors (54/360). However, only 145/360 (40%) of these women were tested prior to 24 weeks gestation. Additionally, 7 women who were diagnosed with early GDM fell outside the current criteria for early testing.

Conclusion: The uptake of the current diagnostic guidelines for GDM has been slow. In this interim analysis, approximately 60% of women with gestational diabetes deemed "high risk" for dysglycaemia were not tested prior to 24 weeks gestation as per current guideline recommendations. Strategies to increase adherence to guideline based recommendations need to be implemented. Furthermore, current criteria for early testing excludes some women with early dysglycaemia.

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Associations between early gestational diabetes mellitus and adverse pregnancy outcomes

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Background

Gestational diabetes (GDM) in the third trimester is associated with adverse pregnancy outcomes and appropriate management improves these outcomes. There is comparatively little known about the outcomes of GDM diabetes in the first or second trimester. The objective of our study was to assess whether high-risk women with early HDM experienced worse maternal and neonatal outcomes compared to women with third trimester GDM and women who never developed GDM.

Methods: A total of 888 pregnant women who underwent a GTT prior to 20 weeks gestation were respectively recruited into the study. Women were grouped based on their GDM status: early GDM (diagnosis prior to 20 weeks 0 days gestation), late GDM (diagnosis after 20 weeks gestation) or no GDM. Outcomes were adjusted for maternal BMI, age, country of birth and parity.

Results: There was no difference in the obstetric composite between groups. Women with early and late GDM experienced greater incidence of the fetal composite compared to women with no GDM. Once broken down into its components, neonatal hypoglycaemia was found to be the significant contributing outcome within the composite. There was no difference in pre-eclampsia, PPH or HDU admission between groups. Women with early and late GDM experienced greater induction of labour compared to women with no GDM.

Conclusion: In this retrospective cohort, early diagnosis of DDM was not associated with adverse obstetric outcomes compared to women with normal glucose tolerance or late GDM after adjustment for maternal factors. This may be due to well-controlled GDM, or because in high-risk women, early GDM does not increase adverse outcomes. Rates of neonatal hypoglycaemia were increased, which may be an effect of increased diagnostic testing.

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Atypical antipsychotic monotherapy in pregnancy and Gestational Diabetes Mellitus (GDM): results of a longitudinal study.

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Introduction: Data from The National Register of Antipsychotic Medications in Pregnancy (NRAMP) cohort study suggests that women taking antipsychotic medications are generally at higher-than-population risk of GDM.

Objectives: To investigate the impact of type and dose of atypical antipsychotic monotherapy during pregnancy on the incidence of GDM.

Methods: A subset (n=186) of NRAMP participants, recruited between 2005 and December 2014, was identified: pregnant women, taking either no antipsychotic, or a single atypical antipsychotic during their first trimester. Exclusion criteria were: pre-existing diabetes, use of clozapine, and miscarriage prior to 24 weeks gestation (ie unlikely to have been screened for GDM). Atypical antipsychotics were grouped as follows: quetiapine (n=104), olanzapine/risperidone/other (n=62), and none (n=20). Women were interviewed by telephone several times throughout pregnancy. Multivariable logistic regression was performed to determine the effect of antipsychotics on the risk of GDM when known risk factors for GDM are taken into account.

Results: GDM was diagnosed in 10% of participants taking no antipsychotic, 13.5% of quetiapine participants, 35.5% of olanzapine participants, 41.7% of risperidone participants, and 33.3% of 'other' participants (p=0.005 for difference between groups). In the adjusted model, GDM was more likely to occur with higher antipsychotic dose (OR 3.08, p=0.013), family history of diabetes (OR 3.5, p=0.008), and higher pre-pregnancy BMI (OR 1.07, p=0.041). Women in the olanzapine/risperidone/other group had a higher GDM risk than the quetiapine group (OR 2.74; p=0.023). There was no statistically significant difference between the quetiapine and no antipsychotic groups.

Conclusions: The incidence of GDM in women who take antipsychotics during pregnancy is high, with olanzapine and risperidone being more diabetogenic than quetiapine. Higher doses of medication also significantly increase the risk of GDM. Traditional risk factors such as family history and BMI remain important in these women.

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Change in diagnostic criteria for GDM: Is it a worthwhile exercise?

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Introduction: GDM affects 8–10% of pregnancies in Australia. Historically diagnosis of GDM in Australia has been derived from an *ad hoc* consensus. In 2013, RANZCOG working party recommended OGTT at 24-28 weeks and the adoption of 2013 WHO diagnostic criteria.

Aim: To evaluate the effect of the implementation of new GDM fasting level guidelines on maternal and neonatal outcomes.

Design: Retrospective Audit

Materials and Methods: Perinatal database was utilised to collect the data from mothers diagnosed with GDM in 2015 with fasting BSL of 5.1, 5.2, 5.3, 5.4 to 5.5 mmol/l. Demographics included BMI and age of patients. Primary outcomes were management of GDM, mode of delivery, post-partum haemorrhage, perineal tear, shoulder dystocia. Secondary outcomes were neonatal birth weight, APGAR < 7 at 5 minutes and neonatal unit admission. Data was analysed with SPSS program.

Results: 151 patients were identified (35% of the total GDM patients diagnosed in 2015). The mean age calculated were 28.82 yrs and mean BMI was 32.6.

The proportion of participants on Metformin and insulin was higher in the BSL=5.5 group (p=0.03). There were no significant difference with mode of delivery (p=0.8), PPH >500mls (p=0.9), perineal tears (p=0.2) and shoulder dystocia (p=0.4) across the groups.

As for neonatal outcomes, mean birth weight was 3529grams (*SD*=545) with no significant difference between the groups (p=0.831). There were no calculated difference in APGAR p=0.2) and admission to neonatal unit (p=0.5) between the groups.

Conclusion: Reduction in fasting blood sugar cut off significantly increased the number of women diagnosed with GDM. In our study, there is no trend within the group with regard to our maternal and neonatal outcome. However, patient with higher BSL were more likely to be treated with a combination of medications.

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Change in the diagnostic criteria for GDM: The Mercy Hospital for Women Experience

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3. Department of Biochemistry, Austin Health, Melbourne

Background: From January 2015 RANZCOG recommended national adoption of WHO/IADPSG diagnostic criteria for GDM. Early experience from St Carlos (1) showed tripling of GDM incidence, improved pregnancy outcomes and overall cost saving.
Aim: To review the impact of change in diagnostic criteria post 2015 at a tertiary obstetric hospital in Melbourne, on the annual incidence of GDM and the rate of insulin commencement.
Method: Pathology data was obtained from 2012 to end May 2016. All POGTT performed at Austin pathology; the pathology provider to MHW were reviewed. Positive POGTT was diagnosed by a fasting glucose level ≥5.5mmol/L or a 2-hour level ≥8.0mmol/L until the end of 2014 and a fasting glucose level of ≥5.1mmol/l, and/or a 1-hour level of ≥10.0mmol/l and/or a 2-hour level of ≥8.5mmol/l from January 2015 till present. Additional cases of GDM diagnosed by external pathology providers were also recorded. Records on insulin starts were obtained from the diabetes educator log book.

Results:

Year	Austin Path POGTT			External pathology		Overall			
	GDM n (%)	POGTT n	Insulin starts n (%)	GDM (n)	Insulin start n (%)	Total GDM	No of deliveries	Combined insulin starts n (%)	%GDM
2012	530 (11.7)	4498	-	72	-	602	5558	-	10.8
2013	604 (12.0)	5023	205 (33)	111	48 (43)	715	6018	253 (35)	11.8
2014	634 (12.3)	5151	230 (36)	163	51 (31)	797	5961	281 (35)	13.3#
2015	759 (15.4)	4932	232 (30)	165	50 (30)	924	5534	282? (31)	16.6**
2016	309 (14.7)	2105	75 (24)	106	18 (16)	415	2726	93 (22)	15.2

- # X^2 17.7, p =0.0001 compared to preceding year/s
- ** X2 95.7, p<0.0001
- ?X2 5.93, p=0.05

Discussion: An increase in the incidence of GDM was observed in the year prior (2014) and also again in the year following (2015) the official change. The

2014 increase may result from use of new and old criteria; pre-emptive change. The increase GDM rate to 16.6% in 2015 fell below the previous prediction of 19%(2) at our institution.

Although the absolute insulin starts did not change the percentage GDM commencing insulin decreased in 2015 suggesting that although more cases of GDM were diagnosed a greater proportion than before could be managed without insulin; i.e. milder disease. Patient characteristics, perinatal and maternal outcomes over this period are still to be assessed.

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Controlling betamethasone induced hyperglyceamia in women with gestational diabetes mellitus

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Introduction: Guidelines recommend women with gestational diabetes (GDM) should maintain glucose levels (BGL) within a tight target (4-7mmol/l) when approaching partition to prevent fetal complications [1]. Betamethasone (BM) is given as two intramuscular injections 24 hours apart for fetal lung maturation if women are expected to deliver under 34-weeks gestation (38-weeks for planned caesarean section) [2,3].

Hypothesis: BGLs are maintained at the recommended level of 4-7mmol/l following BM in GDM by use of a standard adult intravenous insulin protocol, initiated with BGL >6.5mmol/L.

Methods: Retrospective review of women with GDM who received BM on the antenatal ward of a tertiary hospital in 2015. Capillary glucose levels were analysed for 48 hours following the first dose of BM. Univariate and multivariate analyses were used to evaluate factors associated with glycaemic control. Data is shown as mean±SD or median(IQR).

Results: 36 women met inclusion criteria, with mean age 32±5.6 years, gravida 2(1-3), parity 1(0-2), gestation 33±4 weeks at time of BM. Pre-admission treatment was diet alone (47%), metformin monotherapy (6%), and subcutaneous insulin (47%). Mean capillary BGL for 48 hours post BM was 7.3±1.6mmol/L. 54% of observed BGL readings were >7mmol/l, and 7% were >10mmol/L. In 23/36 women with any BGL readings >10mmol/L, 15 had 3 or more readings >10mmol/L. Estimated time spent with BGL >7mmol/L was 23±9/48hrs. Two hypoglyceamic events (both >3mmol/l) occurred in one women. Delays in BGL measurement were associated with suboptimal control, but other factors, including maternal age, gestation, pre-admission treatment, coprescription of subcutaneous insulin were not associated. Trends included prescription of lower intravenous infusion rates to women already on subcutanoues insulin, and lower insulin infusion rates with poorer control.

Conclusion: This study demonstrated that current practice does not achieve target glycaemia. Women with GDM having BM require a specific protocol [4-6] adapted for the local service.

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Determining the risk of your patient with diabetes mellitus: comparing obstetric and neonatal outcomes in pregnancies complicated by diabetes mellitus; stratified by type of diabetes

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Diabetes mellitus is a common complication of pregnancy. The incidence of gestational diabetes mellitus (GDM) has steadily increased over recent years in comparison to that of type 1 diabetes mellitus (T1DM) and type 2 diabetes mellitus (T2DM), which has remained stable. Our objective was to compare obstetric and neonatal outcomes of pregnancies complicated by diabetes mellitus by type of diabetes mellitus, to help inform current evidenced-based antenatal guidelines.

A retrospective cohort study of all pregnancies at the Royal Women's Hospital, Melbourne, between 2010-2015, was performed to identify pregnancies complicated by diabetes mellitus. Demographic data, obstetric outcomes and neonatal outcomes were compared.

Of the 23,030 pregnancies occurring during the study period, ten percent were complicated by diabetes mellitus (3,203). Of this ten percent, 6.8% had T1DM, 7% had T2DM and the remaining 86.3% had GDM. Pre-existing diabetes was more commonly associated with hypertensive disease (18% T1DM, 20% T2DM, 7% GDM) and delivery at an earlier mean gestational age (36.0 weeks T1DM, 36.7 weeks T2DM, 37.8 weeks GDM). Caesarean section was more common in pre-existing diabetes (66% T1DM, 54% T2DM, 40% GDM). Mean birthweight at delivery was significantly greater in T1DM (3,328g T1DM, 3,100g T2DM, 3,152g GDM), and the incidence of macrosomia was also significantly increased in this group (20% T1DM, 9% T2DM, 5.9% GDM). The rate of stillbirth was significantly increased in pre-existing diabetes (2.3% T1DM, 4% T2DM, 0.9% GDM).

