

Diabetes and Pregnancy

University of
HUDDERSFIELD
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Dr Warren Gillibrand

**Deputy Director of Postgraduate
Education**

**Department of Nursing & Midwifery
Department of AHP and Sports Science**

w.p.gillibrand@hud.ac.uk



Aims of the session



1. Describe the different types of diabetes
2. Describe Gestational Diabetes (GD).
3. Discuss Pregnancy in women with pre-existing diabetes (PEDP).
4. Discuss the management of women with gestational diabetes.
5. Discuss the management of women with pre-existing diabetes and pregnancy.
6. Discuss acute complications and emergencies in women with diabetes and pregnancy.



DIABETES

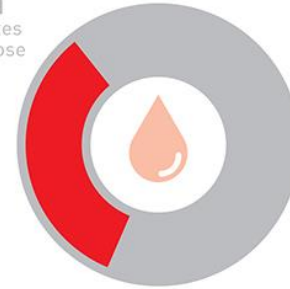
DIABETES IS
ON THE RISE



422 MILLION
adults have diabetes

3.7 MILLION
deaths due to diabetes
and high blood glucose

1.5 MILLION
deaths caused
by diabetes



THAT'S 1 PERSON IN 11



Main types of diabetes



TYPE 1 DIABETES

Body does not produce
enough insulin



TYPE 2 DIABETES

Body produces insulin
but can't use it well



GESTATIONAL DIABETES

A temporary condition in
pregnancy

Consequences

Diabetes can lead to complications in many parts of
the body and increase the risk of dying prematurely.

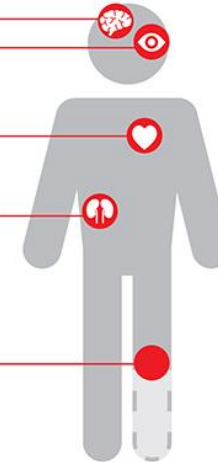
Stroke

Blindness

Heart attack

Kidney failure

Amputation



Classification of Diabetes



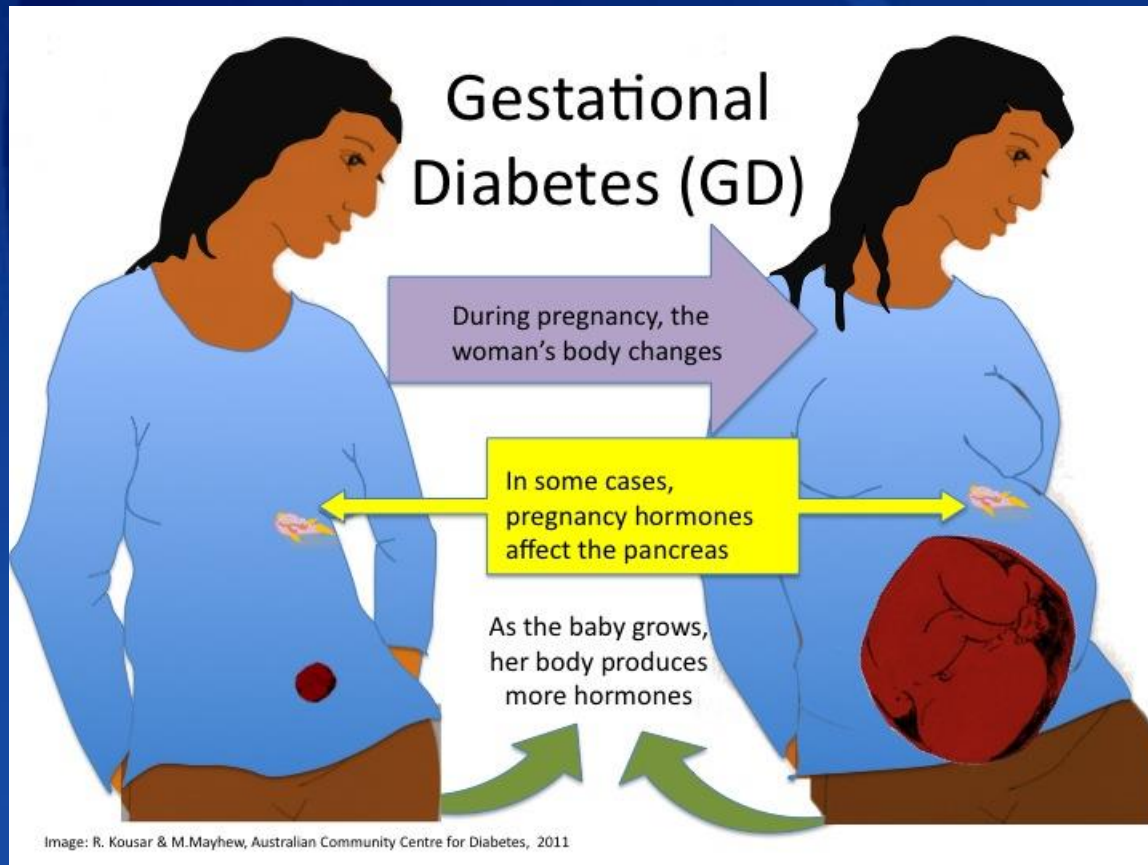
- Type 1: Auto-immune elimination of beta-cells (beta-cell antibodies).
- Type 2: Reduced cellular insulin sensitivity.
- Gestational Diabetes (GD): type 2 diabetes in pregnancy – carbohydrate intolerance leading to hyperglycaemia – Oral Glucose Tolerance Test (OGTT) @ 24-28 weeks (third trimester) - classification to type 2 diabetes 6 weeks after delivery with OGTT.
- Other (Insipidus, diseases of the pancreas, endocrinopathies: e.g.Cushing Syndrome).

