Policy Document Control Sheet

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Final approval

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Name & Job title of Chairman or Executive Sponsor	Shafie Kamaruddin, Chair
Approving Committee	Clinical Standards & Therapeutics Committee
Signed master copy held at:	Corporate Records Office, Trust Headquarters, Darlington Memorial Hospital

Version Control Table

Date of issue	Version number	Status
March 2003	1.0	Superseded
September 2005	2.0	Superseded
September 2007	2.1	Superseded
July 2009	3.0	Superseded
September 2009	3.1	Superseded
November 2009	3.2	Superseded
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14.6.17	6.0	Draft

Table of Revisions

Date	Section	Revision	Author
September 2005	Full	Updated in line with diabetic steering group recommendations. Full review to ensure that document is NHSLA Compliant	Philippa Marsden
September 2007	Partial	Updated in line with diabetic steering group recommendations. Review to ensure that document is NHSLA Compliant	Philippa Marsden
July 2009	Full	Updated in line with diabetic steering group recommendations Full review	Philippa Marsden

		to ensure that document is NHSLA Compliant	
November 2009	Partial	Paediatric review	Philippa Marsden
April 2010	Partial	Page 18 added to bullet point 5 now reads: glucose/potassium infusion Page 18 Table GKI sliding scale added: if not eating/drinking normally	Philippa Marsden
January 2012	Partial	Reviewed and amended in line with CDDFT policy for the development and management of policy and guidance documents	Jackie Hendy
May 2013	partial	Extension of date to allow working party time to develop new guideline	J Woodward P Ranka S Sen
Oct 2013	Full	Full review of guideline in line with NICE recommendations and NORDIP Change from GKI to variable rate insulin	EBPG G Tarigopala P Ranka S Pearson
Sep 2014	Partial	Clarification of existing steroid administration pg 13	As above L Humes
June 2015	Full	Review of guideline against NICE guidance. Changes to blood glucose targets Glucose Tolerance Test for women with glycosuria For Gestational Diabetics	Diabetic team

		offer fasting plasma glucose test in the antenatal Clinic at six weeks post delivery. NOT GTT Reordered Flow charts for steroids added as appendix	
June 2017	Full	Changes to; Suspected Macrosomia pg 11,12 & 21 Multiparity removed from gestational diabetes screening criteria. Pg 17 Glycosuria morning urine specified Pg 17 OGTT more than 34 weeks targets aligned with less than 34 weeks Presence of glycosuria in women who have had a negative OGTT at 26-28 weeks added pg 18 Protocol for administration of antenatal steroids, BG regime amended, time for steroids specified as before 12.00 and flowcharts amended pg 24, 26, 27,41,42 & 43.	K Abouglila G Tarigopala S Sen P Ranka L Mackinnon L Humes J Kitchings J Woodward E Clarkson H Parks S Pickering G Gordon
June 2020		6 month extension requested	
December 2020		Further extension of 3 month requested. Guideline currently with Diabetes Team for review.	

Contents

1 Introduction

- 2–5% of pregnancies involve women with diabetes.
- Miscarriage, pre-eclampsia and preterm labours are more common in women with pre-existing diabetes, and diabetic retinopathy can worsen rapidly during pregnancy. Stillbirth, congenital malformations, macrosomia, birth injury, perinatal mortality and postnatal adaptation problems (such as hypoglycaemia) are more common in babies born to women with pre-existing diabetes.

2 Purpose

The purpose of this guideline is to support staff in providing care based on best practice and best available evidence.

- To provide multidisciplinary high quality care to women with pre-existing diabetes or gestational diabetes pre-conception, antenatally and postnatally.
- To minimise the risks to the mother and baby

3 Scope

All health professionals caring for pregnant women with pre-existing diabetes or gestational diabetes

4 Duties

This guideline defines the roles and responsibilities of midwives, obstetricians, physicians, consultant diabetologists, diabetic specialist nurses & dieticians.
The team have responsibility for planning the care of these women and ensuring the plan of care is documented and available for all health care settings

5 Main Content

5.1 Diabetes Care – Pregnancy

Contact Numbers

Diabetes Centres:

UHND:	**0191 3332209 09:00 – 16:00 am**
Bishop Auckland:	**01325 743530**

Darlington Memorial: **01325 743530**

5.2 Definitions

Type 1 Diabetes: Failure of the body to produce insulin – usually presents in childhood or as a young adult. These patients will be on insulin pre-pregnancy.

Type 2 Diabetes: Failure of the body to respond to insulin, often related to obesity, family history. These women may be diet controlled pre-pregnancy or may be on medication or insulin

Gestational Diabetes: Diabetes presenting in pregnancy where blood glucose sugar levels can return to normal after delivery. Type 1 or type 2 diabetes can present in pregnancy; in these cases blood glucose remains elevated after delivery.

Diabetes (non-pregnant):
- **fasting glucose - equal to or more than 7.0 mmol/l**
- **2 hour glucose - equal to or more than 11.0 mmol/l**

Gestational Diabetes:
- **fasting glucose - equal to or more than 5.6 mmol/l**
- **2 hour glucose - equal to or more than 7.8 mmol/l**

5.3 PLACE OF CARE FOR PREGNANT DIABETIC PATIENTS

Diabetic patients requiring admission at any stage of pregnancy (first, second, third trimester and postnatally) with any condition other than moderate/severe diabetic ketoacidosis (see below) should be admitted to the antenatal ward with input from the obstetric and diabetic teams. The Consultant Obstetrician must be informed of their admission.

5.4 KETOACIDOSIS

Diabetic ketoacidosis (DKA) is a potentially life threatening emergency and needs immediate assessment – Contact the medical on call team urgently

Definition:
Hyperglycaemia (Blood sugar more than 11), Ketonaemia (more than 3 mmol/L, using blood ketone strips), Venous pH less than 7.3 and/or venous bicarbonate less than 15 mmol/L (Beware of "Euglycaemic" ketoacidosis).

Test urgently for ketonaemia if a pregnant woman with any form of diabetes presents with hyperglycaemia or in unwell

Place of care
MAU/HDU/ITU

Management
Refer to trust guideline POL/meddiv/Diabetes/0003

Target Ranges for Treatment of Diabetes in Pregnancy
The following target ranges provide the optimum level of control (NICE guidance)

Fasting glucose:	3.5 – 5.3 mmol/l, if safely achievable. (This may not be safe to do so in some patients and therefore individualised targets for self-monitoring should be agreed)
1 hour postprandial	less than 7.8 mmol/l
2 hour postprandial:	less than 6.4 mmol/l, if safely achievable

5.5 PRE-CONCEPTION CARE

Planning Pregnancy

- Women with diabetes who are planning a pregnancy should be referred for preconception advice in secondary care.
- Women with diabetes who are planning to become pregnant should be informed that establishing good glycaemic control before conception and continuing this through pregnancy will reduce the risk of miscarriage, congenital malformation, stillbirth and neonatal death. It is important to explain that risks can be reduced but not eliminated.
- There should be discussion of the expected treatment plan during pregnancy, highlighting the need for very early referral, frequent follow up, constant monitoring and maintaining target levels of control (Blood Glucose)
- Women should have agreed individualised blood glucose targets for self monitoring. The frequency of self- monitoring will need to be increased and include a mixture of pre- and postprandial levels.
- It is recommended that HbA_{1C} is recorded monthly as a minimum in this group, aiming for optimum glycaemic control peri-conception.
- Target HbA1c should be **less than 48 mmol/mol** (6.5%) if safe to do so.
- Women should be advised to avoid pregnancy i.e. have effective contraception if their HbA_{1C} is **greater than 86 mmol/mol** (10%).
- Renal assessment and retinal assessment by digital imaging with mydriaisis should be carried out before stopping contraception. Consider referral to a nephrologist if serum creatinine is 120µmol/l or more or eGFR is less than 45ml/min/1.73m^2.
- Women should be offered folic acid (5mg daily) for at least three months pre conception, continued up to at least the thirteenth week of pregnancy. When pregnancy is unplanned folic acid (5mg daily) should be commenced as soon as the pregnancy is confirmed.
- Metformin may be used before and during pregnancy, as well as or instead of insulin. Other oral hypo-glycaemic agents, statins and angiotensin-converting enzyme inhibitors should be stopped if planning a pregnancy or as soon as pregnancy is confirmed

6.0 WOMEN WITH PRE-EXISITING DIABETES IN PREGNANCY **or** patients requiring insulin less than 20 weeks)

6.1 Antenatal Management

-
- Patients to book as early as possible and will have **full hospital antenatal care.** GP's/midwives to refer patients urgently (fax referral; speak to diabetic nurse or obstetricians secretary). The patient will be seen in the next combined Obstetric/Medical clinic:

  UHND - Tuesday pm
  Darlington - Tuesday am

Documentation
An individual management plan which covers pregnancy, intrapartum and the postnatal period up to six weeks should be documented in the diabetic pathway.

6.2 Booking visit

Multidisciplinary; Detailed assessment by Consultant Diabetologist, Consultant Obstetrician, Midwives, Diabetic Specialist Nurse and Dietician:

There is a risk that there will not always be a dietician at each diabetic clinic due to availability.
At the first antenatal visit there should be information, advice and support on glycaemic control, including advice on the risks of hypoglycaemia unawareness in pregnancy. Medication should be reviewed and renal and retinal assessment should be made if these have not been performed within the last 12 months. There should be information, education and advice about how diabetes will affect the pregnancy, birth and early parenting (such as breastfeeding and initial care of the baby).