Pregnancies in women with pre-existing diabetes are associated with significantly worse outcomes compared to women with GDM. Both T1DM and T2DM should both be considered a significant risk factor for adverse pregnancy outcomes. Antenatal guidelines for the management of pre-existing diabetes, compared to GDM, should reflect the differing risk profile of these conditions.

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Did the revision in the criteria for diagnosis of gestational diabetes change neonatal outcomes?

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Background

The purpose of this audit was to determine if the rate of large for gestational age neonates (LGA) and foetal adverse outcomes had improved after implementation of the International Association of the Diabetes and Pregnancy Study Groups (IADPSG) criteria for the diagnosis of gestational diabetes (GDM)[1] in 2011 in Wollongong Public Hospital.

Methods: De-identified data from the midwife database for all births in Wollongong Public Hospital was obtained from 2008 to 2015. Patients in 2011, patients without diabetes and with pre-existing diabetes were excluded. The patients from 2008 to 2010 were classified as "Group 1", and from 2012 to 2015 as "Group 2".

Results: There was a significantly increased rate of GDM diagnoses in Group 2 (n=1958, 20.7%) compared to Group 1 there were (n=457, 6.5%) ($p < 0.001$). The median maternal body mass index (BMI) was significantly higher in Group 2 (28 kg/m^2) than in Group 1 (26.7kg/m^2) (p=0.002). There was also a greater need for insulin treatment in Group 2 (n=624, 31.7% vs. n= 115, 25.1%) (p=0.005).

The rate of LGA neonates was significantly reduced in Group 2 (n=269, 13.7%) compared to Group 1 (n=77, 16.8%) (p=0.027), however the rate of special care nursery admissions was greater in Group 2 (n=443, 22.6% vs. n=60, 13%) (p<0.001).

There was no significant difference in the mode of birth (p=0.067), neonatal hypoglycaemia (p=0.087) and respiratory distress (p=0.430) between the two groups.

Conclusions

Since the change in GDM diagnostic criteria, there was double the amount of women diagnosed with GDM than previously published data in 2011[2], possibly relating to a significant increase in median BMI. There were more women requiring insulin treatment. There was a significant decrease in the number of LGA infants. We could not find a significant change in other neonatal outcomes.

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Do Multigravida Women with Gestational Diabetes Differ in their Antenatal Characteristics and Outcomes compared to Primagravida Women?

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Background: There is a paucity of literature on whether multigravida Gestational Diabetes (GDM) women have different antenatal characteristics and outcomes compared to primigravida women.

Aim: To compare primigravida and multigravida women in terms of characteristics in addition to therapeutic and pregnancy outcomes.

Methods: We analysed de-identified prospectively collected singleton pregnancy data (1992-2013) from women diagnosed with GDM on a 75-gram oral glucose tolerance test according to 1991 GDM Ad Hoc Working Party, thence 1998 ADIPS criteria. Antenatal characteristics and perinatal outcomes were compared between primigravid and multivgravid GDM women. Excessive gestational weight gain (eGWG) was defined according to Institute of Medicine(IOM) weight gain targets(1). Large for gestational age (LGA) and small for gestational age (SGA) infants were defined as >90th and <10th centiles respectively, using a customised centile calculator(2). Prematurity was delivery <37 weeks gestation. Independent samples t-tests and chi-square tests were used to assess statistical significance. Women with prior GDM were excluded from analysis.

Results: There were 2635 GDM women, 710 primigravida and 1925 multigravida. Compared to primigravida women, multigravida women were older, had higher pre-pregnancy BMI, and were diagnosed at a slightly earlier gestational age with GDM. Antenatal glucose parameters and HbA1c were similar between the groups. There was no relationship between gravida status and insulin therapy following adjustment for age, BMI and ethnicity. However, multigravida women had a lower OR of 0.7(0.5–0.9) for premature delivery compared to primigravida women. This remained significant following adjustment for age, pre-pregnancy BMI and ethnicity: OR 0.6(0.5–0.9). There was a significant increase in LGA rates in multigravida women OR 1.6(1.2–2.1), which remained significant with OR 1.5(1.1-2.0) following adjustment.

Conclusion: Multigravida GDM women had higher metabolic risk factors, including older age, higher BMI and earlier GDM diagnosis, There was a greater risk of LGA, but a lower risk of premature delivery.

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Does a validated GDM Insulin prediction model work in women from different ethnic backgrounds?

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Background: Ethnicity is associated with differing abnormal glucose profiles and percentage insulin use in women with Gestational Diabetes Mellitus (GDM). We previously developed a model for predicting therapy type in women with GDM – Medical Nutrition Therapy (MNT) only versus MNT+Insulin (MNT+I) therapy (1).

Aim: To test how our Therapy Prediction Model performed in women with GDM from different ethnic backgrounds.

Methods: We analysed de-identified prospectively collected data (1993-2014), for women diagnosed with GDM according to 1991 GDM Ad Hoc Working Party, thence 1998 ADIPS criteria. (2,3) in our multi-ethnic high-risk cohort. The model includes seven dichotomous predictors of therapy type: maternal age >30 years, family history of diabetes, pre-pregnancy obesity (BMI ≥30 kg/m^2), prior GDM, early diagnosis of GDM (<24 weeks gestation), Oral Glucose Tolerance Test (OGTT) fasting BGL ≥5.3 mmol/L, and HbA1c at GDM diagnosis ≥5.5%. A receiver operator curve (ROC) of sensitivity plotted against 1-specificity was constructed based on number of predictors present (0-7) versus therapy outcome for each of the four main ethnicities in our database – European, Middle Eastern, South-East Asian and South Asian. These were compared to the ROC constructed from the pooled data of all ethnicities.

Results: A total of 3144 of 3317 women had complete data for these four ethnicities. Insulin use was highest in women of Middle Eastern background and lowest amongst South-East Asian women. Compared to Europeans, South East Asian women had significantly lower mean OGTT fasting glucose, whilst South Asian women had significantly higher mean HbA1c and both had higher mean OGTT 2hr glucose (see Table).

Table 1

Ethnicity	n=	ROC	95% CI	Insulin%	HbA1c%	Fasting	2 hr OGTT
ALL	3317	0.712	0.693-0.731	32.2	5.3±0.6	5.1±0.8	8.7±1.4
European	747	0.702	0.663-0.741	37.3	5.3±0.5	5.2±0.7	8.6±1.3
Middle Eastern	896	0.703	0.668-0.738	38.8	5.3±0.7	5.3±0.8	8.5±1.5
South-East Asian	1118	0.709	0.673-.745	21.5**	5.2±0.5	4.9±0.8*	8.9±1.3*
South Asian	383	0.661	0.602-.720	34.7	5.5±0.5*	5.2±0.8	9.0±1.5*

Mean ± SD *P<0.001, **P<0.0001 compared to European

Conclusions: In this cohort, the GDM prediction model was similarly predictive of therapy type in all ethnicities, but least for women of South Asian background. This is despite significant differences in insulin use and glucose dynamics between most ethnicities.

Acknowledgements:

We wish to thank all the Diabetes Educators who have collected data and maintained the database.

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Does the prevalence of GDM vary with seasons?

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Background: Clinical observations have suggested a higher number of women with GDM present during the summer months. Blood glucose values at 1-hour and 2-hours after a75 g oral glucose tolerance test (OGTT) have previously been shown to rise in a non-linear fashion with increasing ambient temperature (1). The aim of this study was to determine whether the prevalence of GDM varied with different seasons.

Method: Wollongong has a temperate climate and an ethnic distribution similar to Australia as a whole. The results of all pregnancy OGTTs performed between 2012 and 2014 inclusive were prospectively collected in the Wollongong area with collaboration between the public hospital (Wollongong) and a major private pathology service (Southern IML). The results were grouped by season and considered using the current World Health Organization (WHO) criteria, endorsed by the Australasian Diabetes in Pregnancy Society.

Results: 7,369 pregnancy OGTTs were analysed during this period. In winter, the median 1-hour and 2-hour glucose results were significantly (P<0.0001) lower than the overall 1-hour and 2-hour results. After exclusion of women diagnosed with GDM on the fasting glucose level, the prevalence of GDM using

the 1-hour diagnostic level was 29% higher in summer and 27% lower in winter compared with the overall prevalence (p = 0.02). The prevalence of GDM using the 2-hour diagnostic level was 28% higher in summer and 31% lower in winter compared with the overall prevalence (p = 0.01).

Conclusions: Seasonal variation exists in the prevalence of GDM being either overdiagnosed in summer or underdiagnosed in winter. Standardisation of testing procedures or a seasonal correction of results may be required.

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Does Weighting The Predictors Enhance a Validated GDM Insulin Prediction Model?

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Background

In 2015 we developed and validated a Model for prediction of insulin therapy in women with gestational diabetes (GDM)(1). The Model, using seven readily available clinical items, identifies low and high risk women at GDM diagnosis who could be triaged into different models of care.

Aim

To enhance the Model using weighted predictor variables based upon their respective odds ratio [OR] for predicting insulin therapy.

Methods: In our multi-ethnic cohort, seven items were dichotomised and assessed for GDM therapy prediction. These were, [with their OR]: maternal age >30 years [1.214], family history of diabetes [1.423], previous GDM [1.474], pre-pregnancy obesity (BMI ≥30 kg/m^2) [1.777], HbA1c at GDM diagnosis ≥5.5% [1.878], fasting BGL ≥5.3 mmol/L [2.449] and early GDM diagnosis (<24 weeks gestation) [2.631]. The lowest OR was reset to 1.0 and all others adjusted by dividing the respective OR by 1.214. Resultant values were thence rounded to the nearest 0.5. Using weighted values, a total predictor number (0-10) was calculated for each individual. Cross tabulation was undertaken and a receiver operator curve (ROC) constructed based on predictor score (0-10) versus therapy outcome, with specificity and positive predictive value (PPV) determined.

Results: In 3317 women, compared to the original Model, the ROC Area Under the Curve (AUC)(95%CI) was only marginally higher [0.726 (0.707-0.744) versus 0.712 (0.693-0.731)], and there was no improvement in specificity and PPV, which were lower (see Table).

Table		Prediction of Diet Rx	
Original Model 0-1 Predictors	Specificity	89.9%	
	PPV	86.6%	
Weighted Model 0-2.5 Predictors	Specificity	76.2%	
	PPV	83.4%	
			Prediction of Insulin Rx
Original Model 6-7 Predictors	Specificity		99.4%
	PPV		87.6%
Weighted Model 7.5-10 Predictors	Specificity		98.5%
	PPV		80.9%

PPV = positive predictive value

Conclusions

As in the original Model, increasing predictor score was associated with increasing insulin use, allowing identification of those with least and greatest likelihood of requiring insulin. However the weighted model was less predictive of therapy type. Weighting the predictors has not enhanced the original easy to use Model.

Acknowledgements

We acknowledge and thank all staff who have collected data and maintained the database.

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Does a validated GDM Insulin prediction model work with different treatment targets?

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Background: A validated model was developed by Bankstown-Lidcombe Hospital (B-LH) for prediction of therapy type and adverse outcomes in women with Gestational Diabetes Mellitus (GDM) (1). The Model, using seven clinical items, identifies low and high risk women at GDM diagnosis for triage into different models of care.

Aim: To validate the model in a clinical population with a different ethnic mix, therapeutic targets and model of care.