Incidence of Diabetes in Pregnancy.



- Approx. 700,000 women in pregnancy per year in England and Wales.
- 5% of these will have pre-existing or gestational diabetes= approx. 35,000 per year.
- 87.5% of DiP women will have Gestational Diabetes.
- 7.5% will have T1 (2,625)
- 5% will have T2 (1,750).

Causes of Gestational Diabetes/ Risk Factors for GD



Low Risk

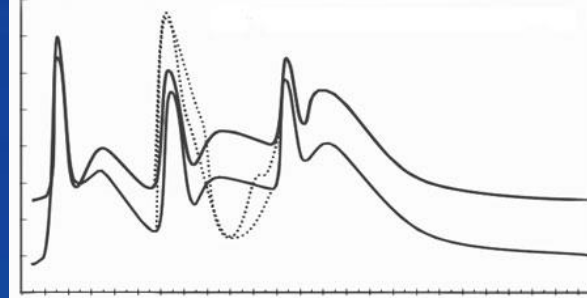
(May Not Need Glucose Challenge Test)

Normal Weight Before Pregnancy

Under Age 25

No History of Unexplained Stillbirth

No Diabetes in Immediate Family



High Risk

(Needs Glucose Challenge Test)

At Risk Ethnicity:

African American
Hispanic/Latina,
Native American
Alaskan
Pacific Islander

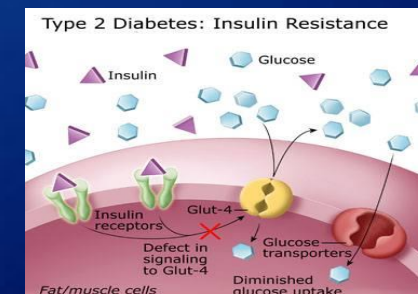
High Blood Pressure

High Cholesterol

Baby weighing over 9 lbs

GD During Previous Pregnancy

Obesity: →
BMI ≥ 30
kg/m²



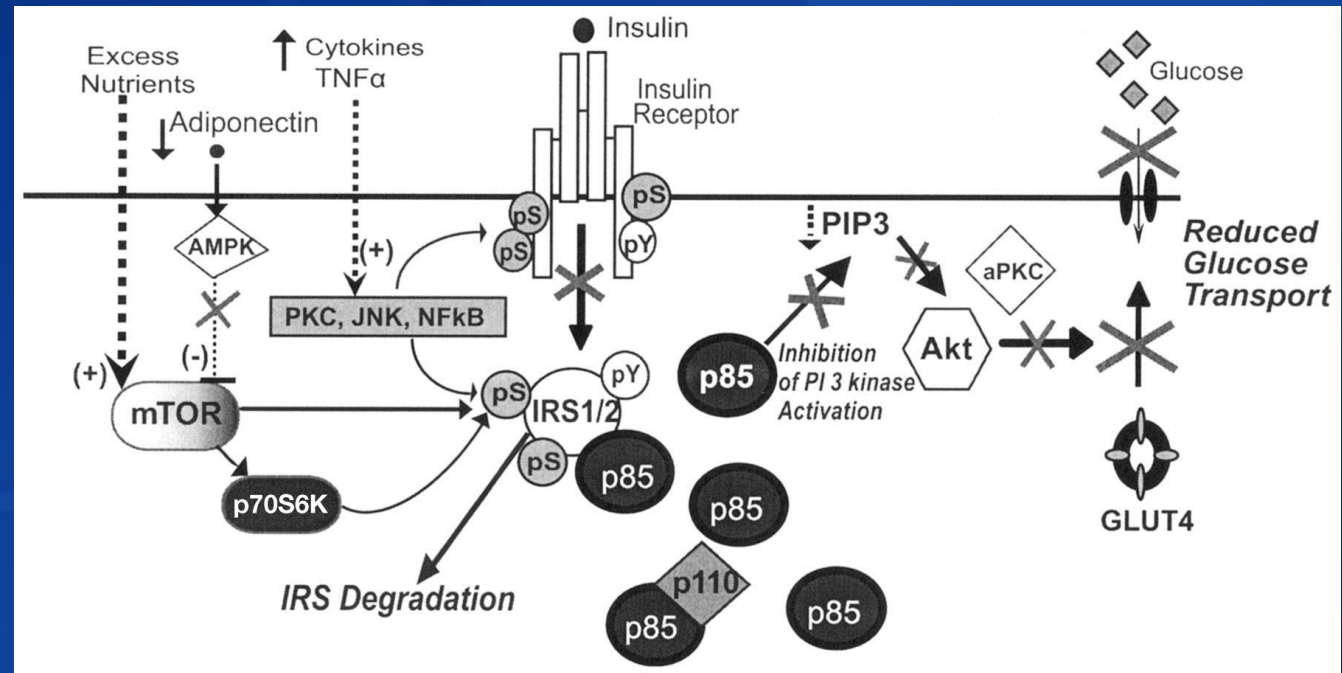
GD Cause- Insulin resistance/ hormonal action