- MSU, U & E's, TFT's, HbA1C, and all normal booking bloods. Early morning urine for albumin/creatinine ratio.
- Must be counselled re maternal screening for Down's syndrome
- Viability scan early in the first trimester
- Community midwife to be informed to contact patient once in each trimester

Blood glucose targets and monitoring during pregnancy

- **Individualised targets** for self-monitoring should be agreed.
  Blood Glucose levels should be monitored frequently and insulin adjusted (including the frequency of injections) to achieve a near normal HbA_{1C} and pre/post prandial blood glucose levels of:
  - Fasting glucose: 3.5 – 5.3 mmol/l, if safely achievable
  - 1 hour postprandial less than 7.8mmol/l
  - 2 hour postprandial: less than 6.4 mmol/l
- Retinal assessment should be offered as soon as possible after first contact in pregnancy if it has not been performed in the past 12 months. Retinal assessment should be carried out by digital imaging with mydriaisis using tropicamide.
- The presence of diabetic retinopathy should not prevent rapid optimisation of glycaemic control in women with a high HbA_{1C} in early pregnancy.

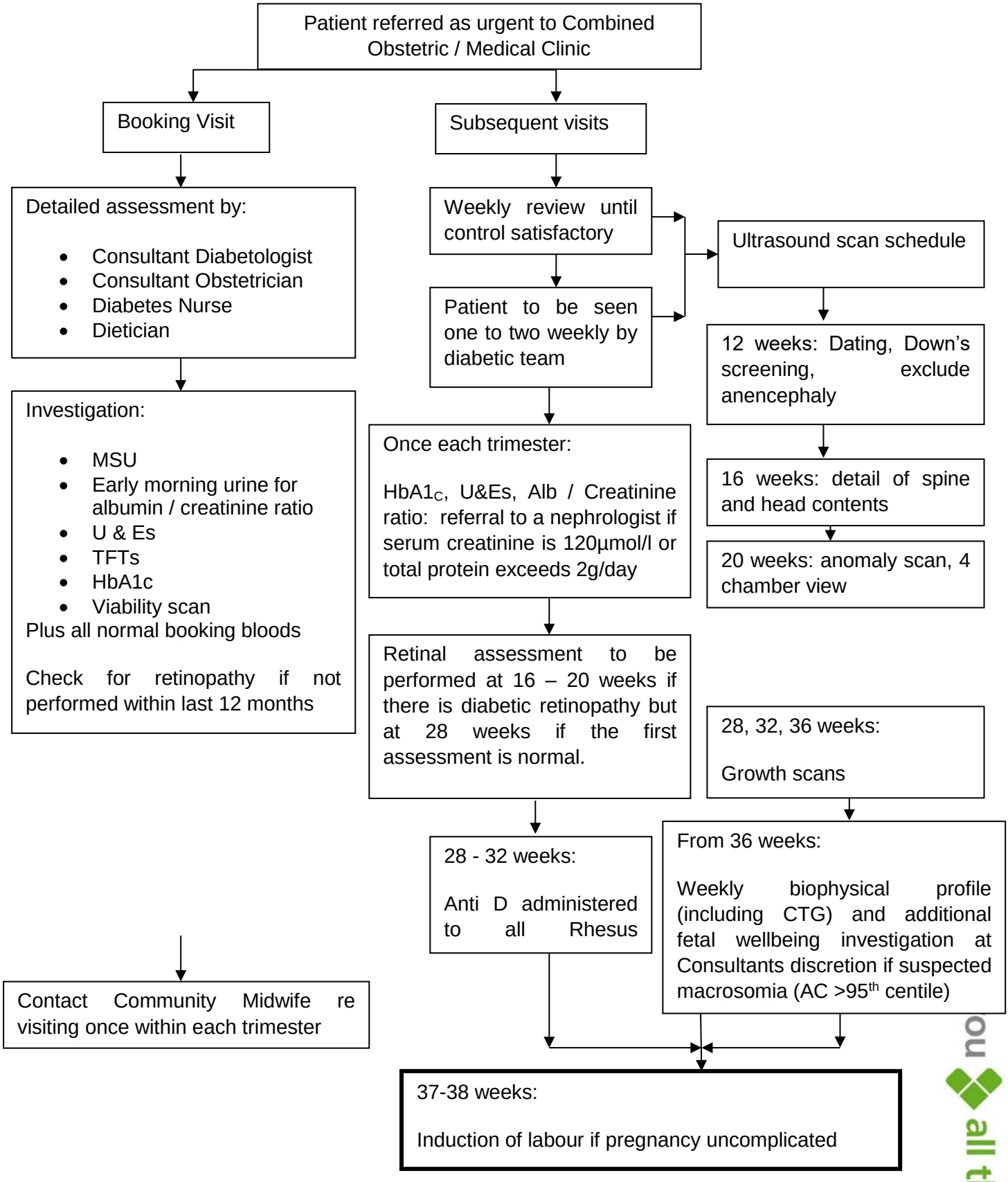
6.3 Subsequent visits

Timetable of antenatal visits: The combined obstetric medical clinic is multidisciplinary so that an individualised plan of care can be made for the woman at each visit. Antenatal visits will usually coincide with scan appointments with additional visits in between scan appointments. Additional visits may be necessary depending on individual circumstances/complication

Ultrasound:

- Repeat scan at 12 weeks gestation to confirm viability, dating and to exclude anencephaly
    - Detailed scan of spine and head contents at 16 weeks
    - Four chamber view performed at 20 weeks with anomaly scan.
    - Consideration should be given to weekly biophysical profile (particular attention to amniotic volume and abdominal circumference) comprising of CTG and additional fetal wellbeing Investigation at Consultants discretion if macrosomia (abdominal circumference greater than 90th centile) is suspected / anticipated. Individualised monitoring of fetal well-being should be offered to women at risk of intrauterine growth restriction (those with microvascular disease or nephropathy).
- Retinal assessment should then be performed at 16 – 20 weeks if there is diabetic retinopathy but at 28 weeks if the first assessment is normal. Retinal assessment should be carried out by digital imaging with mydriaisis using tropicamide.
- HbA_{1C} to be measured every 4 weeks
- Albumin/Creatinine ratio, U & E's to be checked once in each trimester. Consider referral to a nephrologist if serum creatinine is 120 µmol/l or total protein exceeds 2g/day. Do not offer eGFR during pregnancy.
- Anti –D to be administered at 28 - 32 weeks in all rhesus negative women
- **Induction of labour or caesarean section should be offered at 37 - 38 weeks.** If elective Caesarean section is planned, admission for antenatal corticosteroids should be arranged prior to the operation.
- Breast feeding should be encouraged in women with diabetes.

6.4 Antenatal Management of Pre-existing Diabetes (type 1 and type 2) in Pregnancy



6.5 Intrapartum care - Management of Diabetic Women on Insulin or Metformin

Induction of Labour

- A clear individualised plan of obstetric and diabetic intrapartum care and instructions for care immediately following delivery should be documented in the case notes
- When the decision is made the patient will be admitted to the ward according to induction of labour guideline
- Capillary glucose levels will be monitored as per patients normal regime.
- On admission the obstetric / midwifery staff will perform a vaginal examination to assess the cervix and follow Guideline for the Induction of Labour
- Woman to have normal insulin and diet (can have breakfast with usual insulin/metformin). Unless early morning ARM or instructions by Consultant.
- Once transferred for ARM these patients will be required to be **nil by mouth** and a Glucose/Sodium Chloride/ Potassium Variable rate Insulin infusion will commence.
- The care pathway for "Spontaneous Labour" needs to be followed at this point.
- Women who are to have their labour induced should **not be admitted to hospital for this procedure at weekends** unless they develop problems with their pregnancy.
- Infusions of insulin and glucose are usually required but alternative management may be planned according to the patient's need.
- Individual plans of care and treatment recorded in the patient's notes must be adhered to.

The aim of the pathway is:

To achieve and maintain normal blood glucose levels during induction, labour, delivery and in the immediate post-natal period.
The target plasma glucose level will be 4 - 7mmols per litre.

- The patient's diet and short acting subcutaneous insulin should be omitted. **Continue with long acting subcutaneous insulin unless the Diabetologist has indicated** otherwise in the patients' treatment plan.
- It is the Obstetric SHO responsibility to prescribe a Glucose and Insulin infusion.

  It must be double checked, as instructed by Diabetologist.
- The infusions are separate but the syringe driver can be connected to the main line via a Y connector or tap.
- Blood glucose monitoring will take place hourly. The rate of the insulin infusion will be altered according to the sliding scale

- All urine output needs to be measured and tested for the presence of ketones and any positive findings must be reported to the medical staff. Blood to be tested for ketones as well if taken.

- Urea and Electrolytes need to be repeated at four hourly intervals inform medical staff of any concerns (in particular potassium levels).

- The above care is to continue until after the delivery of the baby.

The care pathway following delivery for the mother and baby should then be adhered to.

Glucose/ Sodium Chloride / Potassium / IV Insulin variable rate (old GKI sliding scale)

- **Ensure Trust diabetic prescription charts are used.**
- Capillary blood glucose must be checked hourly.