Methods: De-identified, prospectively collected data were analysed from a major Sydney Teaching Hospital (Royal Prince Alfred Hospital (RPAH)) for women diagnosed from 1992-2010 by 1991 GDM Ad Hoc Working Party, thence 1998 ADIPS criteria (2,3). Treatment targets were 5.3mmol/L fasting, 6.7mmol/L for 2-hour post-prandial (to 1999) and thereafter 7.5mmol/L for 1-hour post-prandial glucose. Seven dichotomous variables were assessed against therapy type: Medical Nutrition Therapy (MNT) only or MNT plus insulin (MNT+I). A receiver operator curve (ROC) of sensitivity plotted against 1-specificity was constructed based on the number of predictors present (0-7) versus therapy outcome.

Results: Data were available for 1381 women, mean±SD age 33.1±5.1 years, GDM diagnosis at 26.4±5.7 weeks, pre-pregnancy BMI 23.9±5.1kg/m2, mean OGTT fasting BGL 4.6±0.7 mmol/L and HbA1c at GDM diagnosis 5.3±0.5%. Main ethnicities were South-East Asian 44.1%, European 32.5%, and South Asian 11.8%. Apart from gestation at diagnosis and HbA1c, all were significantly different to B-LH ($p<0.05$).The Table shows the number of predictors present and the corresponding percentage of women requiring MNT only versus MNT+I. The area under the ROC was 0.634 (95%CI 0.582–0.686).

Number of predictors present	MNT only n= (%)	MNT+I n= (%)
0	59 (64.8)	32 (35.2)
1	198 (61.3)	125 (38.7)
2	242 (50.5)	237 (49.5)
3	113 (38.0)	184 (62.0)
4	43 (31.2)	95 (68.8)
5	8 (19.0)	34 (81.0)
6	0 (0)	10 (100.0)
7	0 (0)	1 (100.0)
Total	663 (48.0)	718 (52.0)

Conclusion: As previously found (1), the greater the number of predictors, the greater the likelihood of MNT+1. Conversely, the less predictors present, the greater likelihood of MNT only. These findings provide further validation of the model.

Acknowledgements: We thank all staff involved in data collection and maintenance of the B-LH and RPAH databases.

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Early age at menarche is associated with higher risk of developing gestational diabetes

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Introduction: Identification of women at high risk of gestational diabetes mellitus (GDM) at an early life stage may allow early health monitoring and intervention. A younger age at menarche has been associated with increased risk of type 2 diabetes, but the association with GDM remains unclear.

Objective: To examine the association between age at menarche and development of GDM in a population-based study of reproductive-aged Australian women.

Methods: Over a follow-up period of 12 years, 4,749 women participating in the Australian Longitudinal Study on Women's Health reported at least one pregnancy. GDM diagnosis was self-reported for each pregnancy and validated in a subsample. Age at menarche was reported at baseline in 2000 when the women were aged 22-27 years. Log-binomial regression analysis was used to estimate relative risks (RR) and 95% confidence intervals (CI).

Results: A first diagnosis of GDM was reported by 357 women (7.5%). Mean age at menarche was 13 years (SD 1.4). Compared with women with menarche at age 13 years, women who had their first menstruation at age 11 or younger had a 65% higher risk of developing GDM (95% CI 1.20, 2.25)

after adjustment for education, parity, polycystic ovary syndrome and physical activity. This higher risk was attenuated by 14% (OR 1.51, 95% CI 1.10, 2.07) after additional adjustment for pre-pregnancy BMI.

Conclusions: Findings from this population-based study of Australian women suggest that a history of early menarche may be clinically useful to identify women at higher risk of developing GDM. Moreover, results indicate that avoiding overweight and obesity in women with early menarche may lower their risk of GDM. Further birth cohort studies are needed to elucidate the role of early life exposures and weight trajectories on age at menarche and subsequent GDM risk.

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Effects and Outcomes of New Diagnostic Criteria for Gestational Diabetes Mellitus

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In January 2015, the diagnostic criteria for gestational diabetes mellitus changed, with the goal of increasing the sensitivity of diagnosis and improving overall glycaemic control, thereby reducing the numbers of adverse pregnancy outcomes associated with this condition. With any change in guidelines, it is imperative to assess the effectiveness of their implementation in terms of achieving outcomes, and to further identify areas for change and improvement.

A retrospective audit was conducted at Mackay Base Hospital to compare maternal and neonatal outcomes before and after the diagnostic guidelines were introduced. Data was collected via chart reviews, for a six month time period prior to January 2015, and a six month period after the introduction of new diagnostic guidelines. Data collected included demographic information, foetal outcomes, maternal outcomes and treatments used for those with gestational diabetes.

Preliminary data analysis has revealed a significant increase in the number of diagnoses of gestational diabetes, and an increase in the use of pharmacological treatments for gestational diabetes. However, the rates of adverse neonatal outcomes associated with gestational diabetes including macrosomia and shoulder dystocia have been similar pre and post the change in guidelines.

Based on the results of this study, the change in diagnostic criteria have not significantly improved neonatal or maternal outcomes in the overall patient cohort, although there has been an increase in the number of diagnoses of gestational diabetes and in interventional measures.

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Exosomal profile present in maternal and foetal circulation during pregnancies with diabetes

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Background: Diabetes during pregnancy is associated with risks to women and foetus such as miscarriage, preeclampsia and preterm birth. In recent years, we have established that exosomes increase during normal gestation where their release from placental cells increase in response to glucose concentration. The aim of this study was to determine the concentration of exoomes present in maternal and foetal circulation in women with with pre-gestational diabetes (Type 1 and 2) and gestational diabetes (treated with diet or insulin).

Methods: Plasma was obtained from maternal and cord blood from women with diabetes type 1 (DM1), type 2 (DM2) and gestational diabetes treated with diet (GDM-diet) or insulin (GDM-insulin) at time of delivery. Exosomes were isolated through differential and buoyant density centrifugation and characterised by size distribution, enrichment of TSG101 and morphology using NanoSight, Western Blot and electron microscopy, respectively. Total number of exosomes (EXO) present in maternal and foetal circulation was determined by nanoparticle tracking analysis and presented as vesicles per mL plasma.

Results: Exosomes were identified as spherical vesicles with size distribution ~100 nm and positive for the enriched exosomal marker TSG101. EXO was significantly higher in diabetic pregnancies compared to normal ($p<0.05$) in both maternal and foetal plasma. Interestingly, EXO was significantly higher in foetal plasma compared to maternal plasma matched by conditions (normal $1.16x10^9$ vs $1.62x10^9$, GDM-diet $1.7x10^9$ vs $2.64x10^9$, GDM-insulin $1.8x10^9$ vs $2.60x10^8$, DT1 $9.6x10^8$ vs $2.78x10^9$ and DT2 $1.7x10^9$ vs $2.69x10^9$, for maternal and foetal, respectively). EXO in foetal plasma was correlated with glucose levels after OGTT at 2h and EXO in maternal plasma was correlated with birth weight in normal and DT1 pregnancies.

Conclusions: The data obtained in this study was the first to characterise changes in maternal and fetal plasma exosomes in diabetic pregnancies. As such, it may provide a baseline that will facilitate the understanding on the role of exosomes during gestation.

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Experience with metformin use for GDM in an urban population

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Metformin is increasingly being used to manage GDM in Australia. Although there is good randomised controlled trial evidence for its benefits during pregnancy, long term effects remain uncertain. The aim of this project was to describe the uptake of metformin when prescribed using a standardised approach to informed patient agreement. Consecutive pregnant women with diabetes were reviewed in the Campbelltown Hospital Antenatal Clinic by either an Endocrinologist or Credentialed Diabetes Educator. Women with frequent hyperglycaemia (x3 FBGL >5.2mmol/L and/or 2 hour >6.7 mmol/L) in spite of self-management and dietetic advice were advised that medication was now required. An information leaflet was provided and discussed, including treatment options (Metformin or insulin), drug modes of action, Metformin dose regimen, along with the possible side effects of each medication and the fact that metformin crossed the placenta. Women were given the option of which treatment to commence. Data from those patients who declined Metformin and the reason for decline were collected. From February 2015 until May 2016, 125 pregnant women with diabetes have been

commenced on Metformin. Only sixteen women (12.8%) declined the medication, opting for insulin therapy. Half of those women listed the reason for declining Metformin as a concern that the fetus was exposed to metformin. Nine (7.2%) of women stopped metformin due to gastrointestinal side effects. Approximately 10-12 women were advised by pharmacists not to use metformin during pregnancy in spite of being given a script. We conclude that few women decline metformin using an informed patient agreement in spite of knowing that metformin crosses the placenta. In view of the uncertainty over the long term effects of metformin, we recommend using a standardised approach ensuring patient consent to prescribing metformin. Several local pharmacists require education over the use of metformin in pregnancy.

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Factors influencing breastfeeding intention, initiation and duration among women living with Type 1 and Type 2 Diabetes in Victoria

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Breastfeeding has well recognised maternal, infant and public health benefits and the WHO recommends exclusive breastfeeding for babies to six months of age. Despite the importance of exclusive breastfeeding, breastfeeding rates and duration of breastfeeding are lower in women with diabetes. This is of particular importance because of the contribution of breastfeeding to optimising neonatal outcomes and that infants of mothers with diabetes are prone to feeding difficulties.

The aim of the study is to identify physical, social, psychological and cultural facilitators and barriers to the intention to breastfeed, the initiation and continuation of breastfeeding from birth for six months among women with type 1 (T1DM) and type 2 (T2DM). Pregnant women in Victoria with T1DM and T2DM were recruited across 3 health services. Data was collected via telephone interviews on four time-points (before childbirth, postnatal, 6-8 weeks postpartum, and 6 months postpartum). The questionnaires comprised Demographics, Infant Feeding Intentions Scale, Pregnancy and Postnatal Wellness surveys. Currently 34 women were interviewed at time1 and 21 women at time2.

Preliminary descriptive statistics show an average age of 34 years and 41.2% of women were having their first child. The initial intention of breastfeeding was high (79.4-91.2%) while 82.3%, 79.4%, and 70.6% of women agreed to breastfeeding child exclusively until the baby is one, three, and six month old, respectively. Higher proportion of women showed positive attitudes towards pregnancy wellbeing than postnatal wellbeing. For example, 94.1% versus 55.9% of women agreed to feel optimistic about baby's future health during pregnancy versus in postnatal surveys, respectively. In addition, 94.1% versus 58.9% of women agreed to feel emotionally supported by family during pregnancy versus in postnatal surveys, respectively. Once the data collection is completed, the repeated measures will be analysed to detect the relationships between the variables and the trajectories of changes over time.

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Gestational Diabetes Mellitus (GDM) diagnostic criteria: Is new better than old?

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Introduction: The diagnostic criteria for GDM have been widely debated, with questions surrounding complication prevention and resource strain. The John Hunter Hospital switched from high-risk to universal screening, and adopted the new GDM diagnostic criteria in 2014.

Hypothesis: Women with concordant oral glucose tolerance test (OGTT) results but discordant treatment status fulfilling former and new diagnostic criteria have different rates of birth complications.

Methods: Two OGTT datasets of pregnant women were collected at a single laboratory, for time periods 1/1/2009 to 31/6/2011(Old), and 1/4/2014 to 1/10/2015(New). Maternal data and perinatal outcomes were analysed with concordant positive OGTT women (Fasting Blood Glucose (FBG) ≥5.5 and 2hr glucose ≥8.5mmol/L) and discordant group (FBG 5.1-5.4 or 2hr glucose 8.0-8.4mmol/L).

Results: 262/2284 women were positive in the old criteria over 30 months (old timeframe), and 262/2897 women fulfilled new criteria over 18 months (new timeframe). The odds of any complication were significantly associated with concordant GDM positive women (OR 1.79, p=0.0002). There are increased odds of any complication for those with discordant treatment. Despite treatment, women with FBG 5.1-5.4mmol/L have thrice the odds of having macrosomia compared to those with 2hr glucose 8.1-8.4mmol/L (OR 3.03 p=0.06, and OR 0.75, p=0.74).