Increased:

Oestrogen: cortisol: placental lactogen

= insulin action inhibited

= Increased blood glucose



Severity of Diabetes in Pregnancy

↑ risk of:

Miscarriage.

Pre-eclampsia.

Pre-term labour.

Macrosomia

Birth injury

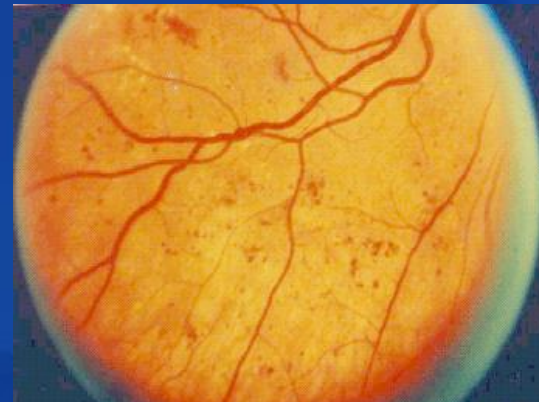
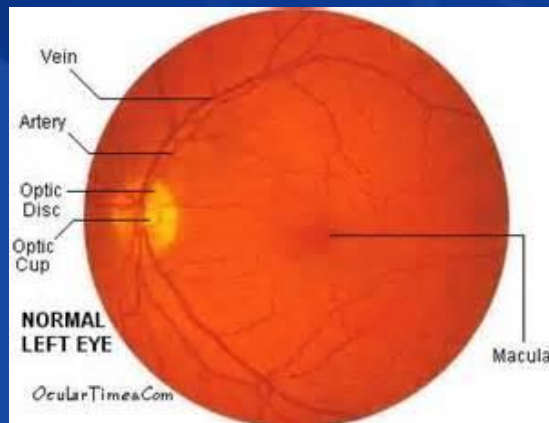
Stillbirth

Congenital malformations

Perinatal mortality

Post –natal adaptation problems (↑ hypoglycaemia).

In women with pre-existing diabetes: ↑ risk , or worsening of, microvascular complications



Diagnosis of GD

Table 1. International consensus cut-offs for diagnosing gestational diabetes mellitus

	ADA ^a 2012/ IADPSG ^b	ACOG ^c	WHO ^d
	75g OGTT	100g OGTT	75g OGTT
Fasting glucose, mg/dL	≥92	≥95	≥126
1-hour glucose, mg/dL	≥180	≥180	-
2-hour glucose, mg/dL	≥153	≥155	>140
3-hour glucose, mg/dL	-	≥140	-
Criteria for diagnosis	At least 1	2 or more	At least 1

^aADA, American Diabetes Association

^bIADPSG, International Association of Diabetes and Pregnancy Study Groups

^cACOG, American College of Obstetrics and Gynecology

^dWHO, World Health Organization

WHO (2018) Gestational Diabetes.

<http://www.who.int/mediacentre/factsheets/fs312/en/>. Accessed 2018

NICE current diagnostic criteria for GD

- A fasting plasma glucose level of 5.6 mmol/litre or above **or**
- A 2-hour plasma glucose level of 7.8 mmol/litre or above.