50 units of actrapid in 50mls of 0.9% Sodium Chloride in a separate syringe driver.
Given via the same cannula with non-returnable valve

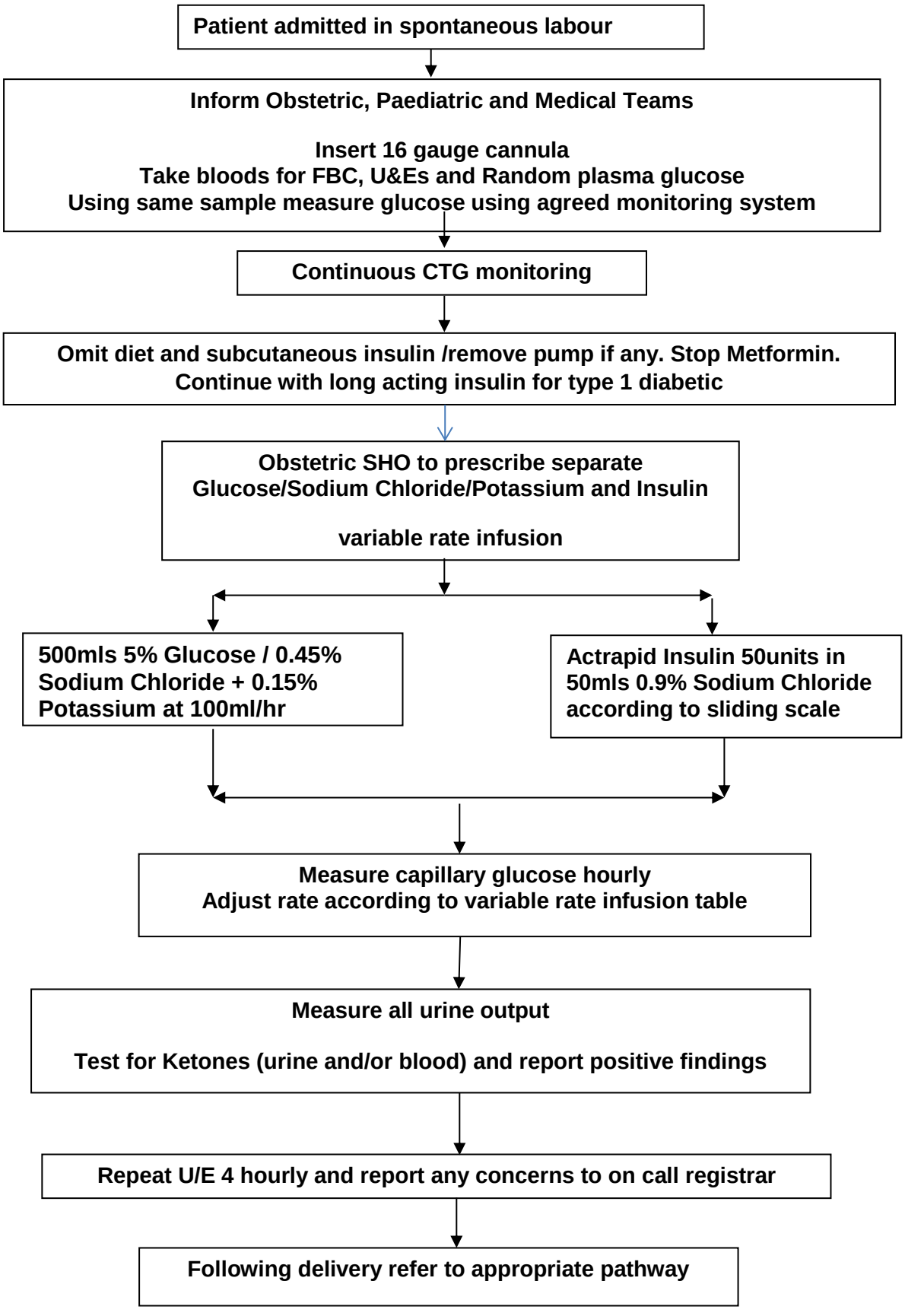
and

500mls of 5% Glucose / 0.45% Sodium Chloride with 0.15% (10mmols) of Potassium (at a rate of 100ml/hr)

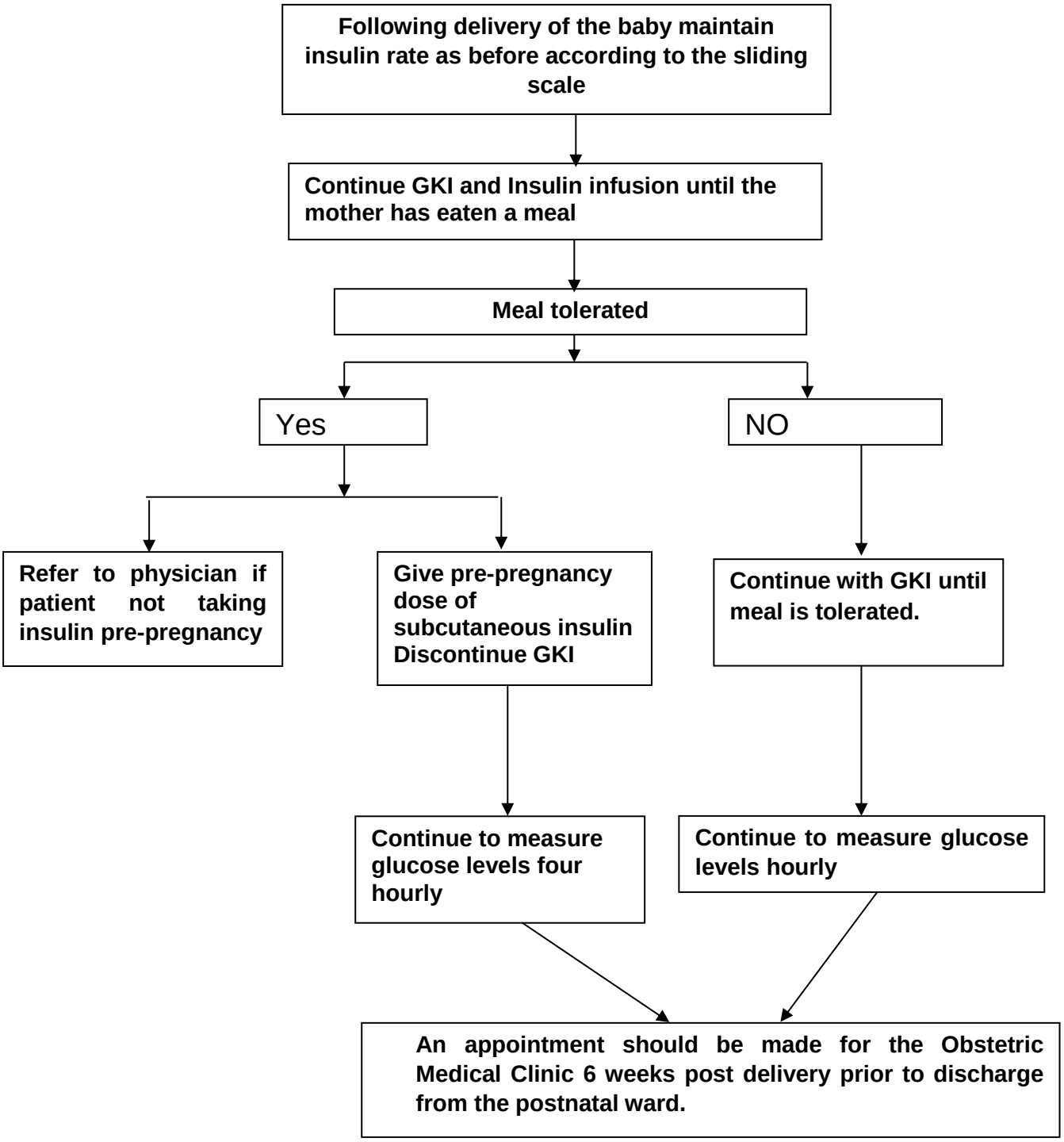
Blood Glucose Level	Rate Units /hour
0 - 5	0 **
5.1 - 8	1
8.1 -12	2
12.1-16	4
16.1- 20	6
20.1- 24	8
Greater than24	8 and contact doctor

** In type 1 patients if capillary blood glucose 4.1 - 5 mmol/l then give 0.5 units per hour

6.6 Management of Insulin or Metformin Treated Diabetic Women in spontaneous labour



6.7 POST NATAL MANAGEMENT of Women with pre-existing diabetes



7.0 Screening for Type 2 Diabetes and Gestational diabetes

Screening for type 2 diabetes

Require GTT at booking

- BMI 40 or over
- Impaired glucose tolerance/gestational diabetes in previous pregnancy
- Women of Asian and afro-Caribbean descent