Conclusion: This study reflects clinical data with dual introduction of new GDM diagnostic criteria and universal screening. Although there has been an overall decrease in GDM diagnoses with universal screening, we have noticed a net increase in clinic patient load due to all pregnant women being screened. Fasting hyperglycaemia appears to predict macrosomia better in the new compared with former criteria. However in local practice, there has not been a significant benefit in outcomes with treatment of macrosomia. This may be in relation to obesity being a bigger contribution for fasting hyperglycaemia, or increased difficulty with attaining timely treatment targets.

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Gestational Diabetes Mellitus - eLearning series for Health Professionals

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The Queensland Statewide Diabetes Clinical Network gestational diabetes mellitus (GDM) project conducted service mapping of all public health facilities (N=41) providing care for women diagnosed with GDM. It was identified that services were overburdened and there were limited educational opportunities and resources to provide education to health care professionals caring for women diagnosed with GDM. The introduction of the new diagnostic criteria for GDM and development of a statewide clinical guideline for GDM contributed to an increase in workloads and services required.

A GDM eLearning series consisting of 12 modules has been developed to enhance education for health professionals. An expert multidisciplinary advisory group was formed to ensure content was relevant and evidence informed. A pre and post knowledge assessment has been incorporated in the eLearning series to measure confidence and competence. The series includes modules about testing and diagnosing GDM, dietary managment, physical activity, blood glucose monitoring, pharmacology, antenatal, peripartum, intrapartum and post partum care as well as divers case histories.

It is anticipated the series will take six hours to complete. eLearning is a cost effective means for organisations to deliver essential education to health care professionals and aims to be flexible, engaging, learner-focused and interactive.

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Gestational Diabetes Mellitus among young adult women with PCOS: association with BMI trajectories over 13 years

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Objective: Meta-analyses indicate a 3X increased risk of gestational diabetes (GDM) among women with polycystic ovary syndrome (PCOS), however relationships between longitudinal trajectories of body mass index (BMI) and GDM risk in PCOS remain unclear. We aimed to identify BMI trajectory groups, compare GDM prevalence across trajectory groups and assess BMI trajectories impact on GDM risk.

Methods: This is a secondary analysis from the (Australian longitudinal Study on Women's Health) ALSWH with 8,200 women aged 18-36 across five surveys (13 years). The main outcome measure was GDM prevalence. We used latent-class growth modelling to identify distinct BMI trajectories and logistic regression to assess GDM risk.

Results: 575 women (7.0%, 95% CI 6.5-7.6 %) reported PCOS. Among women with ≥1 live pregnancy, 15.1% developed GDM vs. 6.0% controls (p<0.001). Three distinct BMI trajectories were identified over the 13 year follow-up: low-stable (LSG) (63.4% women), moderately-rising (MRG) (29.2%) and high-rising (HRG) (7.5%). These were defined as: LSG-average trajectory remaining within healthy range; MRG-curvilinear trajectory commencing in healthy and terminating in overweight range and HRG-curvilinear trajectory starting and terminating in obese range. Women with PCOS were more likely to belong to MRG and HRG groups (OR 1.8, 95% CI 1.5-2.2 & OR 4.2, 95% CI 3.2-5.4). The GDM prevalence in PCOS differed significantly across trajectory groups (9.4% vs 20.0% vs 21.0%, p=0.02). After adjusting for BMI trajectories, age and demographic factors, women with PCOS were twice as likely to develop GDM compared to controls (OR 2.3, 95% CI 1.6-3.2).

Conclusion: Women with PCOS have higher rates of weight gain, yet PCOS remains an independent predictor of GDM irrespective of BMI trajectories over reproductive years. This aligns with the non-BMI dependent inherent insulin resistance in PCOS highlighting need for aggressive universal GDM screening in PCOS, independent of BMI and weight gain.

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Gestational Diabetes Mellitus: Should we measure 1-hour glucose levels?

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Introduction: The optimal diagnostic criteria for gestational diabetes (GDM) continue to be widely debated, with guideline recommendations based on statistical postulations of adverse outcomes from the Hyperglycaemia and Adverse Pregnancy Outcomes (HAPO) study[1]. Only one abnormal glucose reading is required for diagnosis of GDM (fasting glucose ≥5.1mmol/L; 1-hour glucose ≥10mmol/L; or 2-hour glucose ≥8.5mmol/L). Baseline and 2-hour glucose readings have been commonly used for antenatal oral glucose tolerance tests (OGTT), but the clinical utility of 1-hour glucose levels remains largely unknown. There has been variable adoption of this additional test due to increased resource strain with unclear benefits of improved pregnancy outcomes.

Hypothesis: Women with normal OGTT levels at baseline and 2 hours, but elevated 1-hour glucose have increased perinatal complications.

Methods: A total of 2897 antenatal 75g OGTTs were collected from a single laboratory over an 18-month period. Maternal data and perinatal outcomes were analysed for women diagnosed with GDM through an isolated raised 1-hour glucose level. Receiver operating curves (ROC) were used to determine the best cut off values for using 1-hour glucose to predict elevated 2-hour glucose (≥8.5mmol/L) in women with normal fasting glucose (<5.1mmol/L).

Results: Of 263 GDM positive women with elevated 1-hour glucose, 107 (40.7%) had normal fasting and 2-hour glucose. These pregnancies were not significantly associated with increased risk of perinatal complications, although all odds ratio estimates were greater than 1. Using an area under the ROC curve from the logistic model, a 1-hour glucose of 8.2mmol/L was a strong predictor of 2-hour glucose ≥8.5mmol/L, using a predicted probability of 0.035, sensitivity 84.5%, specificity 80.6%, positive likelihood ratio 4.36 and negative likelihood ratio of 0.19.

Conclusion: Routine screening of 1-hour glucose during OGTT for diagnosis of GDM may not be necessary, as a cut off of ≥10mmol/L does not result in significant reduction in perinatal outcomes. With the advent of universal screening, cost savings may be substantial if only one test post glucose challenge is performed. A 1-hour test, instead of 2-hour, with more stringent diagnostic criteria of ≥8.2mmol/L may be considered, with benefits including reduced time in the laboratory, and improved resource utilisation.

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Gestational diabetes under the new diagnostic criteria: how demographic characteristics impact on the prevalence

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The prevalence of gestational diabetes mellitus (GDM) in South-Western Sydney is high, and this may be related to the diverse ethnic backgrounds of the residents. In 2013, the Australian Diabetes in Pregnancy Society (ADIPS) adopted new criteria for diagnosing GDM. We anticipate that the prevalence of GDM will increase, but it is not clear how that would be related to the woman's age, pre-pregnant body mass index (BMI) and ethnic background. The aim of this study is to compare the prevalence of GDM at Liverpool Hospital using the old and new diagnostic criteria, with particular reference to the woman's age, pre-pregnant BMI and ethnic background. We reviewed the results of all oral glucose tolerance tests (OGTTs) performed on pregnant women between February and December 2015 in our hospital, and determined whether the women would be diagnosed with GDM based on the old and new ADIPS criteria. Each woman's age, BMI and country of birth were documented. There were 2140 OGTTs performed in 1725 pregnant women during that period. GDM was diagnosed in 14.8% (255/1725) of women under the old criteria, but this was increased to 29.6% (510/1725) under the new ADIPS criteria. The prevalence of GDM went up in all ethnic groups, but women from East/South-East Asia had the lowest increment (19.2 to 22.3%) while those from South Asia had the highest increment (22.0 to 44.4%). For women who were obese (BMI>30kg/m^2), their risk of developing GDM was almost 50%. With maternal age, the risk of GDM increased with the higher age groups, but there was only a relatively small increment in women with age >35 years. Under the new ADIPS criteria, the prevalence of GDM could increase by 100% in some regions in Australia, depending on the demographic characteristics of women living in those regions.

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Gestational Diabetes complicated by Diabetic Ketoacidosis. A case review of three women diagnosed in 2016 at King Edward Memorial Hospital.

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Diabetic Ketoacidosis (DKA) is a serious medical and obsteric emergency which usually occurs in women with type 1 diabetes. DKA is an infrequent complication of gesational diabetes (GDM) which compromises both the fetus and the mother in the later stages of pregnancy and can result in fetal loss. The metabolic changes occuring during pregnancy, can predispose a pregnant woman with GDM to DKA. This diagnosis of DKA can be more challenging during pregnancy as it does not always manifest with the classic presenting symptoms or laboratory findings. Although uncommon during pregnancy, DKA may develop even in the setting of relative normoglycaemia. Prompt diagnosis and management is essential in order to optimise maternal and fetal outcomes.

This year at King Edward Memorial Hospital (KEMH), there has been three woman diagnosed with GDM diagnosed with DKA in pregnancy. All three woman had different contributing factors. Two of the three woman were given prophylactic corticosteroids for fetal lung maturity as delivery was thought to be imminent and the third presented with infection.

A discussion of the precipitation factors to DKA will be outlined for each of the three women in this poster.

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Impact of substantial weight loss on thyroid function in obese women planning pregnancy

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Background: Maternal obesity is associated with significant maternal and neonatal complications. To address this, weight-loss must begin pre-conception. Hypothetically, substantial weight-loss could be accompanied by changes in thyroid function. Given thyroid hormones are crucial for early fetal neurodevelopment, it is imperative to understand these changes. The impact of both modest and substantial weight-loss on thyroid function have been poorly described. Furthermore, there are no prospective studies evaluating the effects of weight-loss on thyroid hormones in the context of pre-pregnancy care.

Objective: To investigate the impact of substantial weight-loss on thyroid function in obese women planning pregnancy.

Method: Obese pre-pregnant women aged 18-38 years were randomised to substantial weight-loss (VLED diet) or modest weight-loss (lifestyle advice based on current Australian guidelines) for 12 weeks. Fasting blood samples were collected at baseline and 12 weeks for measurement of thyroid function (fT3, fT4 and TSH). In a subset of 11 women who fell pregnant after the intervention, a third blood sample was collected at 12 weeks gestation for analysis. All samples from the pregnant subgroup were further tested for rT3 levels.

Results: 48 women (mean age: 33.78±3.28, mean parity: 0.75±1.13, mean BMI: 36.84±6.36kg/m2 and mean weight 98.94±18.67kg) were randomised as above. Total body weight-loss in the substantial and modest weight-loss arms were 13.87±4.22kg and 2.55±2.03kg respectively. There were no statistically significant differences in the levels of serum fT3, fT4 or TSH between those with modest weight-loss and those with substantial weight-loss at baseline, week 0 and 12 weeks gestation.

Conclusions: Substantial preconception weight-loss is not associated with statistically significant changes in serum levels of fT3, fT4, TSH or rT3 prior to pregnancy or in early pregnancy when compared with women who achieved modest weight-loss. Reassuringly, pre-pregnancy weight-loss does not significantly alter maternal thyroid function.

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Is current early testing of women with GDM based on guideline risk factors?

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The Australasian Diabetes in Pregnancy Society (ADIPS) recommends testing for gestational diabetes mellitus (GDM) at the first available antenatal opportunity for women with acknowledged risk factors. The method of testing is at the discretion of the obstetric care provider. The fasting glucose level will normally fall after the first trimester and it is possible that women with an abnormal result may be normal if tested later in pregnancy. Our clinical impression is that many more women than expected are being referred for the management of GDM after a raised fasting glucose level in the first trimester. The purpose of this audit was to determine how many women were being tested according to the ADIPS guidelines.

Methods.

All of the women with GDM referred to the Diabetes Centre in Wollongong for the last 6 months of 2015 have been considered. Referrals were from general practitioners, antenatal clinics and private obstetricians. The obstetric population has an ethnic distribution similar to national data.

Results.

There were 444 women referred with GDM of whom 139 had a GTT after 20 weeks and have not been considered further. There were 301 women with singleton pregnancies tested before 20 weeks with a fasting glucose. Risk factors considered were; non-Australian country of birth 28 (9.3%), previous GDM 56 (18.6%), family history 72 (23.9%), maternal age ≥ 40 12 (4.0%), BMI > 30 (99) (32.8%). Overall 190/301 (63.1%) had one or more risk factors. Women with risk factors were more likely to require insulin therapy (OR 1.98. p = 0.02).

Conclusion.