NICE (2015) **Diabetes in pregnancy: management from preconception to the postnatal period.**

<https://www.nice.org.uk/guidance/ng3/chapter/1-Recommendations#gestational-diabetes-2>. Accessed 2018

Management of GD/PEDP

- Inform the primary healthcare team when a woman is diagnosed with gestational diabetes.
- Refer all women with GD and PEDP to a joint antenatal /diabetes clinic.
- Aim for good blood glucose control throughout pregnancy which will reduce the risk of fetal macrosomia, trauma during birth (for her and her baby), induction of labour and/or caesarean section, neonatal hypoglycaemia and perinatal death.
- Teach women with gestational diabetes about self-monitoring of blood glucose.



Management of GD/ PEDP



- Use the same capillary plasma glucose target levels for women with gestational diabetes as for women with pre-existing diabetes:
 - Agree individualised targets for self-monitoring of blood glucose with women with diabetes in pregnancy, taking into account the risk of hypoglycaemia.
- Type 1 diabetes : test fasting, pre-meal, 1-hour post-meal and bedtime blood glucose levels daily during pregnancy.
- Type 2 diabetes or gestational diabetes treated with multiple daily insulin injection regimen : test fasting, pre-meal, 1-hour post-meal and bedtime blood glucose levels daily during pregnancy.
- Type 2 diabetes or gestational diabetes: test fasting and 1-hour post-meal blood glucose levels daily during pregnancy if the person is:
 - on diet and exercise therapy **or**
 - taking oral therapy (with or without diet and exercise therapy) or single-dose intermediate-acting or long-acting insulin.

Management of GD/ PEDP



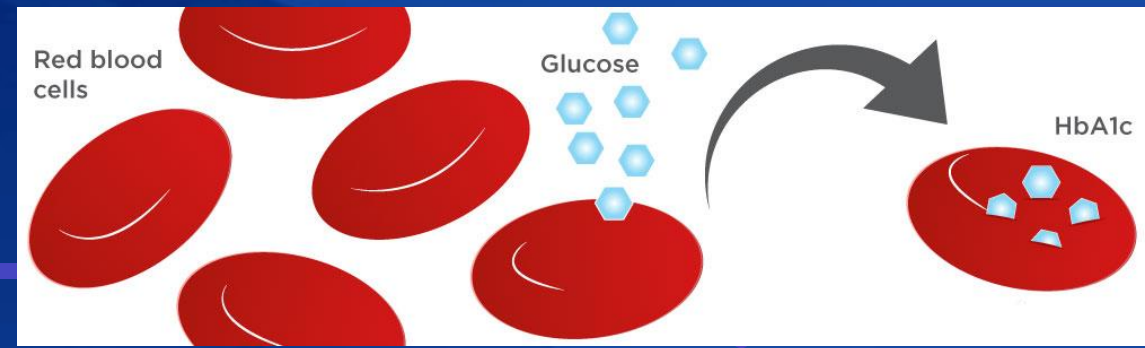
- Advise pregnant women with any form of diabetes to maintain their capillary plasma glucose below the following target levels, if these are achievable without causing problematic hypoglycaemia:
- fasting: **5.3 mmol/litre**
and
- 1 hour after meals: **7.8 mmol/litre or**
- 2 hours after meals: **6.4 mmol/litre.**
- Advise pregnant women with diabetes who are on insulin or glibenclamide to maintain their capillary plasma glucose level above **4 mmol/litre.**

Management of GD



- **Healthy diet:** low glycaemic index : dietician
- **Regular exercise.**
- Trial changes in diet and exercise to women with gestational diabetes who have a fasting plasma glucose level below 7 mmol/litre at diagnosis.
- Offer **metformin** to women with gestational diabetes if blood glucose targets are not met using changes in diet and exercise within 1–2 weeks.
- Offer **insulin** instead of metformin to women with gestational diabetes if metformin is contraindicated or unacceptable.
- Offer addition of insulin to the treatments of changes in diet, exercise and metformin for women with gestational diabetes if blood glucose targets are not met.
- **Offer immediate treatment with insulin, with or without metformin, as well as changes in diet and exercise, to women with gestational diabetes who have a fasting plasma glucose level of 7.0 mmol/litre or above at diagnosis.**
- **Consider immediate treatment with insulin, with or without metformin, as well as changes in diet and exercise, for women with gestational diabetes who have a fasting plasma glucose level of between 6.0 and 6.9 mmol/litre if there are complications such as macrosomia or hydramnios**