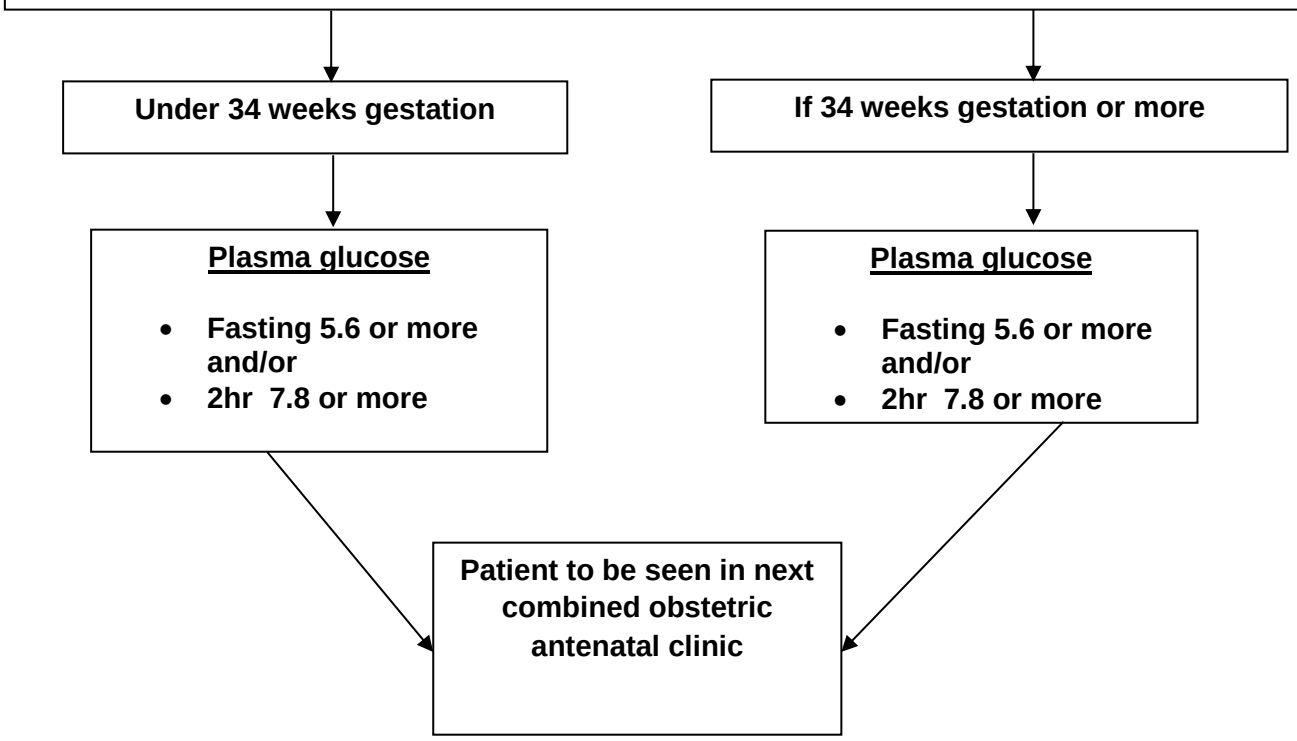
Screening for gestational diabetes

Require GTT at 24 – 28 weeks

- BMI 40 or over
- Impaired glucose tolerance/gestational diabetes in previous pregnancy
- Women of Asian and afro-Caribbean descent

} Also at booking in these women as above

- BMI 30 or over
- First degree relative with diabetes
- Previous baby weighing more than 4.5kg
- Previous unexplained stillbirth
- Confirmed polyhydramnios
- Polycystic ovary syndrome
- **Glycosuria + or more on 2 occasions or ++ on 1 occasion (morning urine) – consider GTT**



Presence of glycosuria in women who have had a negative OGTT at 26-28 weeks

Women who have already had a negative OGTT at 26-28 weeks due to risk factors identified at booking who present with glycosuria (1+ on two occasions and 2+ on one occasion) with no other concerns with growth or AFI do not require an additional OGTT.

Women with a negative OGTT at 26-28 weeks due to risk factors identified at booking who present with glycosuria (1+ on two occasions and 2+ on one occasion) with some concerns with growth or AFI should receive a further OGTT and referral to Obstetric/Medical Antenatal Clinic if required.

7.1Antenatal Management - Pregnant Women requiring Insulin as Out-patients

(including Gestational Diabetes)

Patient referred by GP or Hospital Doctor

↓

Appointment sent to patient

↓

Insulin requirements prescribed by Diabetic team

↓

Patient meets with Diabetes Nurse Specialist and the Midwife in clinic to negotiate appropriate time and place to commence insulin.

↓

Diabetes Nurse Specialist to: - demonstrate pen device and insulin therapy.
- provide appropriate information / Education pack
- teach about Blood Glucose Monitoring

↓

Patient to be seen by Dietician in clinic

↓

Diabetes Team to inform GP of change of treatment

↓

Diabetes Nurse Specialist to: - Provide patient with contact numbers
Arrange ongoing contact until patient competent with treatment.

Education will cover the information about basic Diabetes and Diet

- What is Diabetes and how it affects pregnancy
- Healthy Diet
- Treatment
- Timing of medication / how medication works / Hypoglycaemia
- Injections / Injection sites
- The importance of good control throughout pregnancy

The Midwife/DSN will provide the following:

- The information, education pack and Pregnancy and Diabetes. Diabetes UK
- Information about Insulin therapy
- Demonstrate how to use the blood glucose monitoring equipment
- Demonstrate the appropriate pen device
- Ongoing advice about Diabetes, dietary requirements and treatment during the hospital stay
- Encourage and support the patient when giving the first injection.

7.2 Newly Diagnosed - In-Patient Care

The Midwife will start the patient education as soon as diagnosis has been made. All the appropriate equipment will be ordered from Pharmacy at this point.

Refer to next available obstetric diabetes clinic Tuesday AM DMH
Tuesday PM UHND

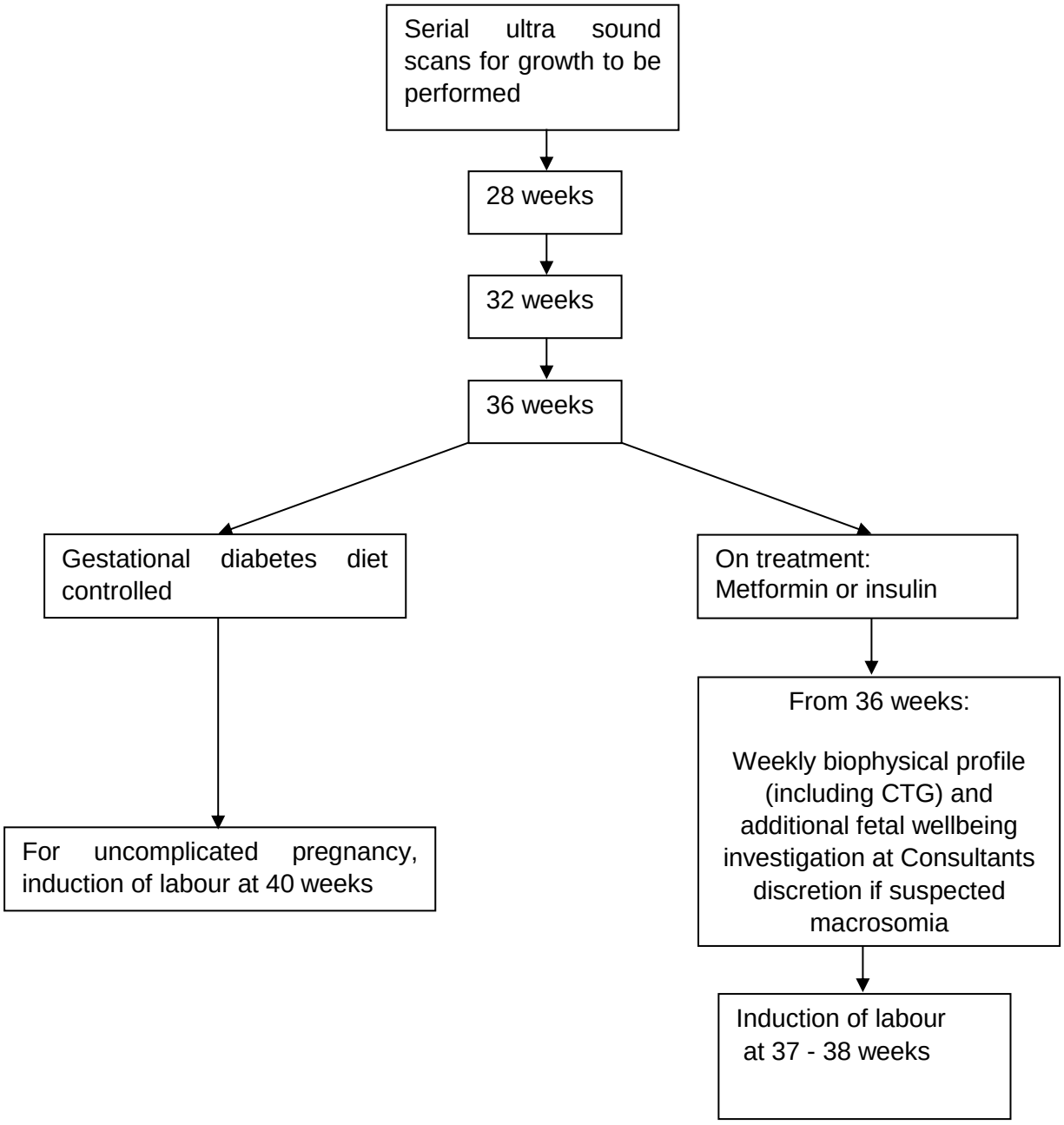
Contact DSN

7.3 Newly Diagnosed Gestational Diabetes - Out-Patient Care (Flowchart)

The patient will be referred to the Diabetes Nurse Specialist within one week via the Combined Obstetric Diabetes Clinic, dependent on the Glucose Tolerance Test result

- The Diabetes Nurse Specialist/Midwife with special interest will see the patient in the clinic and provide the follow:
    - demonstrate how to use the plasma glucose monitoring equipment
    - advise the patient on the frequency of the monitoring
    - to discuss the importance of good control throughout pregnancy and give specific information
- A Dietician will see the patient in the clinic. (see Dietetic pathway)
- The Diabetologist and Obstetrician with special interest will plan the rest of the antenatal care.
- Offer advice about diet and exercise
- Offer a trial of changes in diet and exercise to women with gestational diabetes who have a fasting plasma glucose level below 7mmol/l at diagnosis.
- Offer metformin if blood glucose targets are not met using changes in diet and exercise within 1-2 weeks
- Offer insulin instead of metformin if this is contraindicated or unacceptable to the woman. Or if targets not met with addition of metformin
- Offer immediate treatment with insulin, as well as changes in diet and exercise, to women with gestational diabetes, who have a fasting plasma glucose level of 7.0mmol/l or above at diagnosis

7.4 - Schedule of Care - GESTATIONAL DIABETES



7.5 INTRAPARTUM CARE -Diet Controlled Gestational Diabetes

During labour optimum blood glucose levels will be 4 – 7 mmol/l

Monitor glucose levels

↓

If glucose levels above 10 mmol/l repeat hourly and start variable rate infusion if persistently above 10mmol/l for 3 hours and inform on call obstetric team.