Around 40% of the women being tested early in pregnancy had no risk factors, but some still subsequently met the criteria to commence on insulin. Fasting glucose levels used for diagnosis in early pregnancy are still an area of contention.

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Maternal characteristics influence pregnancy outcomes differently depending on ethnicity

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Background: Our institution services a high proportion of women with Gestational Diabetes Mellitus (GDM) from diverse ethnic backgrounds. Whilst risk factors for adverse pregnancy outcomes have been well documented, there are few data quantitating the varying contribution these may have to outcomes in women of different ethnicities.

Aim: To explore the significance of pre-pregnancy BMI (BMI), total gestational weight gain (GWG) and fasting glucose (FBGL) on key neonatal and maternal outcomes in four ethnic groups.

Methods: We compared de-identified prospectively collected data (1993-2015), for singleton births from women diagnosed with GDM on a 75-gram OGTT (1,2). We analysed antenatal characteristics including BMI (based on self-reported pre-gestational weight), GWG and FBGL in the four largest ethnic groups: European (n=954), Middle-Eastern (n=1167), South-East Asian (n=1407) and South Asian (n=512). Using logistic regression analysis we calculated log-B statistics as odds ratios (OR) and associated 95% confidence intervals (95% CI) for large for gestational age birth-weight (LGA) and caesarean delivery (CS) in each ethnic group.

Results: There were 4040 records with data available across 4 ethnic groups: Figure 1 shows that each increment of GWG or FBGL had the largest impact on LGA in South-East Asians compared to other ethnic groups. Overall changes in FBGL influenced LGA and CS (figure 2) rates more than the other variables did except in South Asians. BMI correlated with LGA only in South Asians (figure 1) but was associated with more CS in South-East Asians than other ethnicities (figure 2).

Figure 1: Odds Ratios for LGA determined by 3 independent variables according to ethnicity

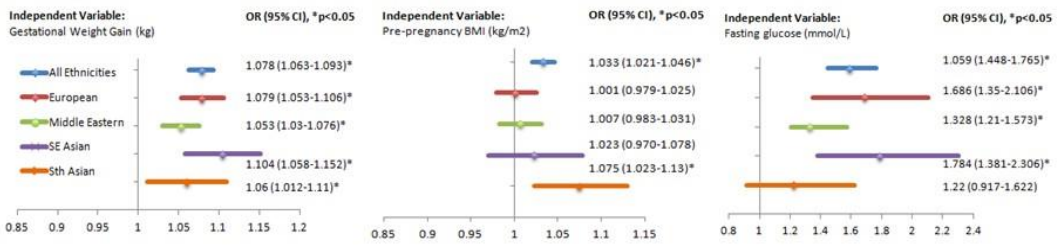
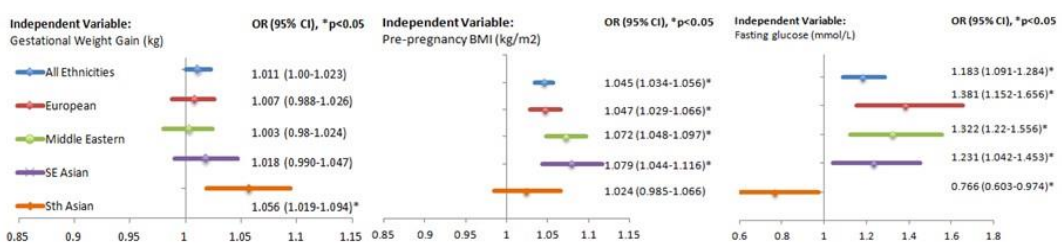


Figure 2: Odds Ratios for CS determined by 3 independent variables according to ethnicity



Conclusions: Individual antenatal characteristics contribute to LGA and CS rates differently depending on ethnicity. For example, a higher FBGL or GWG had a strong association with LGA in South-East Asians while BMI influenced CS more in this subgroup. A more tailored risk-stratification approach may help to guide management decisions for particular ethnic groups.

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National Nutritional Standards of Care for Gestational Diabetes Mellitus (GDM) in New Zealand

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The 2014 Ministry of Health guidelines recommend that all women diagnosed with gestational diabetes mellitus (GDM) should be offered dietary advice either by, or in conjunction with a dietitian. However, there are a limited number of dietitians who specialise in diabetes in pregnancy (DIP) in New Zealand. Furthermore, the number of women with GDM referred to DIP services in New Zealand is projected to increase by 35-40% due to both the increasing prevalence of GDM and implementation of compulsory screening. Therefore, dietary advice to women with GDM will likely often be provided by 'non-specialist' dietitians. At present, there are no standards of care for the nature or delivery of this dietary advice.

Aims: To develop an evidence-based national standard of care (SOC) for dietitians, to ensure accurate and consistent dietary advice for women with GDM in New Zealand.

Methods: In 2015, eight Diabetes in Pregnancy Specialist Dietitians across seven major District Health Boards began collaboration on the development of a national nutritional SOC for GDM. The current 'Dietitians New Zealand SOC for the nutritional management of type 2 diabetes mellitus in adults' was adapted for GDM based on consensus agreement of reviews of the literature and international guidelines on the medical nutritional therapy (MNT) of GDM.

Results: The development of a national SOC provides a concise guide for dietitians and other members of the DIP team to ensure that up to date and evidence-based dietary advice is delivered to women with GDM throughout New Zealand. Given the complexity of MNT in GDM, we believe that dietary advice to women with GDM should ideally be provided by dietitians.

Conclusion: The development of a national nutritional SOC for GDM will likely improve the care of women with GDM throughout New Zealand.

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Nutrition Education for Women with Gestational Diabetes Mellitus Using Two Different Group Education Models: A Comparison Study

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An adequate understanding of Medical Nutrition Therapy (MNT) for Gestational Diabetes Mellitus (GDM) is essential for successful management of women who are newly diagnosed. The aim of this study is to identify pre-existing knowledge of women newly diagnosed with GDM, determine the impact of group education for women with poor pre-existing knowledge and determine the efficacy of nutrition education using two different group education models.

This study consists of 2 cohorts, each involving 100 women from the Diabetes Centre at Liverpool Hospital. A questionnaire consisting of 10 questions was developed to determine women's knowledge of GDM principles pre and post education. One cohort received education in the original format involving carbohydrate exchanges, the other cohort with a stronger focus on practical application of GDM concepts and appropriate carbohydrate serves per meal.

Assessment of pre-existing knowledge revealed that the median score was 8 and 7 in cohort 1 and 2 respectively, with 22% of women scoring below 5. Despite the global improvement in score post education across the two cohorts, 12% of women continued with a score below 5 post education. There was a significant improvement in score post education using both education models (median score 8 and 9 in cohort 1 and 2 respectively, p-value <0.05 in both cohorts). There was no significant difference between the two education models in improving scores (P-valve=0.07), however women from the second cohort scored significantly better on questions relating to practical application of knowledge (P-value=0.04).

This study showed that the new education model is not only acceptable in delivering information on carbohydrate adequacy and other MNT principles, it may be even more effective in helping women to better apply their knowledge. The study also identified that some women with poor pre-existing knowledge may be unlikely to benefit from education in a group setting.

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Obstetric and Midwifery Staff Adherence to Early Screening Guidelines for Gestational Diabetes Mellitus

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Australian guidelines for the screening and diagnosis of gestational diabetes mellitus (GDM) changed at the beginning of 2015 and included recommendations to screen women with risk factors with an oral glucose tolerance test (GTT) early in pregnancy. We aim to evaluate the obstetric and midwifery staff adherence to the early screening guidelines in an Australian tertiary maternity centre.

589 non-diabetic women, <20 weeks gestation and attending their first visit at Mercy antenatal clinic undertook a short researcher administered questionnaire. The questionnaire assessed all risk factors described in the screening guidelines. Following the appointment, researchers reviewed medical records and online pathology systems to determine if an early GTT was ordered, and whether a midwife, obstetrician or junior medical staff member provided care. Data was collected and managed using REDCap and analysed with STATA, using univariate analysis and multiple logistic regression.

59.9% (n=353) of participants were eligible for an early test. 30% (n=106) of the eligible women were appropriately offered an early GTT. 2.1% (n=5) of the low-risk women were offered an early GTT inappropriately. There was no significant difference in appropriate ordering or not ordering between categories of staff (p=0.35). Variables significantly associated with a reduced likelihood of appropriate screening included age>40 (OR 0.04, 95%CI 0.00-0.31, p=0.002), high-risk ethnicity (OR 0.10, 95%CI 0.05-0.18, p<0.001), first-degree family history (OR 0.36, 95%CI 0.18-0.69, p=0.002), and polycystic ovarian syndrome (OR 0.22, 95%CI 0.10-0.50, p<0.001). Previous GDM (OR 61.64, 95%CI 13.88-273.71, p<0.001) was associated with appropriate screening. BMI was not significant (p=0.294).

Adherence to early screening recommendations for gestational diabetes is poor. 70% of high-risk women were not given the opportunity for early diagnosis. We are not appropriately screening women with risk factors other than previous GDM. A greater understanding of the barriers and attitudes to early screening would be useful in improving guideline adherence.

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Poor coding and reporting of GDM in administrative data grossly underestimates the impact on health services.

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Background The administrative 'Perinatal Data Collection' (PDC) dataset is collected by all state-wide Obstetric Services and data are collated and reported annually by the Ministry of Health as the 'NSW Mothers and Babies Report'. From 2008 to 2014, gestational diabetes (GDM) had a reported rate of 4.8% increasing to 7.5%. Many clinicians believe this rate is significantly under reported, with several reports supporting this (1-3).

Aim To assess and validate the rates of GDM and pre-gestational diabetes as reported in the PDC from our hospital over a 5 year period.

Methods We reviewed 5 years of PDC data for Bankstown-Lidcombe Hospital for the years 2011-2015, and compared this with data prospectively collected in our GDM/diabetes database as part of routine care. Data were matched by MRN thence records known to have been managed by our Department with GDM and pre-gestational diabetes were reviewed in regards to the ultimate PDC coding that had been made.

Results There were a total 11,182 deliveries. The PDC data extract reported a total of 354 with pre-gestational diabetes (3.2% of births), and 348 with GDM (3.1% of births). From our database, respective numbers were 65 (0.6%) and 1576 (14.1%). Firstly, this represents an underreporting overall of 57.2%. Secondly, much of the miscoding of GDM as diabetes was predominantly in the last 3 years. Only 53.2% of these miscoded individuals (coding GDM as pre-gestational diabetes) were managed with insulin, the remainder were GDM women managed on diet alone.

Conclusions These data confirm our suspicion that GDM was under reported, whilst pre-gestational diabetes was significantly over reported. We were surprised by the significant degree of miscoding which requires investigation and correction. Appropriate allocation of resources to manage the increasing prevalence of GDM will not occur without appropriate data reporting. Urgent action is needed to improve this situation.

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Pre-Pregnancy Care in Women with Type 1 and Type 2 Diabetes: Are we doing enough?

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There is good evidence that pre-pregnancy counselling (PPC) among women with type 1 and type 2 diabetes is associated with better pregnancy outcomes. However, implementation of PPC remains patchy. The aim of this project was to assess current practice in pregnancy management and pregnancy outcomes for women with type 1 and type 2 diabetes and to gather local recommendations for improving access to PPC. A retrospective cohort study of 96 pregnancies of women aged 16 to 45 with type 1 and type 2 diabetes between 2011 to 2015 in the Macarthur District was performed. Management during pregnancy were compared with ADIPS guidelines, including HbA1c, folate and teratogenic medication use and retinal screening. Pregnancy outcomes observed included delivery method, congenital malformations, and neonatal complications. Discussions with health care professionals were conducted to explore their knowledge, management and opinions on PPC. The mean pre-pregnancy HbA1c (7.7±2.7%, n=66) exceeded ADIPS recommendations. Where recorded, 44% took no folic acid, ACEI/ARBs, statins and sitagliptin/exenatide/gliclazide were taken by 3%, 2% and 3% respectively. 33% of women had no retinal screening. Major/minor congenital malformations occurred in 5%/4% pregnancies respectively. 57% pregnancies involved jaundice, hypoglycaemia, shoulder dystocia and/or other complication. Only 30% of births occurred through normal, non-induced vaginal births with 21%/31% involving elective and emergency caesarean sections. Discussions with local health professionals revealed a general consensus regarding the need for establishing and improving awareness of PPC in the area. They suggested increased sex-education and pre-pregnancy advice, establishment of after-hours clinics or including a diabetes specialist in after-hours antenatal clinics. Online or telephone consultations were also proposed. Another suggestion was to increase funding to train and employ more staff skilled in PPC. We conclude that lack of PPC remains an issue in this area and a systematic approach to PPC is recommended.