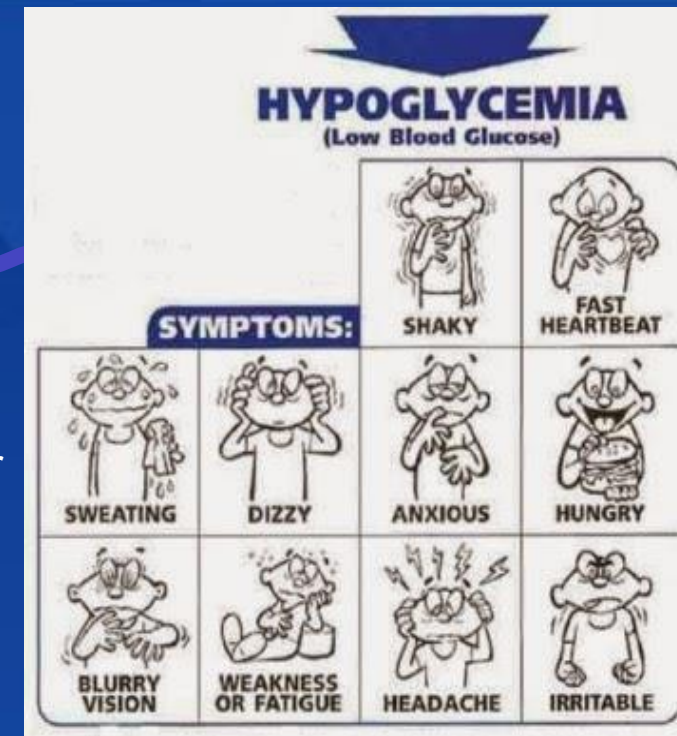
HbA1c- Glycated Haemoglobin



- Measure HbA1c levels in all pregnant women with pre-existing diabetes at the booking appointment to determine the level of risk for the pregnancy.
- Consider measuring HbA1c levels in the second and third trimesters of pregnancy for women with pre-existing diabetes to assess the level of risk for the pregnancy.
- Be aware that level of risk for the pregnancy for women with pre-existing diabetes increases with an HbA1c level above 48 mmol/mol (6.5%).
- Measure HbA1c levels in all women with gestational diabetes at the time of diagnosis to identify those who may have pre-existing type 2 diabetes.
- **Do not use** HbA1c levels routinely to assess a woman's blood glucose control in the second and third trimesters of pregnancy.

Diabetes Emergencies (GD or PEDP)

- **Hypoclycaemia:**
- Be aware that the rapid-acting insulin analogues (aspart and lispro) have advantages over soluble human insulin during pregnancy and consider their use.
- Advise women with insulin-treated diabetes of the risks of hypoglycaemia and impaired awareness of hypoglycaemia in pregnancy, particularly in the first trimester.
- Advise pregnant women with insulin-treated diabetes to always have available a fast-acting form of glucose (for example, dextrose tablets or glucose-containing drinks).
- Provide glucagon to pregnant women with type 1 diabetes for use if needed. Instruct the woman and her partner or other family members in its use.
- Offer women with insulin-treated diabetes continuous subcutaneous insulin infusion (CSII; also known as insulin pump therapy) during pregnancy if adequate blood glucose control is not obtained by multiple daily injections of insulin without significant disabling hypoglycaemia.