Follow spontaneous labour guideline for insulin treated women

↓

Pre meal glucose levels to be monitored 4 hourly for 24 hours post delivery.

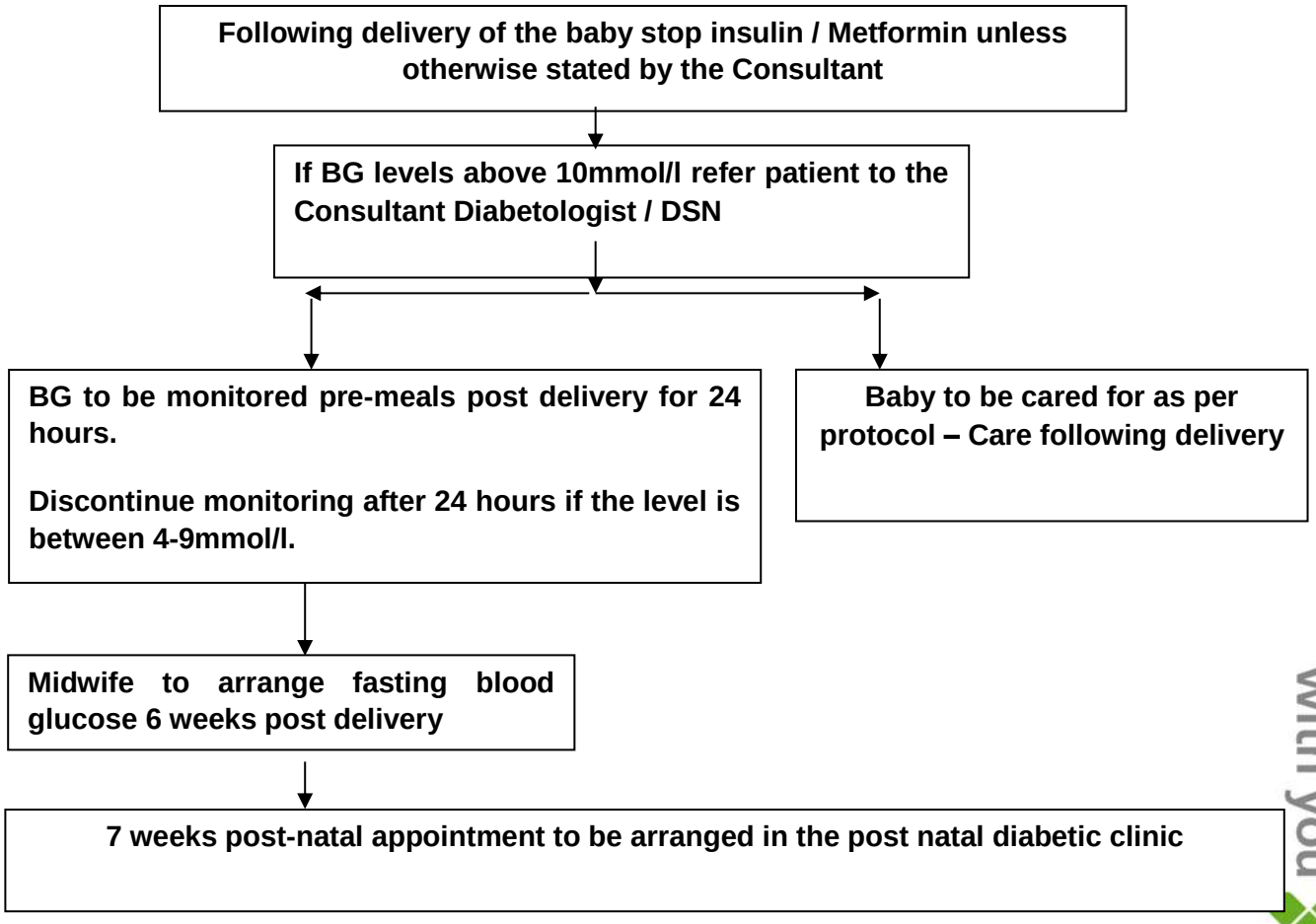
Discontinue monitoring after 24 hours if the level is between 4 - 9mmol/l

Follow care pathway for baby

Inform diabetic team / DSN for review and to arrange follow up

7.6 Post Natal Management of Women with Gestational Diabetes

- These patients should not have insulin prescribed unless it is documented in the medical notes. All staff should check the notes to ascertain if this is required..
- Following delivery the baby's care should follow that of the care pathway "Care following delivery for the baby"
- The mother's blood glucose levels should be monitored pre-meals following delivery for 24 hours. If the levels remain between 4 - 9 mmols per litre then monitoring can be discontinued after 24 hours.
- It is the responsibility of the Midwife to arrange a:
    - Offer fasting plasma glucose test in the antenatal Clinic at six weeks post delivery. NOT GTT
    - A seven-week post natal appointment in the Combined Obstetrical Medical Clinic prior to discharge from hospital.



8.0 Corticosteroid administration to promote fetal lung maturity
(for all insulin treated pregnant women)

Aim: To prevent severe maternal hyperglycaemia and possible ketoacidosis

- In diabetic women steroids are recommended if vaginal delivery is likely to be before 38 weeks gestation. If delivery is by planned CS steroids should be administered up to 39 weeks.
- Steroids are given in the form of Betamethasone / Dexamethasone 12mg intramuscularly (2 doses 24 hours apart).
- Ensure individualised management plan is developed for each woman.
- Even if the woman is eating and drinking normally will need to have a glucose/sodium chloride/potassium infusion if variable rate insulin infusion is required.
- Twice daily U&E whilst on variable rate insulin infusion

Protocol for administration of antenatal steroids

- Admit to Antenatal ward before 12.00 if possible
- Inform diabetes team of admission
- Administer first dose of steroids
- Blood glucose estimation by glucose meter pre and post prandial (breakfast, lunch and dinner) and bedtime until 24 hours after 2nd dose of steroids
- Twice daily U&E whilst on variable rate insulin infusion

- **For patients on diet or metformin** An individualised plan will be in the notes. Continue Metformin if taking already. All patients should have blood glucose monitored pre and post prandial (breakfast, lunch and dinner) and bedtime and urinary ketones measured at each void. If glucose rises above 10mmol/L blood glucose should be retested after 1 hour and if remains above 10mmol/L start variable rate intravenous insulin and seek medical advice. Check blood ketones .

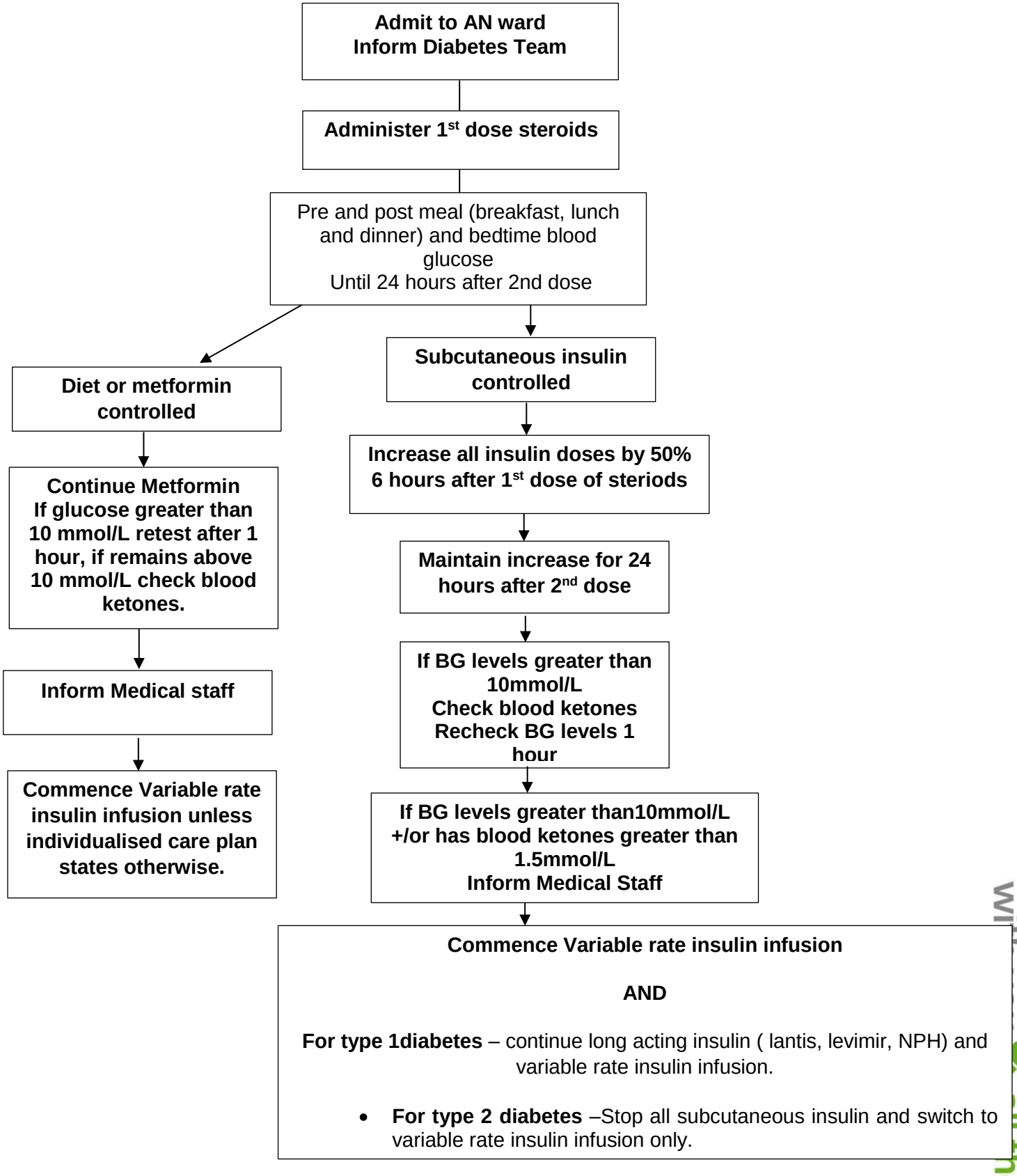
- **For patients on subcutaneous insulin** increase all insulin doses by 50% 6 hours after the first dose of steroids
- Maintain this increase until 24 hours after the second dose of steroids.
- If BG levels are greater than 10mmol/L, retest after 1 hour and if remains above 10mmol/L check for blood ketones and commence IV variable rate insulin. (see Intravenous insulin management).
  AND
  For type 1diabetes – continue long acting insulin (lantis, levimir, NPH) and variable rate insulin infusion.
  For type 2 diabetes –Stop all subcutaneous insulin and switch to variable rate insulin infusion only.