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Pregnancy outcomes in women with class III obesity according to gestational diabetes status

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Introduction: Previous studies have shown that the combination of obesity and untreated gestational diabetes mellitus (GDM) has a higher risk of adverse pregnancy outcomes compared with obesity alone. It is not known if obesity in combination with treated GDM also has an increased risk.

Objectives: To compare the maternal and neonatal outcomes of women with class III obesity (body mass index ≥ 40kg/m^2), with and without GDM (treated with diet or insulin).

Methods: A retrospective cohort study of 307 class III obese women who had singleton deliveries at The Canberra Hospital between mid-2011 and mid-2014. Women with pre-existing diabetes were excluded. Maternal demographic and clinical data, including GDM diagnosis and treatment, and maternal and neonatal outcomes were obtained from the Birthing Outcomes System, clinic attendance records and patient medical records. Occurrence rates of large-for-gestational-age (LGA) neonates, preterm delivery, primary caesarean section and pregnancy-related hypertension were compared between groups according to GDM status using logistic regression.

Results: 240 women (78.2%) did not have diabetes, 28 (9.1%) had diet-treated GDM and 39 (12.7%) had insulin-treated GDM. LGA was observed in 42 (17.5%) women with no diabetes, 3 (10.7%) with diet-treated GDM and 13 (33.3%) with insulin-treated GDM. Relative to women with no diabetes and diet-treated GDM, the odds ratio for a LGA neonate for women with insulin-treated GDM was 2.3 (1.06-4.92) after adjustment for maternal age, BMI, parity, smoking during pregnancy and chronic hypertension (p=0.04). Differences in rates of preterm delivery, primary caesarean section and pregnancy-related hypertension according to diabetes status were not seen.

Conclusion: In class III obese women, insulin-treated GDM compared to diet-treated GDM and no diabetes was associated with a higher rate of LGA neonates. Diet only or insulin-treated GDM were not associated with a greater risk of other adverse maternal or neonatal outcomes.

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Prevalence of Disordered Eating Psychopathology in Women with Gestational Diabetes Mellitus: A Pilot.

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Background: Prevalence rates of Disordered Eating Psychopathology (DEP) in women with Gestational Diabetes Mellitus (GDM) are yet to be reported in published literature to the investigators' knowledge.

Aim: To determine the occurrence of DEP in GDM women attending our Clinic.

Methods: Women with GDM, diagnosed by Australasian Diabetes In Pregnancy Society 1998 Criteria(1), referred for management in the GDM Clinic were approached and screened at their initial visit for English literacy using the Single Item Literacy Screener(2). Those literate in English were invited to participate. DEP was assessed using the Eating Disorders Examination Questionnaire (EDE-Q)(3,4). This well validated self-report measure assesses specific psychopathology and key behaviours of eating disorders including: binge eating, self-induced vomiting, laxative misuse, excessive exercising and dietary restriction undertaken in the last 28 days. EDE-Q subscale scores ≥4 are considered to be in the extreme range (3). An empirically derived Global Score threshold ≥ 2.3 has been found to be an indicator of eating disturbances (5).

Results: Of 74 women invited, 53 of 72 (73.6%) English literate women agreed to participate and completed the EDE-Q. Patient characteristics were mean(+SD)[range] age 32.6+5.2 [19-42] years, diagnosed at 23+5.1 [14-32] weeks gestation, with pre-pregnancy BMI 27.3+7.1 [15.8-53.6] kg/m2. Individuals who scored in the extreme range are presented in Table 1a[n= (%)]. Analysis of responses to questions about key behaviours demonstrated that several individuals experienced a regular occurrence of behaviours consistent with DEP in the last 28 days (see Table 1b). A total of 20.4% admitted to objective bulaemic episodes.

Table 1a:
Individuals with EDE-Q scores in the extreme range[n= (%)].

Restraint (restricting diet)	Eating concern	Shape concern	Weight concern	Global EDE-Q score
1 (1.9)*	0 (0)*	6 (11.1)*	2 (3.7)*	8 (14.8)**

*Individuals with subscale scores in the extreme range (≥4) (3)
**An empirically derived Global EDE-Q score threshold ≥ 2.3 is used as an indicator of eating disturbances (5).

Table 1b:
Key Behaviours of the EDE-Q [n=(%)].

Key behaviours	Any occurance	Regular occurance	Total
A Objective bulimic episodes	6 (11.1)	5 (9.3)	11 (20.4)
B Self-induced vomiting	0 (0)	2 (3.7)	2 (3.7)
C Laxative use	0 (0)	2 (3.7)	2 (3.7)
D Driven exercising	1 (1.9)	7 (13.0)	8 (14.8)
E Extreme dietary restriction	3 (5.6)	1 (1.9)	4 (7.4)

EDE-Q = Eating Disorder Examination-Questionnaire
Any occurrence is ≥ 1 episode over the past 28 days (for A-E)
Regular occurrence ≥ 4 episodes over the past 28 days (for A-D) and ≥ 3 (i.e, > 12 days over the past 28 days) (for E)

Conclusions: This study found that there was a subset of women who displayed EDE-Q Scores indicative of eating disturbances, and a number who regularly engaged in key behavioural features of eating disorders during their pregnancy. These findings indicate a need to further assess such behaviours in a larger study.

Acknowledgements: We thank the women with GDM who participated and completed the questionnaire.

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Qualitative study - Perceptions of women with previous gestational diabetes during Ramadan pertaining to fasting.

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Background: Thirty seven percentage of women with Gestational Diabetes (GDM) attending antenatal services at Northern Health (NH) identify themselves as being Muslim. Although GDM is considered a medical condition exempting women from fasting, anecdotal feedback suggested that many women either wish to, or choose to fast during Ramadan. Aim: To identify and explore the perceptions associated with the decision making process to fast by women who diagnosed with GDM during Ramadan in 2014. Methods: An explorative qualitative pilot study using semi-structured interviews with post-partum women diagnosed GDM during Ramadan 2014 was conducted. A culturally sensitive questionnaire was developed focusing on their decision-making process of fasting. Ten women were recruited who identified themselves as Muslim; 5 fasting and 5 non-fasting as documented in clinical notes. Results: Participants came from a range of cultural backgrounds and all had previously fasted during Ramadan prior 2014. Their decision to fast was based primarily on their views held by their family/friends, and their previous positive experience of fasting whilst pregnant with or without GDM. Four of the 7 participants were treated with insulin successfully fasted, 2 women chose not to fast whilst another discontinued fasting following hypoglycaemia. Of the 5 women identified in their medical records as non-fasting, 4 reported during the interviews that they had not disclosed their true fasting status due to their concerns the healthcare team were not sufficient culturally sensitive to understand and support their decision. Conclusion: Religious beliefs can influence self-management of GDM and healthcare professionals need to be more culturally aware of the importance of fasting for women with insulin and non-insulin treated GDM during Ramadan. Acknowledge: Recipient of the Northern Health Small Research Grants 2014.

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Retrospective audit of the use of third trimester ultrasound in women with diabetes in pregnancy in a regional maternity unit

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There is a lack of consensus in the use of ultrasound for monitoring fetal growth among women with gestational diabetes (GDM) and pre-existing diabetes mellitus (DM). The poor accuracy of ultrasound for the prediction of fetal weight further limits its use for this purpose. In accordance with the Queensland Clinical Guidelines which recommends longitudinal growth assessment of fetus commencing 28-30 weeks, our unit performs at least one growth ultrasound for all women with diabetes in pregnancy. Further ultrasounds (2-4 weekly) are considered for women with poor blood glucose control or those who require pharmacological therapy.

This study aims to examine the use of ultrasound in women with GDM and pre-existing DM, and the birth weight of infants born to women in these groups.

A retrospective audit was conducted on women registered in the antenatal clinic from January to December 2015, with a diagnosis of GDM, pre-existing DM or maturity onset diabetes of the young (MODY). Data was collected from the diabetes register and electronic medical records.

Among 226 eligible women included in the study, there were 223 singleton and 3 twin pregnancies. Almost all (99.6%) women had at least one third trimester ultrasound. 60% of women with diet controlled GDM had one or less ultrasound while more than 60% of women requiring pharmacological therapy has at least two ultrasounds. 5.2% of infants had an estimated fetal weight (EFW) ≥90thcentile while 12.2% had an estimated abdominal circumference ³90th centile. Only 4.8% of infants had an actual birth weight ≥4000g. 0.9% of infants had an EFW ≤10th centile and 4.8% had low birth weight of ≤2500g.

The data highlights the current use of ultrasound in a regional maternity unit for monitoring fetal growth among women with diabetes. Rates of macrosomia and low birth weight are lower than that reported in literature. Further research is required to assess the optimal frequency and timing of growth ultrasounds among women with diabetes, including the practicality of 2-4 weekly ultrasound in women requiring pharmacological therapy in a regional hospital.

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Risk factor prediction of pregnancy induced hypertension in women with gestational diabetes mellitus

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Objectives: To assess the risk factors that predict the development of pregnancy induced hypertension (PIH) among gestational diabetes mellitus (GDM) patients in the Australian Capital Territory (ACT) and to compare the perinatal outcomes of women with GDM-only (GO) to women with GDM superimposed with PIH (GP).

Research Design and Methods: A retrospective clinical audit of GDM patients treated in the ACT between 01/01/2010 and 30/06/2014 was conducted. Maternal demographic data and neonatal/maternal clinical outcomes data were analysed.

Results: GP (n=85) compared to GO (n= 890) GDM mothers were more obese (body mass index [BMI] 33.4±9.3 vs 27.2±6.8 kg/m2, p<0.001), more likely to be diagnosed with GDM earlier (26.5±4.5 vs 27.6±3.7 weeks, p=0.041), had a higher oral glucose tolerance test (OGTT) fasting glucose level (5.7±0.7 vs 5.3±1.0 mmol/l, p<0.001), a higher HbA1c level (5.6±0.4% vs 5.4±0.5%, p=0.013), and a lower Vitamin D level (48.1±20.5 vs 58.7±21 nmol/L, p=0.005). On stepwise regression analysis, only higher BMI (odds ratio 1.050, 95% confidence interval 1.001-1.101) and higher OGTT fasting glucose level (odds ratio 2.013, 95% confidence interval 1.200-3.374) increased the risk of having PIH among GDM patients. Regarding the perinatal outcomes, GP patients had more caesarean-sections (51.8% vs 33.5%, p<0.001), more preterm delivery (before 37 weeks) (20% vs 6.9%, p<0.001) and were more likely to require insulin treatment (55.3% vs 38.8%, p=0.004). Babies of GP had higher rates of hypoglycaemia (17.6% vs 6.1%, p<0.001), higher rates of respiratory distress (12.9% vs 5.6%, p= 0.016), and higher rates of neonatal special care admission (25.9% vs 12.8%, p=0.003).

Conclusion: GDM patients who have higher BMI and higher OGTT fasting glucose levels are more likely to develop PIH. GDM patients with PIH have worse perinatal outcomes.