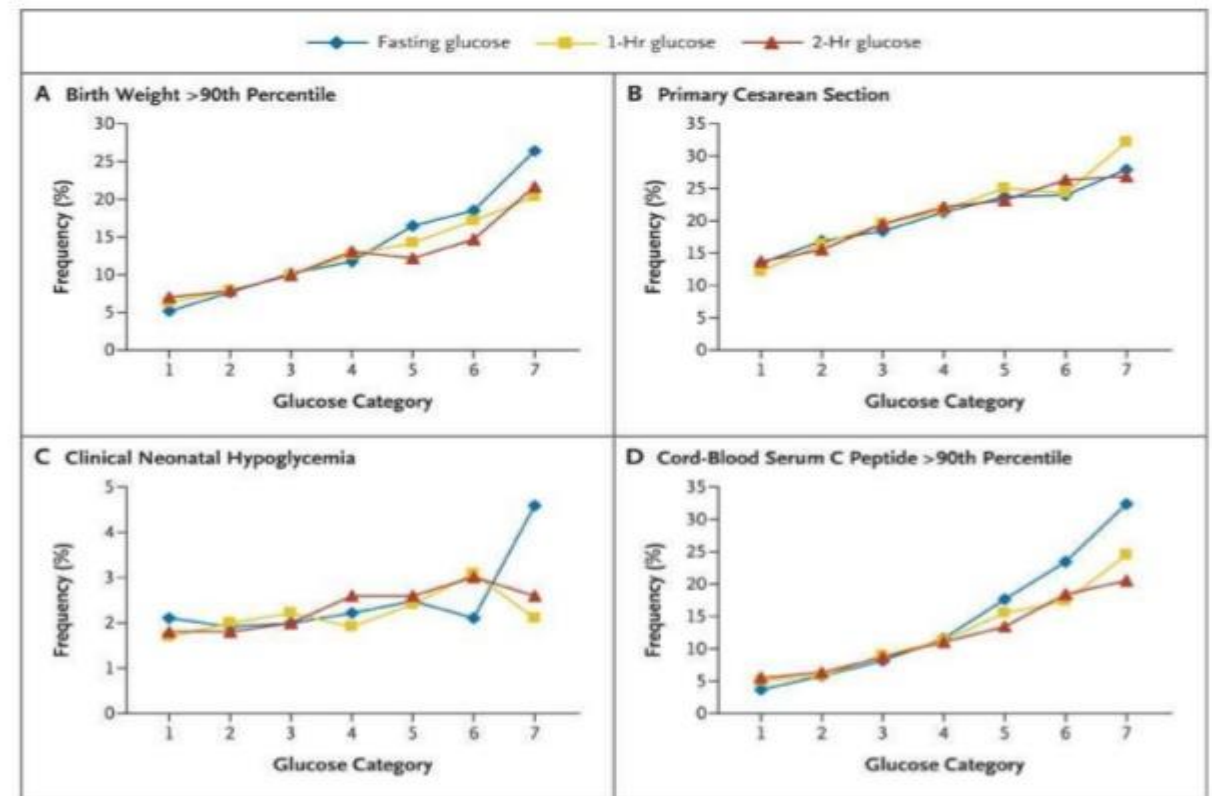


Diabetes Emergencies (GD or PEDP)

Hyperglycaemia:

- Offer pregnant women with type 1 diabetes blood ketone testing strips and a meter, and advise them to test for ketonaemia and to seek urgent medical advice if they become hyperglycaemic or unwell.
- Advise pregnant women with type 2 diabetes or gestational diabetes to seek urgent medical advice if they become hyperglycaemic or unwell.
- Test urgently for ketonaemia if a pregnant woman with any form of diabetes presents with hyperglycaemia or is unwell, to exclude diabetic ketoacidosis.
- During pregnancy, admit immediately women who are suspected of having diabetic ketoacidosis for level 2 critical care, where they can receive both medical and obstetric care.

Hyperglycemia and Adverse Pregnancy Outcomes (HAPO) study



HAPO Study Group. Hyperglycemia and Adverse Pregnancy Outcomes NEJM 2008 358: 1991-2002

Blood glucose control during labour and birth



- Monitor capillary plasma glucose every hour during labour and birth in women with diabetes, and ensure that it is maintained between 4 and 7 mmol/litre.
- If general anaesthesia is used for the birth in women with diabetes, monitor blood glucose every 30 minutes from induction of general anaesthesia until after the baby is born and the woman is fully conscious.
- Intravenous dextrose and insulin infusion should be considered for women with type 1 diabetes from the onset of established labour.
- Use intravenous dextrose and insulin infusion during labour and birth for women with diabetes whose capillary plasma glucose is not maintained between 4 and 7 mmol/litre.

Neonatal care for babies of mothers with diabetes

- Advise women with diabetes to give birth in hospitals where advanced neonatal resuscitation skills are available 24 hours a day.
- Babies of women with diabetes should stay with their mothers unless there is a clinical complication or there are abnormal clinical signs that warrant admission for intensive or special care.
- Carry out blood glucose testing routinely in babies of women with diabetes at 2–4 hours after birth. Carry out blood tests for polycythaemia, hyperbilirubinaemia, hypocalcaemia and hypomagnesaemia for babies with clinical signs.
- Perform an echocardiogram for babies of women with diabetes if they show clinical signs associated with congenital heart disease or cardiomyopathy, including heart murmur. The timing of the examination will depend on the clinical circumstances.