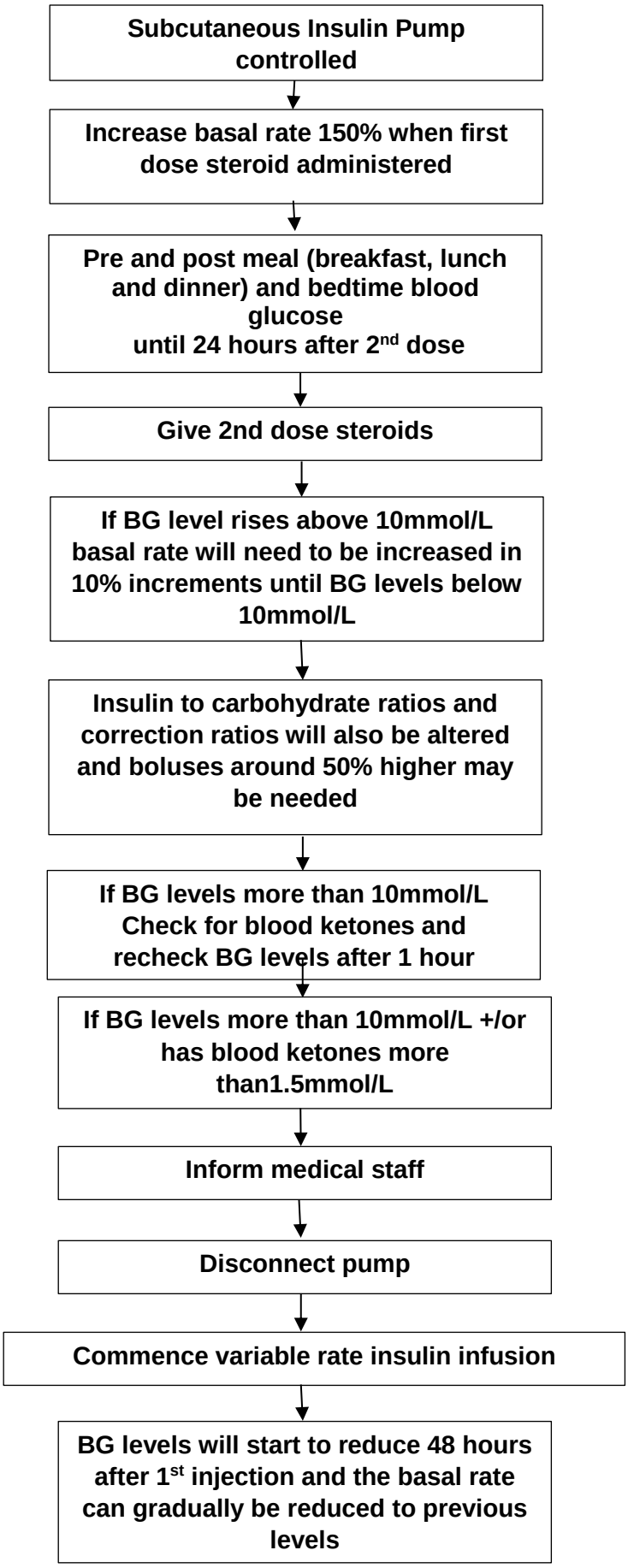
- **Subcutaneous insulin pump –**. When first dose is administrated, the basal rate should be increased to 150%, by using the temporary basal rate. When the second injection of steroid is given, if the blood glucose level rises above 10 mmol/L, the basal rate will need to be further increased, in further 10% increments until blood glucose levels are under control (below 10mmol/L)
- Insulin to carbohydrate ratios and corrections ratios will also be altered, and boluses around 50% higher than usual are likely to be needed.
- If BG levels are greater than 10mmol/L, check for blood ketones.

- If BG levels remain greater than 10mmol/L and/or the patient has blood ketones greater than 1.5mmol/L, **commence IV variable rate insulin and disconnect the pump (see Intravenous insulin management).**
- BG levels will start to reduce 48 hrs after first injection and the basal rate can gradually be reduced to its previous levels.

See flow chart for management

8.1Flow chart for use of Steroids





9.0 Elective Lower segment Caesarean section

- When the decision is made a plan of care to be written in the patients notes regarding timing of admission to the ward/ labour ward.
- Omit all medications on day of surgery.
- Elective LSCS on diabetic patients must be planned for 9am and must not be arranged for weekends unless the indication for delivery is urgent.
- Start the variable rate infusion on admission. The care pathway must be followed at this point.

10.0 Insulin Pump Guidelines during Pregnancy, Labour and Post Delivery

10.1ANTENATAL

- Each individual patient's diabetic management to be discussed with the diabetic team
- As pregnancy progresses, insulin needs will increase incrementally, particularly towards the end of the second trimester and into the third and needs regular review of both basal and bolus rates.
- Infusion set can still be sited in the abdomen, although as the pregnancy progresses the cannula or needle might need to be sited more laterally. Alternative sites such as the buttocks and thighs can be used.
- Infusion set should be changed at least every 48hrs.
- Access to a spare pump should be considered in cases of pump failure.

Blood glucose monitoring and testing

- Blood glucose levels need to checked at least 8 times day including testing in the middle of the night to ensure that the night time basal rate is correct. Blood glucose testing to be performed pre-meal and two hours postprandial.
- Test for ketones is recommended when blood glucose around 10 mmol/L or higher, as ketones are likely to appear at lower level in pregnancy

Preparation for labour

- Any time after 30 weeks gestation, a plan should be put in place and written in the medical notes of how labour should be managed.
- After delivery of the baby use pre-pregnancy basal rate.
- Alternative plan for variable rate infusion should be documented in case there is any reason why pump therapy cannot be used in labour.

10.2 LABOUR

1. **Pump Management during Labour**
    - Self-management of the pump can be continued during labour, however if the patient is not able to manage herself it should be discontinued and commenced on the variable rate infusion
    - Hourly blood glucose monitoring.
    - As soon membrane ruptured start 10 % reduction of basal rate through temporary basal.
    - During Labour start 70-80% reduction of basal rate.
    - Switch to pre-pregnancy basal rate when the baby is delivered.

2. **Pump Management - Caesarean section:**
    - Insulin pump can be used during spinal or Epidural anaesthesia.
    - In situation of using General anaesthesia variable rate infusion should be used instead of insulin pump and the pump can be reconnected after recovery from operation.
    - After delivery the pump should be switched to the pre-pregnancy basal rate.

N. B The pump can be discontinued

- Because of personal preference.
- If women are finding it too much to cope with and cannot concentrate on making the decisions they need to about managing the pump as well as dealing with the labour.

- If blood glucose targets of 4-7 mmol/L are not being achieved.
- If more than a trace of ketones is present in the blood.
- If the pump is discontinued during labour, an IV infusion of variable rate insulin should be used.

10.3 Post Delivery

- All patients on pump should continue/recommence pump as soon as possible and programmed pre-pregnancy basal rate.
- Monitor blood glucose 4-6 times daily.
- **An appointment should be made for the Obstetric Diabetes Clinic 6 weeks post-delivery prior to discharge from the postnatal ward.**

11.0 NEONATAL CARE – all Babies – refer to Care of babies at Risk of Hypoglycaemia for plan of care.

Care of infants of mothers with either pre-existing diabetes or gestational diabetes

Aims

1. To enable the midwife to care for the baby of a Diabetic Mother on the post-natal ward whilst monitoring feeding and blood glucose levels closely.
2. To avoid unnecessary separation of mother and baby.
3. To ensure early and frequent feeds - to prevent hypoglycaemia
4. To monitor blood glucose levels.
5. To promote breastfeeding.
6. To prevent admission to the Special Care Baby Unit.

