

## **Update on the PANDORA Study**

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discovery for a healthy tomorrow





- Diabetes in pregnancy and inter-generational risk
- PANDORA aims and methods
- Baseline study
- Wave 1 study
- Wave 2 study
- Conclusions and key clinical messages



- Pre-existing diabetes in pregnancy affects <1% pregnancies and gestational diabetes mellitus (GDM) ~5% of pregnancies
- Aboriginal and Torres Strait Islander women compared to other Australian women (2005-06 to 2007-08):
  - 10x likely to have type 2 diabetes in pregnancy
  - 1.5x likely gestational diabetes (GDM)
  - Significantly younger (75% vs. 44% aged <30 years)
  - More likely to experience adverse effects of pregnancy, labour and delivery

AIHW Diabetes in pregnancy 2010



# Gestational and pre-existing diabetes in pregnancy in the Northern Territory

#### Northern Territory Midwives Data Collection



#### Non-Aboriginal mothers



Hare M et al. Unpublished data



#### **Intergenerational Diabetes**



In-utero GDM & T2M exposure & risk of diabetes in offspring – Manitoba, Canada

Ref: JAMA Pediatrics 2018



## Type 2 Diabetes in Young People

52% increase in NT Aboriginal youth (age 15-24) with type 2 diabetes between 2014 & 2018



Ref: NT Aboriginal Health Forum (unpublished)







## **Breaking the cycle**





## Pregnancy And Neonatal Diabetes Outcomes in



## Remote Australia

1139 women and their 1170 children

with current funding to follow-up

mothers and infants to 10 years post-partum/of age







 Health
 DIP Partnership Clinical
 Youth type 2 diabetes

 System
 Register & Models of Care
 Models of Care

 Changes
 Post-partum
 Community-based
 Aboriginal

 Implementation Trials
 Post-partum
 Health
 Coaches



### **PANDORA (recruitment 2012-17)**









Baseline 2012-17 Pregnancy and birth

> Mums: n=1139 Babies: n=1170

Wave 1 2-4 years Mums: n=415

Kids: n=423

All baseline participants eligible



Aboriginal: n=130



### Baseline study









### PANDORA baseline aims

### Baseline Pregnancy and birth

Mums: n=1139 Babies: n=1170 To assess relationships of clinical, biochemical and demographic risk factors with perinatal outcomes in Aboriginal and non-Indigenous NT women across the spectrum of glucose tolerance in pregnancy





## **PANDORA Main Results**

- Higher rates of poor birth outcomes for Indigenous women largely related to T2DM
- Preventable and modifiable risks impact outcomes: diabetes, BMI (additive), gestational weight gain, smoking
- Prevention or delay of T2D in younger women is vital to improve outcomes as early as possible in the life course





Maple-Brown et al, International Journal of Epidemiology, 2019. 48(1):307-318

PANDORA neonatal size and adiposity

- Maternal BMI and excess gestational weight gain -> increased neonatal adiposity
- Maternal BMI and T2DM independent risk factors
- Indigenous neonates compared to Europid neonates had greater skin folds
- Indigenous ethnicity was significantly associated with greater skin folds







### Lifestyle modification beneficial in GDM

PANDORA: Compared to mothers with normal glucose, those with lifestyle-managed GDM had:

- Less gestational weight gain
- Lower birthweight for gestational age with:
  - No increase in SGA
  - Suggestion of less LGA (OR 0.55, p=0.06)
- Same rate of C-sections, serious adverse events & shoulder dystocia
- But more inductions



#### **Gestational weight gain**



### Wave 1 study









### **PANDORA Wave 1 aims**

Baseline Pregnancy and Birth

Mums: n=1139 Babies: n=1170 Wave 1 2-4 years Mums: n=415 Kids: n=423 To compare growth of children born to mothers with and without diabetes in pregnancy

Eligible: Indigenous and Europid women with and without diabetes in pregnancy at baseline



### Wave 2 study









## zies PANDORA Wave 2 Study Methods

### Mums

Pathology: Fasting blood and spot urine Buccal swabs Anthropometrics **Blood pressure** Body composition / Bio-impedance Questionnaires -Medical history / pregnancy -PHQ9 – Depression scale -Diet / nutrition -Physical activity -Sleep questionnaire Acanthosis nigricans Activity monitor

### Child / Sibling

Pathology: Fasting blood and spot urine **Buccal swabs** Anthropometrics and skin folds **Blood pressure** Aorta intima-media thickness ultrasound Body composition / Bio-impedance Pubertal status Questionnaires -Strengths and difficulties -Diet / nutrition -Physical activity -Sleep questionnaire Acanthosis nigricans Activity monitor



## enzies Conclusions from PANDORA

- Higher rates of poor birth outcomes for Indigenous women largely  $\bullet$ related to T2D
- Preventable and modifiable risks impact outcomes: diabetes, BMI (additive), gestational weight gain, smoking
- Maternal BMI and T2D independent risk factors neonatal adiposity
- Women with GDM-lifestyle greater induction but trend to lower LGA ۲ compared to women without hyperglycaemia in pregnancy



### Screening for youth onset diabetes

From 10yo (or earlier if pubertal) in Indigenous children with any of:

- Acanthosis nigricans
- Overweight or obese (BMI Z score ≥1)
- Family history of diabetes
- Dyslipidaemia
- Psychotropic medications
- Maternal history of diabetes in pregnancy







#### Screening pathway for type 2 diabetes in Aboriginal young people in NT





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