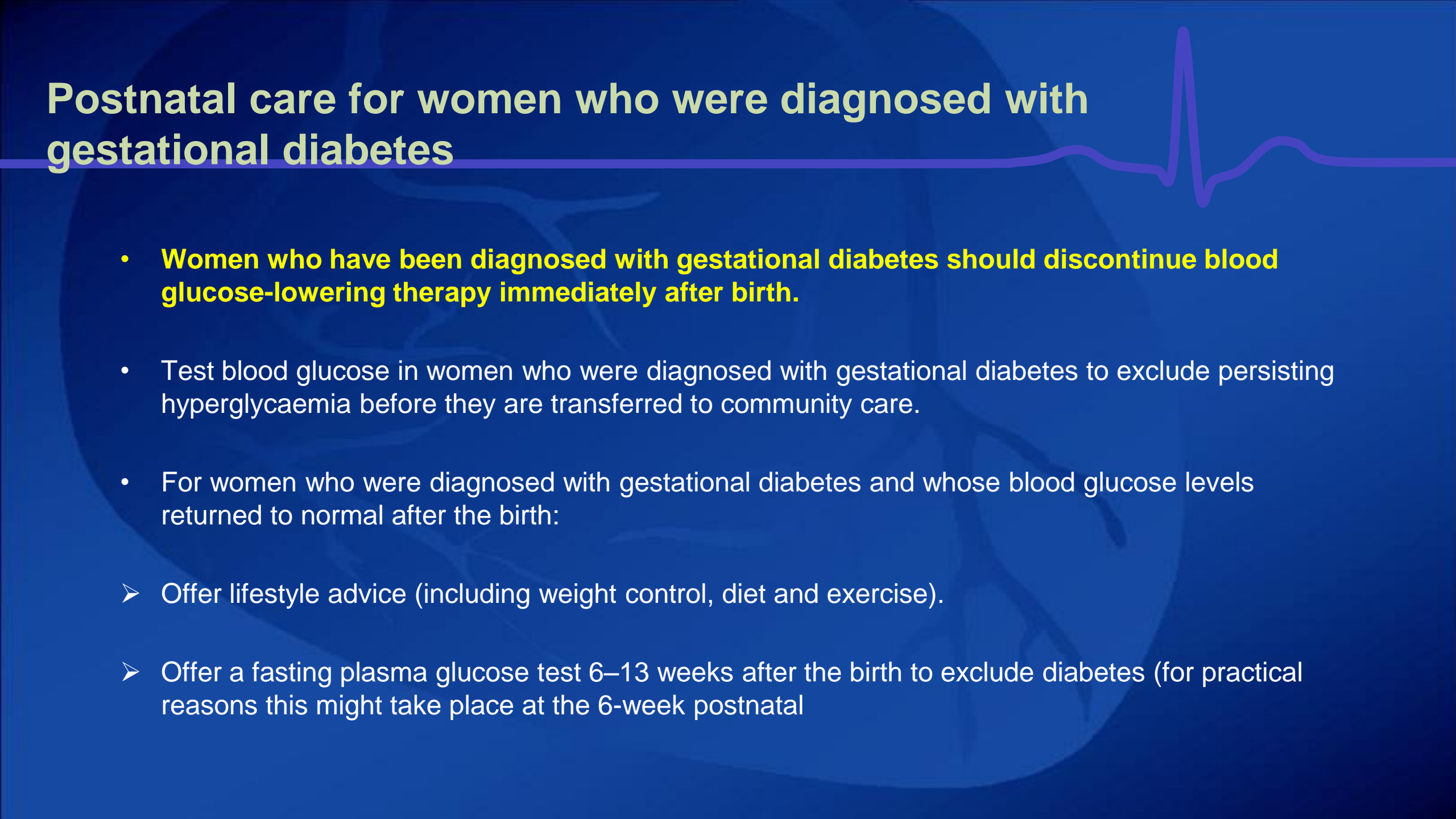


Preventing and assessing neonatal hypoglycaemia



- Test the blood glucose of babies of women with diabetes using a quality-assured method validated for neonatal use (ward-based glucose electrode or laboratory analysis).
- Women with diabetes should feed their babies as soon as possible after birth (within 30 minutes) and then at frequent intervals (every 2–3 hours) until feeding maintains pre-feed capillary plasma glucose levels at a minimum of 2.0 mmol/litre.
- If capillary plasma glucose values are below 2.0 mmol/litre on 2 consecutive readings despite maximal support for feeding, if there are abnormal clinical signs or if the baby will not feed orally effectively, use additional measures such as tube feeding or intravenous dextrose. Only implement additional measures if one or more of these criteria are met.
- Test blood glucose levels in babies of women with diabetes who present with clinical signs of hypoglycaemia, and treat those who are hypoglycaemic with intravenous dextrose as soon as possible.