- On delivery of the baby the Midwife will inform the Neo-natal Unit

- Babies of Diabetic mothers should stay with the mother unless extra neonatal care is required.

- Babies should not be discharged into the community until they are at least 24 hours old, maintaining their blood glucose levels and feeding well.

- Babies should be fed as early as possible, within 30 minutes of birth, and then at frequent intervals 2-3 hours, until pre-feeding blood glucose levels are maintained at 2.6 mmol/litre or more.

- Blood glucose levels should be taken 3-4 hours after birth (usually taken pre 2nd feed) using a quality-assured method (Haemacue) or laboratory analysis.
- Blood glucose levels should be checked if the baby has signs of hypoglycaemia.

- Follow Guidelines for Care of babies at risk of Hypoglycaemia
- Blood tests should be taken for polycythaemia (FBC), hyperbilirubinaemia (SBR), hypocalcaemia (calcium levels) and hypomagnesaemia (magnesium levels) if the baby has any clinical signs.

Reasons for admission to the neonatal unit

- Is hypoglycaemic with abnormal signs
- Has respiratory distress

- Has signs of cardiac decompensation, neonatal encephalopathy or polycythaemia
- Needs intravenous fluids
- Needs tube feeding (unless adequate support is available on the postnatal ward).
- Is born before 36 weeks

12 Monitoring

7.1 Compliance and Effectiveness Monitoring

Compliance with this policy will be monitored as outlined in the table below.

7.2 Compliance and Effectiveness Monitoring Table

Monitoring Criterion	Response
Who will perform the monitoring?	Maternity Services
What are you monitoring?	a. Documented evidence of the involvement of the multidisciplinary team including the obstetrician, midwife, diabetes physician, diabetes specialist nurse and dietician in the provision of care when appropriate b. Documented evidence of an individual management plan in the health records that covers the pregnancy and postnatal period up to six weeks c. Documented evidence advising women with type 1 diabetes of the risks of hypoglycaemia and hypoglycaemia unawareness in pregnancy
When will the monitoring be performed	Annually
How are you going to monitor?	Audit of maternity hand held record/intrapartum care pathway
What will happen if any shortfalls are identified?	Action plan will be agreed against areas of poor practice
Where will the results of the monitoring are reported?	Quarterly Clinical Risk Audit Meeting
How will the resulting action plan be progressed and monitored?	Obs & Gynae Operational Group – re audit agreed as necessary
How will learning take place?	Mandatory study days, team meetings,

13 Associated Documentation

Confidential Enquiry into Maternal and Child Health. (2007). *Diabetes in Pregnancy: Are we providing the best care? Findings of a national enquiry. England, Wales and Northern Ireland*. London: CEMACH. Available at: www.cmace.org.uk

Department of Health. (2001). *National Service Framework for Diabetes: Standards*. London: COI. Available at: www.dh.gov.uk

Healthcare Commission. (2008). *Towards better births: A review of maternity services in England*. London: Commission for Healthcare Audit and Inspection. Available at: www.cqc.org.uk

National Institute for Health and Clinical Excellence. (2008). *Diabetes in pregnancy: Management of diabetes and its complications from pre-conception to the postnatal period*. London: NICE. Available at: www.nice.org.uk

National Institute for Health and Clinical Excellence. (2015). *Diabetes in pregnancy: Management of diabetes and its complications from pre-conception to the postnatal period*. London: NICE. Available at: www.nice.org.uk

Nursing and Midwifery Council (2008) *The code: Standards of conduct, performance and ethics for nurses and midwives*. London: NMC. Available at: www.nmc-uk.org

Nursing and Midwifery Council. (2009). *Record Keeping: Guidance for nurses and midwives*. London: NMC. Available at: www.nmc-uk.org

Royal College of Obstetricians and Gynaecologists, Royal College of Anaesthetists, Royal College of Midwives, Royal College of Paediatrics and Child Health. (2008). *Standards for Maternity Care: Report of a Working Party*. London: RCOG Press. Available at: www.rcog.org.uk

Associated Documentation

This Policy refers to the following CDDFT Trust policies and procedures:

- Management of diabetic ketoacidosis
- Induction of Labour Guideline
- Management of babies at risk of hypoglycaemia

This policy refers to the following guidance, including national and international standards:

- NICE Guidance: Diabetes in pregnancy: Feb 2015
- CDDFT Policy for the Development and Management of Policy and Guidance
- Nursing & Midwifery Council (2007) Midwives Rules & Standards. rule 9
- Trust Diabetic Prescription chart.

14 Appendices

Equality Impact Assessment

Appendix 1

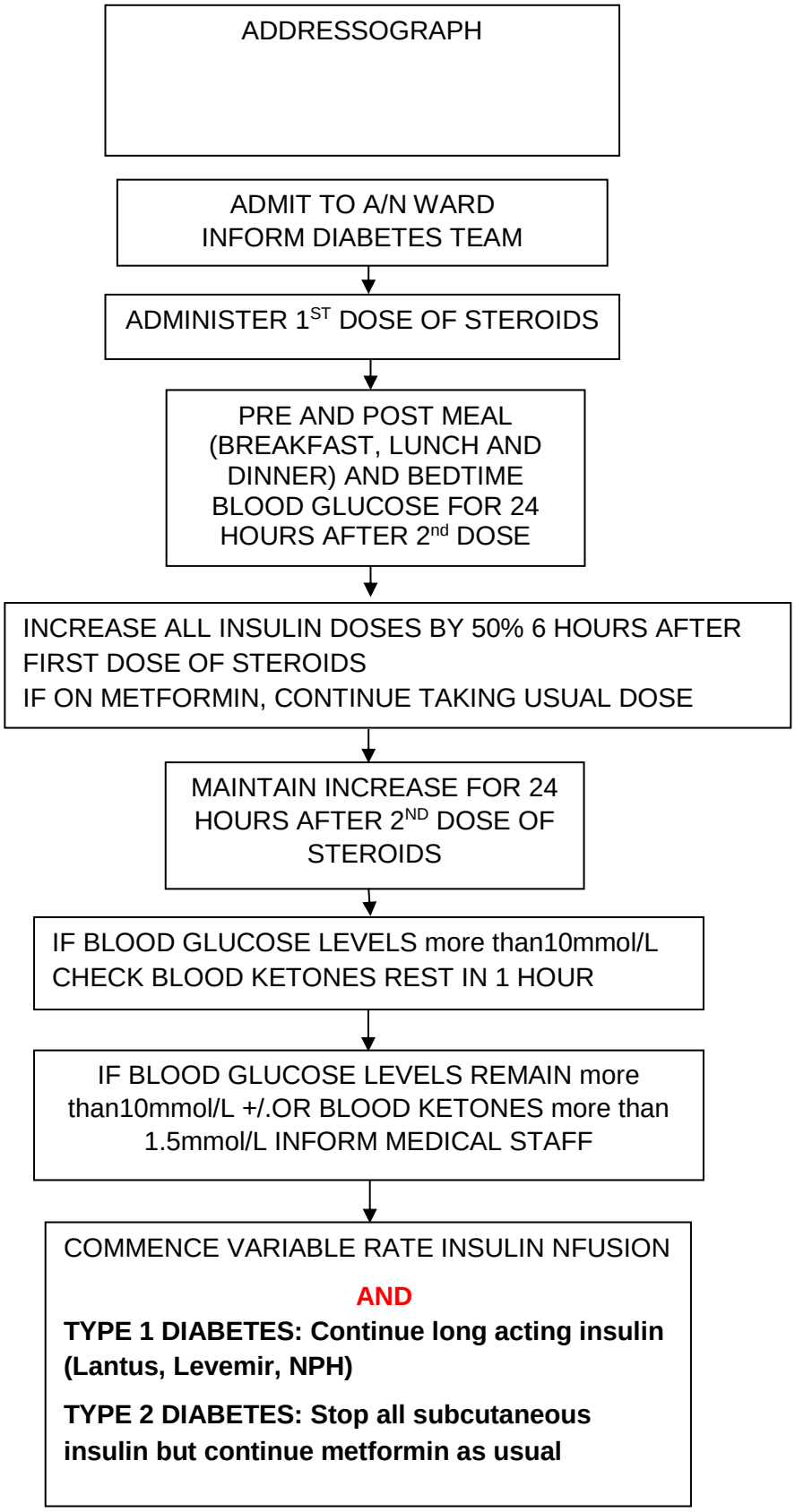
NICE SCHEDULE of CARE

Specific antenatal care for women with diabetes Appointment	Care for women with diabetes during pregnancy
First appointment (joint diabetes and antenatal clinic) - ideally by 10 weeks	Offer information, education and advice in relation to optimising glycaemic control. Take a clinical history to establish the extent of diabetes-related complications. Review medications for diabetes and its complications. Offer retinal and/or renal assessment if these have not been undertaken in the previous 3 months. Measure HbA1c levels for women with pre-exisiting diabetes to determine the level of risk for the pregnancy. Offer self monitoring of blood glucose or a GTT as soon as possible for women with a history of gestational diabetes who book in the first trimester.
7–9 weeks	Confirm viability of pregnancy and gestational age.
Booking appointment (ideally by 10 weeks)	Discuss information, education and advice about how diabetes will affect the pregnancy, birth and early parenting (such as breastfeeding and initial care of the baby).
12 weeks	confirm viability, dating and to exclude anencephaly
16 weeks	Offer retinal assessment at 16–20 weeks to women with pre-existing diabetes who showed signs of diabetic retinopathy at the first antenatal appointment. Detailed scan of spine and head contents at 16 weeks
20 weeks	Offer four-chamber view of the fetal heart and outflow tracts plus scans that would be offered at 18–20 weeks as part of routine antenatal care.
28 weeks	Offer ultrasound monitoring of fetal growth and amniotic fluid volume. Offer retinal assessment to all women

	with pre-existing diabetes.
32 weeks	Offer ultrasound monitoring of fetal growth and amniotic fluid volume. Offer to nulliparous women all investigations that would be offered at 31 weeks as part of routine antenatal care.
36 weeks	Offer ultrasound monitoring of fetal growth and amniotic fluid volume. Offer information and advice about: • timing, mode and management of birth • analgesia and anaesthesia • changes to hypoglycaemic therapy during and after birth • management of the baby after birth • initiation of breastfeeding and the effect of breastfeeding on glycaemic control • contraception and follow-up.
37 - 38 weeks	Offer induction of labour, or caesarean section if indicated to women with type 1, 2 and gestational diabetes on treatment.
38 weeks	Ensure fetal wellbeing
39 weeks	Advise women with uncomplicated gestational diabetes to give birth no later than 40+6 weeks