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Severe Neonatal Hypoglycaemia in Gestational Diabetes

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Neonatal hypoglycaemia is a common complication of pregnancies complicated by GDM. The modified Pedersen Hypothesis suggests that in maternal hyperglycaemia, excess glucose crosses the placenta stimulating the fetal pancreas into hyperinsulinemia. A direct consequence of hyperinsulinemia is neonatal hypoglycaemia. The aim of this project was to conduct a retrospective clinical audit of pregnancies complicated by gestational diabetes from Macarthur Diabetes Clinic within the last 3 years and examine modifiable and non-modifiable factors such as antenatal care, maternal demographics, diabetes management and obstetric complications associated with severe neonatal hypoglycaemia. Neonatal hypoglycaemia was defined as <1.1 mmol/l if <37 weeks gestation and <1.7 mmol/l if 37+ weeks. Among the 555 women, 21 (3.8%) had births documented as being complicated by severe neonatal hypoglycaemia. Mean age and pre-pregnancy body mass index were not significantly different, but fasting glucose on the oral glucose tolerance test was significantly higher in index cases (5.4±0.1 vs 5.1±0.1 mmol/l; p=0.026) who were also born earlier (36.9±0.5 38.7±0.1 weeks p<0.001) with lower birthweight (2841±127 vs 3312±25g p<0.001). Women with births complicated by neonatal hypoglycaemia were non-significantly more likely to be treated with insulin (38% vs 26%) with higher insulin doses (31±7 vs 25±2 units). Metformin therapy was taken by 13% v 10% (NS). We conclude that

pregnancies complicated by severe neonatal hypoglycaemia are more hyperglycaemic when diagnosed, and that therapy has been insufficient to prevent this complication. More births occurred prematurely in the pregnancies complicated by neonatal hypoglycaemia, which would have also been an exacerbating factor.

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The combination of pregnancy, gestational diabetes mellitus and antipsychotic medications

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Introduction: While gestational diabetes mellitus (GDM), or concurrent comorbid diabetes mellitus (DM) during pregnancy puts women at high risk, the added combination of mental illness and antipsychotic medication creates further complexity.

Objectives: The National Register of Antipsychotic Medication in Pregnancy (NRAMP), a world-first research project which tracks women who take antipsychotic medication during pregnancy, aims to establish evidence-based medication safety guidelines and encourage women and their clinicians to support robust maternal health and wellbeing, particularly during the child-bearing years.

Methods: NRAMP mothers are followed during pregnancy and up to the first year of their baby's life. Descriptive data is collected during interviews and from Medical Records. Information gathered includes, but is not limited to, the presence/absence of GDM and comorbid DM, perinatal antipsychotic medications, family history of DM and previous GDM exposure of self and siblings, plus outcomes for mother and infant at postnatal 12 months.

Results: NRAMP data confirm that pregnant women with mental illness who take antipsychotic medication during pregnancy are at a higher risk of developing GDM overall (20%), compared with the Australian Bureau of Statistics data for the general Australian pregnant population (5-10%). In addition, second generation antipsychotics are particularly weight-promoting, further compounding pre-pregnancy BMI for many women, putting them in either the overweight or obese range before pregnancy, and adding extra stressors where weight gain, medication management, macrosomia, birth complications and infant outcomes are concerned. Furthermore, family history of diabetes is also pronounced in this group (45%).

Conclusions: Our research highlights the need for ongoing work in this important area of women's mental health, to support healthy mother/infant outcomes, child development and adult biopsychosocial health promotion. Such crucial information will generate a useful source of best-practice guidelines, providing strategies for achieving and maintaining optimum maternal health with minimal fetal risk.

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The effects of change in diagnostic criteria on a service and patients.

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Gestational diabetes Mellitus (GDM) is rapidly becoming a normal condition of pregnancy in some demographic regions. Currently 16.6% of the pregnant women attending the Mercy Hospital for Women (MHW) in Heidelberg have a diagnosis of GDM. This diagnosis can promote feelings of anxiety surrounding GDM, its management and the implications for the baby. Education and information for a woman newly diagnosed with GDM should be timely, cater for all levels of health literacy and meet the capacity of the service provider. On 1 January 2015 the MHW adopted the revised diagnostic criteria for GDM in line with RANZCOG recommendations. This led to increased numbers of women diagnosed with GDM necessitating a change in the process for notifying women from a personalised phone call to a letter.

MHW wanted to evaluate whether the needs and expectations of the women who were diagnosed with GDM were being met. 50 women were surveyed at their next hospital appointment following the GDM group class. Questionnaires explored women's satisfaction with the service offered by MHW.

One third of the women who received a letter in the mail stated they were unhappy with the method of notification, some of them expressing their distress with not knowing what to do and feeling they did not receive enough information. The level of anxiety was also evident with 82% of women indicating anxiety/worry about having GDM.

Unsurprisingly women sought knowledge to reduce their anxiety with all 50 women seeking advice from another source of which 76% looked to the internet for answers. Women accessing the internet is concerning, hence MHW is considering updating and directing the women to the Mercy site hence providing evidenced based information. Levels of anxiety surrounding diagnosis may also be explored comparing those who receive a phone call to those who receive a letter.

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The gut microbiome in overweight and obese women is associated with metabolic hormones in early pregnancy

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Introduction: Outside pregnancy, the gut microbiome modulates metabolic health and may affect insulin resistance and lipid metabolism. It is not clear whether this modulation occurs in pregnancy. The aim of this study was to reveal any relationships between gut microbiome composition and circulating metabolic hormones in overweight and obese pregnant women at 16 weeks gestation.

Methods: Gut microbiota composition in 29 overweight and 41 obese pregnant women was analysed by 16S rRNA sequencing. Fasting serum insulin, c-peptide, glucagon and adipokine concentrations were measured using multiplex ELISA.

Results: Overweight pregnant women had altered metabolic hormone levels and microbiome profiles from overweight pregnant women. Abundance of specific bacteria was correlated to changes in particular metabolic hormone levels: Adipokine levels were strongly positively correlated

with *Ruminococcaceae* and *Lachnospiraceae,* which affect energy metabolism. Insulin and C-peptide were positively correlated with the genus *Collinsella.* In the overall gut microbime analyses, BMI was not associated with these bacteria.

Conclusions: This study shows that the gut microbiome composition is associated with the metabolic hormonal environment in overweight and obese pregnant women at 16 weeks gestation. Therefore metabolism in pregnancy may be modulated by manipulation of the gut microbiome.

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To what extent does pre-pregnancy body mass index explain the relationship between a Mediterranean diet and gestational diabetes?

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Introduction: Higher adherence to a Mediterranean diet before pregnancy has been associated with lower risk of developing gestational diabetes mellitus (GDM). The importance of pre-pregnancy body mass index (BMI) as a pathway of this relationship remains unclear, but this may help inform targeted prevention strategies.

Objective: To quantify the extent to which pre-pregnancy BMI explains the relationship between a Mediterranean diet and development of GDM.

Methods: This study includes 3,378 women aged 25-30 years participating in the Australian Longitudinal Study on Women's Health. Women were not pregnant at baseline in 2003 and reported at least one pregnancy during follow-up until 2012. GDM diagnosis was self-reported for each pregnancy and validated in a subsample. A Mediterranean diet score was created using a baseline validated food frequency questionnaire, and categorised as low (<25th percentile) and higher adherence (≥25th percentile). Mediation analysis was performed to estimate total, natural direct and indirect effects of the pre-pregnancy Mediterranean diet on risk of GDM and proportions mediated through pre-pregnancy BMI.

Results: A total of 240 women (7.1%) developed GDM. Women with low adherence to a Mediterranean diet were at higher risk of developing GDM (OR 1.35, 95% CI 1.02-1.60) after adjustment for education, parity, polycystic ovary syndrome, energy intake and physical activity. The higher GDM risk due to low adherence to the Mediterranean diet was partly explained by pre-pregnancy overweight (21%) and obesity (38%) compared with normal weight.

Conclusions: Overweight and obesity before pregnancy contribute substantially to the total effect of the Mediterranean diet on risk of GDM. These findings suggest that interventions successful in implementing a Mediterranean diet before pregnancy may reduce the risk of GDM substantially through optimising pre-pregnancy BMI. The most effective ways to optimise BMI prior to pregnancy should be explored and addressed in future intervention studies.

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Treatment of Booking Gestational diabetes Mellitus: The ToBOGM Pilot

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New ADIPS GDM diagnoctic criteria are based upon 24-28 week glucose data but many clinics use the same criteria at booking. The aim of this study was to test the feasibility of a RCT of treating GDM at booking or awaiting the oral glucose tolerance test at 24-28 weeks. Consecutive women booking <20 weeks gestation, with at least one GDM risk factor, were invited into the study. All women completed a questionnaire, anthropometry and an oral glucose tolerance test (OGTT) with additional fasting blood sampling. Women with GDM at booking were randomised to either clinic management or awaiting the results to a repeat 24-28 week OGTT, along with those women without Booking GDM. Birth and baby anthropometric data were collected. All babies had a heel prick glucose at 1-2 hours. A survey of study procedures was undertaken postnatally. Of the 607 women approached, 100 were consented to enter the RCT. The main reason for exclusion was gestation 20+/40 (290), only 28 refused overall, 78 had previously been tested or refused OGTT and 95 had no risk factors. Of those consenting, 28 were withdrawn (eg 12 did not attend OGTT). There were 22 women with Booking GDM: (vs no GDM respectively: 50% vs 56% European, age- 30±6 vs 29±6 years, BMI- 32.4±7.1 vs 29.4±7.1 kg/m^2 NS) and 17 (77%) had an elevated fasting glucose. Of the 11 randomised to treatment deferral, 10 (92%) still had GDM at the 24-28 week OGTT. Women with GDM at booking had lower adiponectin (8.2±2.8 vs 11.8±7.6 ug/ml p=0.044) but higher insulin (146±89 vs 81±54 pmol/l p<0.001), and leptin (63±28 vs 47±26 ng/ml p=0.026). We conclude that an RCT of treating GDM at booking is feasible. Women with GDM at booking are relatively insulin resistant, hyperleptinaemic and hyperinsulinaemic compared with other women.

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Vitamin D and Gestational Diabetes Mellitus – Is there a link?

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It is becoming increasingly recognised that vitamin D has roles beyond bone health. Vitamin D deficiency is becoming a major public health problem in Australia. This is attributed to sedentary lifestyle, limited sun exposure, skin pigmentation and religious veiling. Recent studies have shown conflicting evidence on the relationship between vitamin D insufficiency and gestational diabetes mellitus (GDM).

We aimed to study the local incidence of vitamin D deficiency in pregnant women attending the antenatal service at the Canterbury Hospital. Furthermore, we aimed to examine if there is a relationship between vitamin D insufficiency and the development of GDM.

Methods: We performed a prospective, case-controlled study whereby we collected 25-hydroxyvitamin D and calcium levels in pregnant women who presented for publically funded antenatal care at Canterbury Hospital during August 2011 to December 2013. Questionnaires with demographic details were also collected.

Women were eligible if they were over the age of 18yrs and under 46yrs, with a singleton pregnancy, and an initial blood test at ≤ 30 weeks gestation age. Exclusion criteria included pre-existing type I or type II diabetes, inflammatory bowel disease, coeliac disease and those patients who were unable to

provide consent due to reduced cognitive ability. GDM was diagnosed as per the Australasian Diabetes in Pregnancy Society criteria (1). Vitamin D insufficiency is defined as 25 hydroxy-vitamin D levels of 49 nmol/L or less.

Results:A total of 785 women enrolled in this study. 40 women were excluded, mostly due to late presentation, incomplete data and lost to follow-up. The incidence of GDM in our population was 23.6%, much higher than the reported NSW average of 7.5% (2). There was no association between vitamin D levels and GDM. The only statistically significant predictors for GDM was complexion. This suggests that ethnicity, not vitamin D status, is the main predictor for GDM.

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What are the clinical implications of a recurrent pregnancy affected by Gestational Diabetes?

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Background: Recurrent Gestational Diabetes(GDM) has been shown to increase the risk of large for gestational age infants (LGA) by 70%(1). The aim of this study was to evaluate the implications of recurrent GDM pregnancies.