Postnatal care for women who were diagnosed with gestational diabetes

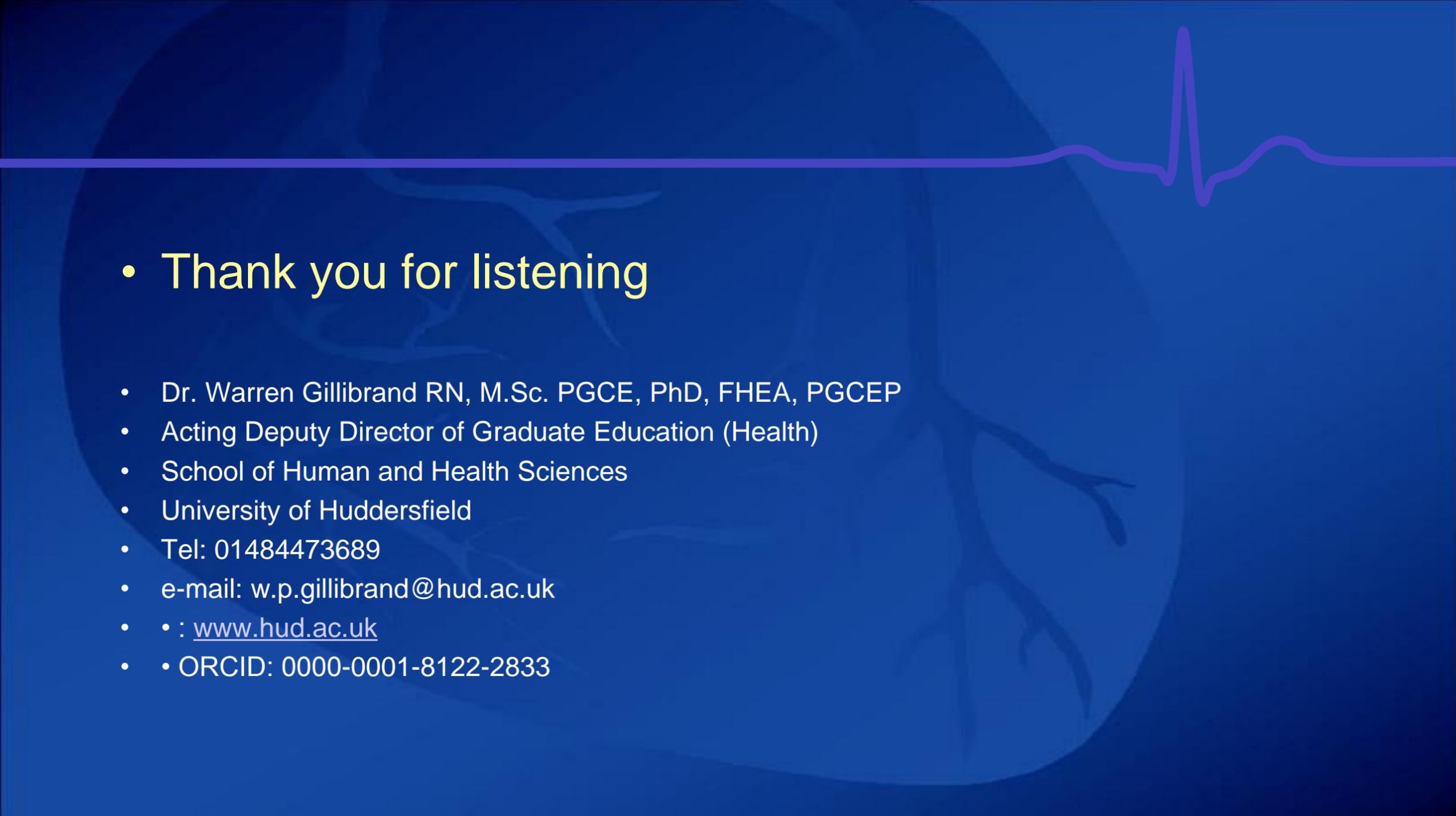


- **Women who have been diagnosed with gestational diabetes should discontinue blood glucose-lowering therapy immediately after birth.**
- Test blood glucose in women who were diagnosed with gestational diabetes to exclude persisting hyperglycaemia before they are transferred to community care.
- For women who were diagnosed with gestational diabetes and whose blood glucose levels returned to normal after the birth:
 - Offer lifestyle advice (including weight control, diet and exercise).
 - Offer a fasting plasma glucose test 6–13 weeks after the birth to exclude diabetes (for practical reasons this might take place at the 6-week postnatal

Postnatal care for women with pre-existing diabetes



- Women with insulin-treated pre-existing diabetes should reduce their insulin immediately after birth and monitor their blood glucose levels carefully to establish the appropriate dose.
- Explain to women with insulin-treated pre-existing diabetes that they are at increased risk of hypoglycaemia in the postnatal period, especially when breastfeeding, and advise them to have a meal or snack available before or during feeds.
- Women with pre-existing type 2 diabetes who are breastfeeding can resume or continue to take metformin¹ and glibenclamide² immediately after birth, but should avoid other oral blood glucose-lowering agents while breastfeeding.
- Women with diabetes who are breastfeeding should continue to avoid any medicines for the treatment of diabetes complications that were discontinued for safety reasons in the preconception period.



- Thank you for listening

- Dr. Warren Gillibrand RN, M.Sc. PGCE, PhD, FHEA, PGCEP
- Acting Deputy Director of Graduate Education (Health)
- School of Human and Health Sciences
- University of Huddersfield
- Tel: 01484473689
- e-mail: w.p.gillibrand@hud.ac.uk
- • : www.hud.ac.uk
- • ORCID: 0000-0001-8122-2833