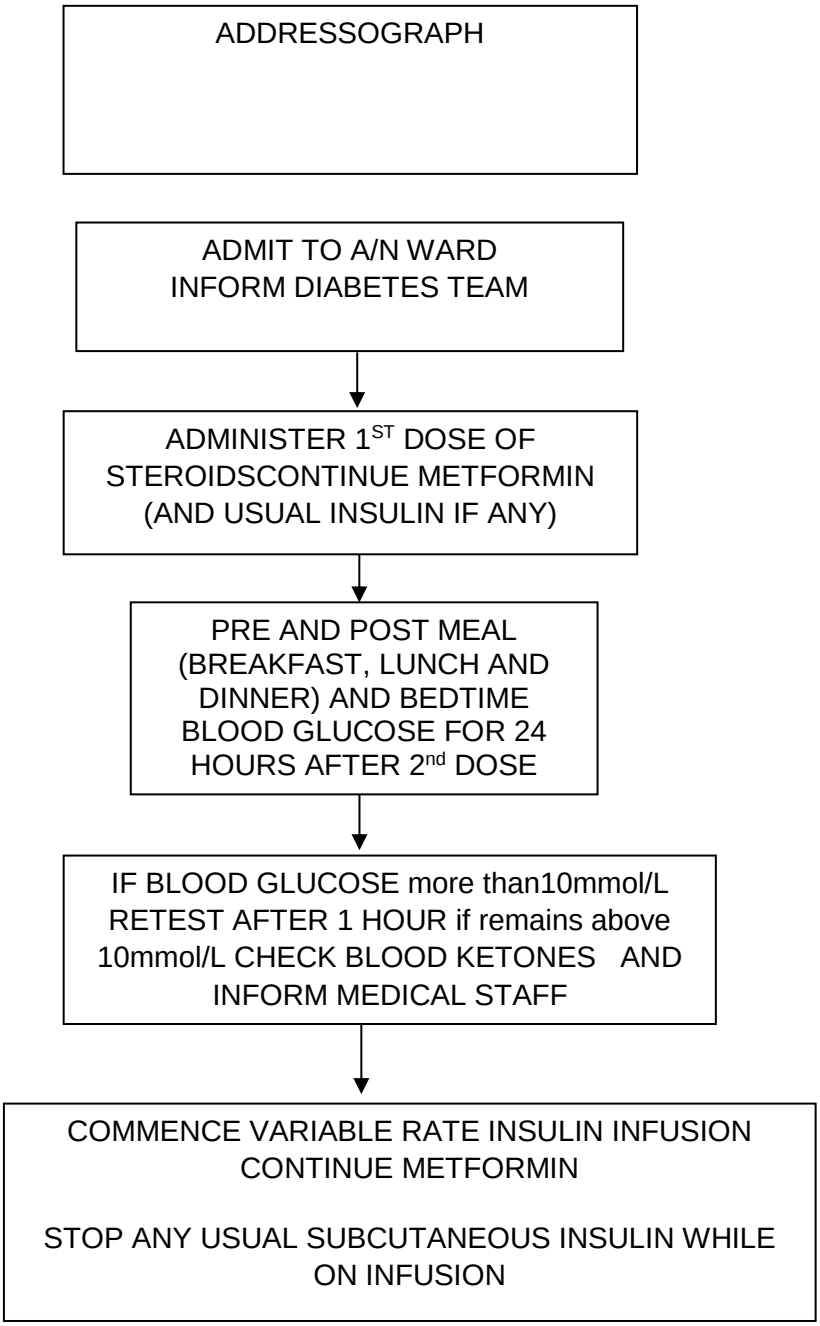
INDIVIDUAL CARE PLAN FOR STEROID ADMINISTRATION

PATIENTS WITH TYPE 1 OR TYPE 2 DIABETES – ON SUBCUTANEOUS INSULIN (+/- METFORMIN)



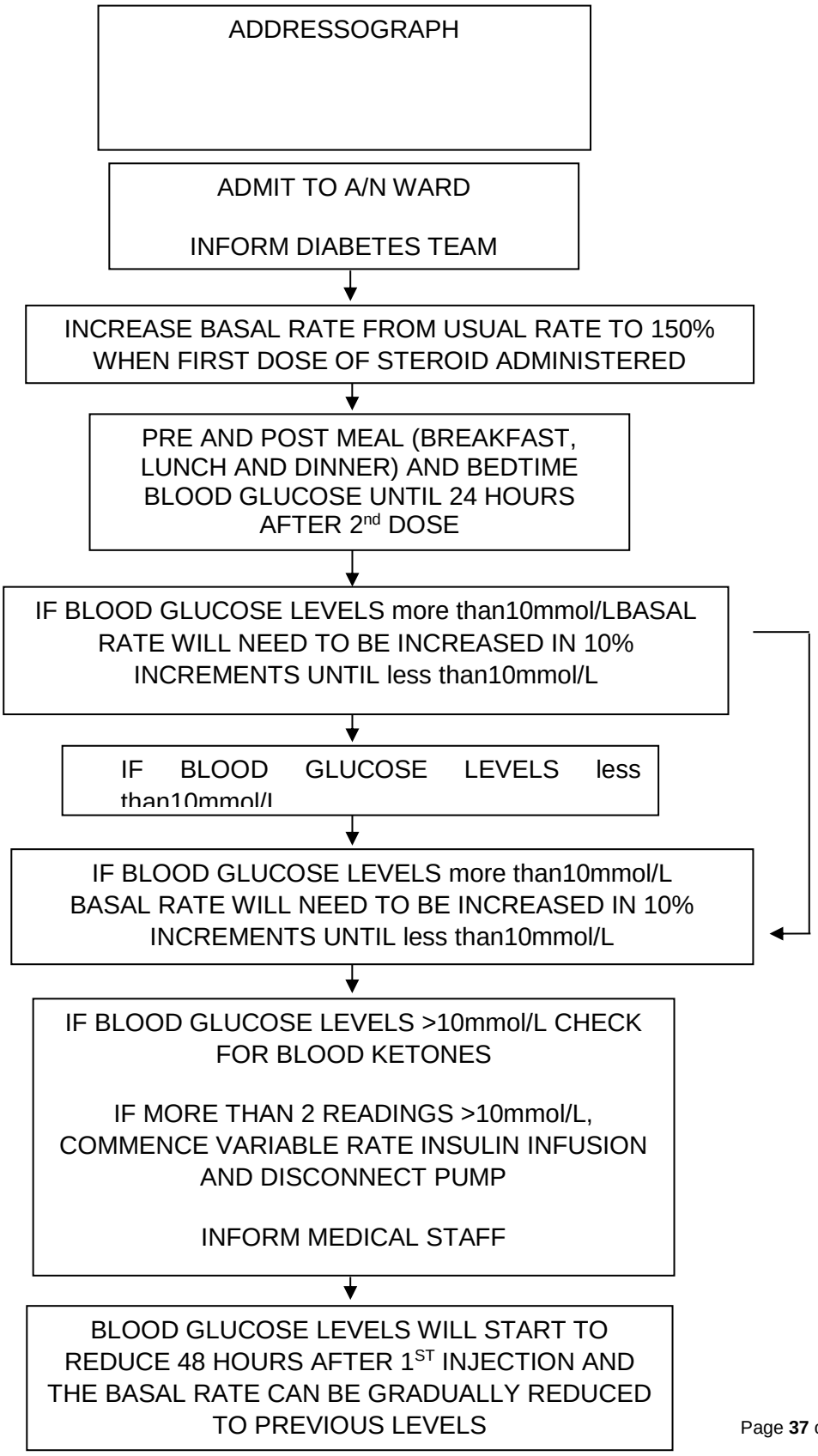
INDIVIDUAL CARE PLAN FOR STEROID ADMINISTRATION

GESTATIONAL DIABETES ON METFORMIN/INSULIN OR DIET CONTROLLED



NDIVIDUAL CARE PLAN FOR STEROID ADMINISTRATION

TYPE 1 DIABETES PATIENTS ON SUBCUTANEOUS INSULIN PUMP



Equality Analysis - Diabetes.docx