Methods: We analysed de-identified prospectively collected singleton pregnancy data (1992-2013) from women diagnosed with GDM on a 75-gram oral glucose tolerance test according to 1991 GDM Ad Hoc Working Party, thence 1998 ADIPS criteria. We specifically analysed women who had a total of three pregnancies affected by GDM at Bankstown-Lidcombe Hospital. Fourth pregnancies were not included due to small patient numbers. Antenatal characteristics and perinatal outcomes were compared between first and second/third pregnancies. Excessive gestational weight gain (eGWG) was defined according to Institute of Medicine (IOM) weight gain targets(2). LGA and small for gestational age (SGA) infants were defined as >90th and <10th centiles respectively, using a customised centile calculator. Paired samples t-tests and McNemar's tests were used to assess statistical significance for continuous and categorical data respectively over subsequent pregnancies.

Results: There were a total of 62 women who had three GDM pregnancies. Compared to the first GDM pregnancy, both second and third GDM pregnancies were diagnosed at an earlier gestational age and exhibited higher pre-pregnancy weight/BMI. The third GDM pregnancy also required a larger maximal dose of insulin.

In regards to perinatal outomes, second GDM pregnancy women were more likely to require insulin therapy, and less likely to have eGWG. Third GDM pregnancy women, had a significantly higher rate of LGA (31.1% vs 11.3%, p<0.01.) compared to the first GDM pregnancy

Conclusion: Following analysis of paired data, subsequent pregnancies affected by GDM, exhibit higher risk antenatal characteristics as well as a high risk of adverse pregnacy outcomes including need for insulin therapy and a significantly higher rate of LGA.

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Audit of obstetric and neonatal outcomes for women with pre-gestational diabetes

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Pre-gestational diabetes is associated with increased risk of adverse obstetric and neonatal outcomes, although adherence to current guidelines including preconception counselling, intensive blood glucose management and consideration of induction of labour at 38 weeks can help to optimize outcomes for these women. We conducted a single centre retrospective review of patient charts coded for diabetes in pregnancy over a four year period, to assess obstetric and neonatal outcomes.

71 pregnancies in 67 women were reviewed, 40 (58%) had T1DM and 29 (42%) T2DM, and 2 women with MODY. Rates of preconception counseling, including the use of high dose folate was low, as was pre-pregnancy recording of Hba1c only 36% (T2 41% vs T1 32%). Women with T1DM had higher rates of premature delivery (55% vs 24%), LGA (52.5% vs 45%) and IUFD (2 cases associated with DKA vs 0), however PET was equally prevalent (15% vs 17%). Rate of induction of labour was 46% (T1DM 50% vs T2DM 41%), and half of inductions required delivery by caesarean section. Consistent with other series total caesarean section rate was 64%. Almost all (96%) babies were monitored in special care nursery, for an average duration of 2.5 days.

This series provides up to date local information to guide counselling of women of child bearing age with diabetes, including a reminder to endocrinologists of the importance of pro-active counselling due to high rates of unplanned or inadequately planned pregnancy.

POSTER LISTING

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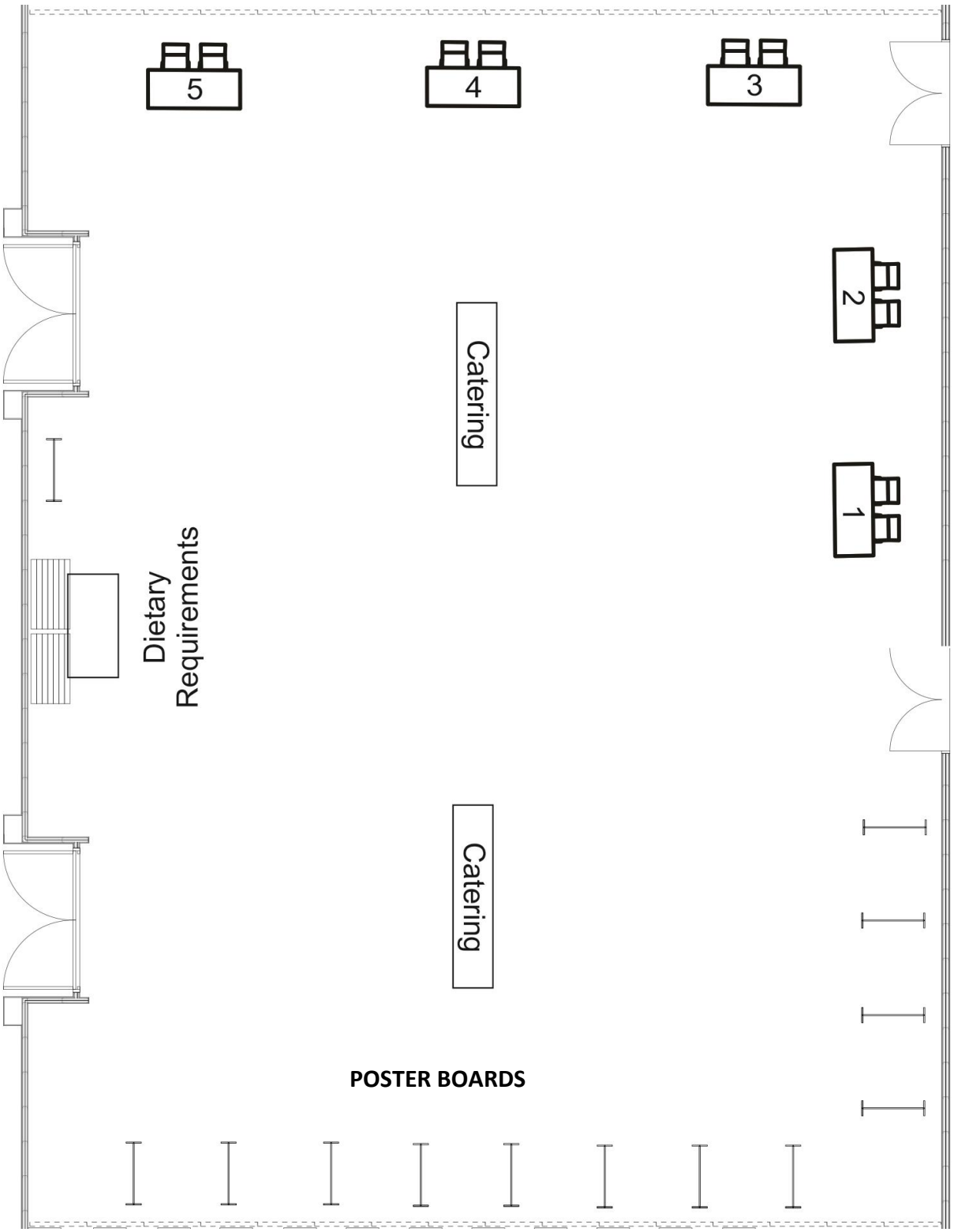

Saturday 27th August

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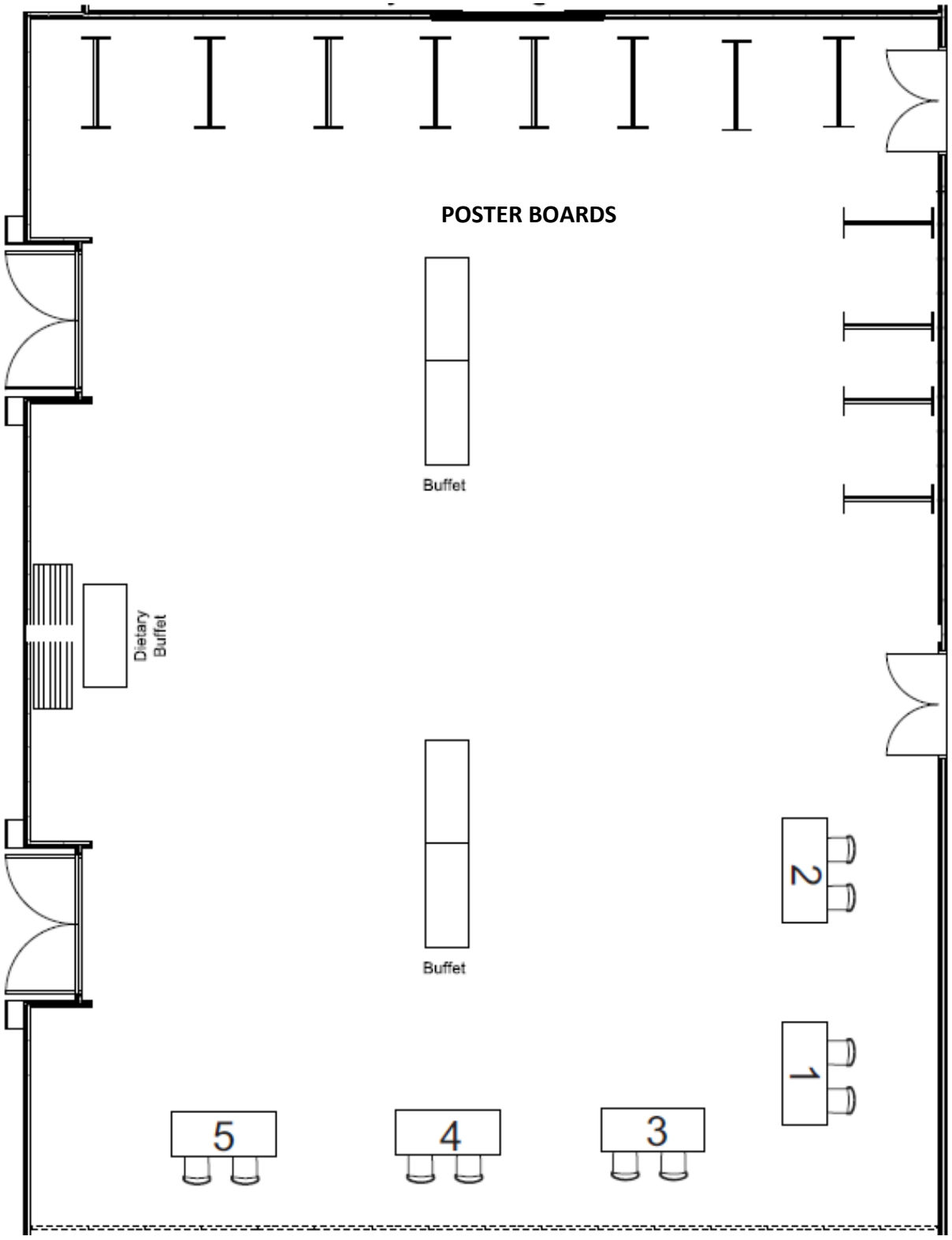

NOVO NORDISK — TABLE #1

Novo Nordisk is a focused health care company and a world leader in diabetes care. Founded in 1923, we have pioneered many therapeutic breakthroughs in diabetes care.
Our strong commitment to changing diabetes is reflected in our focus on research and development, our partnerships with professional and consumer organisations and our commitment to communities in the developing world through the World Diabetes Foundation.
Novo Nordisk is committed to fighting this growing epidemic and to drive change for people affected by diabetes with the ultimate aim of finding a cure.

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MEDTRONIC AUSTRALASIA — TABLE #2

Through innovation and collaboration, Medtronic improves the lives and health of millions of people each year. The company aims to transform diabetes care by expanding access, integrating care and improving outcomes, so people living with diabetes can enjoy greater freedom and better health.
Learn more at medtronic.com.au

ELI LILLY PHARMACEUTICALS — TABLE #3

Lilly is a global healthcare leader that unites caring with discovery to make life better for people around the world. Lilly employees work to discover and bring life-changing medicines to those who need them, improve the understanding and management of disease, and give back to communities through philanthropy and volunteering

DIABETES AUSTRALIA — TABLE #4

The National Diabetes Services Scheme is an initiative of the Australian Government administered with the assistance of Diabetes Australia. The NDSS delivers diabetes-related products at subsidised prices and provides information and support services to people with diabetes. Registration is free and open to all Australians diagnosed with diabetes.

AUSTRALASIAN DIABETES IN PREGNANCY SOCIETY — TABLE #5

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