PRE- EXISTING DIABETES GUIDELINE

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CHANGE RECORD			
Date	**Author**	**Nature of Change**	**Reference**
August 12	Linda Wilkinson Medical Obstetric Team	Temple plate change and update	V10
November 12	Compliance Manager	Minor amendments to section 5	V11
May 2014	Obstetric Guidelines Group	Amendment to monitoring form – frequency of audit	V11.1

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PRE- EXISTING DIABETES GUIDELINE

1 INTRODUCTION

Diabetes is the most common pre existing medical disorder complicating pregnancy affecting 4 per 1000 pregnancies. It is associated with significant maternal morbidity and fetal morbidity and mortality. It should therefore be managed by a multidisciplinary team.

All pregnant woman with pre-existing diabetes are seen in the Medical Obstetric Team Clinic (MOT) which includes: Consultant Obstetricians, Diabetes Physicians, Diabetes Specialist Midwife/Nurse, Dietician and Midwives, at Hull and East Yorkshire Hospitals NHS Trust

2 PURPOSE

To provide evidenced guidance, for the multidisciplinary management and care of women with pre-existing diabetes to reduce the risks associated with pregnancy.

- Developing a timetable of antenatal care provision which can include a pre-conception review
- Developing individual documented management plans in pregnancy and the postnatal period up to six weeks
- Providing guidance when advising women of the risks of hypoglycaemia and hypoglycaemia unawareness in pregnancy
- Providing guidance for women who require antenatal steroids
- Providing guidance for women who experience diabetic ketoacidosis

3 SCOPE

This guideline applies to Obstetricians, Diabetes Physician, Diabetes Specialist Midwife/Nurse, Dietician and Midwives,

4 DUTIES

The following section details staff duties and responsibilities for the implementation of this guideline. The following list is a guide only and is not exhaustive:

4.1 Obstetricians

The MOT Obstetrician in liaison with the Diabetes Physician, Diabetes Specialist Midwife/Nurse and the Diabetes Specialist Dietician will develop an individual management plan in pregnancy and the postnatal period up to six weeks.

4.2 Diabetes Physician

To provide senior medical knowledge on pre-existing diabetes liaising with the Obstetrician, Diabetes Specialist Midwife/Nurse and the Diabetic Specialist Dietician to develop the individual management plan in pregnancy and the postnatal period up to six weeks.

4.3 Diabetes Specialist Midwife/Nurse

To be the coordinator of care ensuring women are supported with:

- A timetable of antenatal care provision
- A multidisciplinary management plan
- Diabetic treatments are prescribed and adjusted in line with this guidance

4.4 Diabetes Specialist Dietician

Will provide advice on diet and medication adjustment as part of the multidisciplinary team.

4.5 Midwives

Will be able to recognise any diabetic complications and be able to take appropriate action and escalate to the appropriate obstetric team member.

5 CONTENT

Preconceptual Care - Preconception counselling is available through the Medical Obstetric Team (MOT) clinic to all women with diabetes to initiate and provide appropriate care and information. GPs and Nurse practitioners can refer any woman with pre-existing diabetes to the medical obstetric team pre-conception clinic at the Women & Children's Hospital. Women can also self refer by contacting the Diabetic Specialist Midwife/Nurse.

5.1a Involvement of the multidisciplinary team including the obstetrician, midwife, diabetes physician, diabetes specialist nurses and dietician in the provision of care where appropriate.

A specific individualised management plan will be developed in the Medical Obstetric Team (MOT) clinic and recorded for all the women with diabetes including, pregnancy, and post pregnancy management. The MOT Clinics are held weekly, and comprise of the following: Consultant Obstetricians, Diabetes Physicians, Diabetes Specialist Midwife/Nurse, Dietician and Midwives,

At subsequent visits, the woman is seen by the most appropriate member of the above team according to her clinical need. The team communicates effectively via documentation in the Diabetic Pregnancy Record (Individual management plan) and the woman's hand held records to optimise the care provided.

5.2b Timetable of antenatal appointments

The timetable of antenatal appointments is contained at Appendix 3.

5.3c Requirement to document Individual Management Plan

The outcomes of each MOT Clinic visit will be documented in the Diabetic Pregnancy Record (Individual management plan) by the team. Each Individual management plan will vary according to the woman's clinical condition.

Antenatal

The antenatal care plan is followed according to the details contained in Appendix 3.

Postnatal – All women will have an individualised plan of care for the first 6 weeks of the postnatal period, including: Insulin /metformin adjustments, Infant feeding support will be arranged by the multidisciplinary team.

Type 1 Diabetes - Women with established type 1 diabetes
• Return immediately to their pre pregnancy insulin doses
• If the first full meal is tolerated (not a snack) recommence the pre pregnancy doses of subcuticular insulin and discontinue IV Insulin approximately 30mins after starting the meal (NB this is required as IV Insulin is metabolised in 10-15mins)
• For the administration of long acting insulin see individual care plan
• Monitor blood glucose 2 hourly for 12 hours. Contact diabetes team if the results are constantly over 9mmols/l (test blood for ketones if blood glucose over 13 mmols/l)
• Blood glucose may be monitored 4 hourly when stable and the woman is self caring

• Aim to maintain blood glucose levels between 4-9 mmols/l and avoid hypoglycaemia
Type 2 Diabetes (diet / oral / Insulin) the individual care plan will identify previous treatment
• Monitor blood glucose 2 hourly for 8 hours then pre meals and pre bedtime, If over 9mmols/l on 2 consecutive occasions inform medical staff.
• Aim to maintain blood glucose levels between 4-9 mmols/l and avoid hypoglycaemia

5.4d Targets for Glycaemic Control
Women will be supported by the multi disciplinary team to achieve glycaemic targets, by optimising the drug requirement and provision of education by the Dietician/Diabetes Specialist Nurse/Midwife. An individualised glycaemic target will be determined by the MOT each visit in line the NICE Diabetes in Pregnancy Guidance http://www.nice.org.uk/CG063 . The frequency of appointments will be arranged according to clinical need.

5.4e Advising of Risks of Hypoglycaemia and Hypoglycaemia unawareness in pregnancy
Women with type 1 diabetes will be advised of the risk of hypoglycaemia and hypoglycaemia unawareness by the MDT during their first assessment in the MOT clinic. Further advice will be provided by the MDT during any subsequent visits if issues or concerns are raised by the woman. This will be documented in the Diabetic Pregnancy Record.

5.5f Offering antenatal fetal cardiac ultrasound at 20 weeks
This investigation is offered to all women with pre-existing diabetes between 18-22 weeks along with the anatomy scan. Refer to Appendix 3 for further details.

5.6g Women who are suspected of having diabetic ketoacidosis are admitted immediately to a high dependency unit where they can receive both medical and obstetric care
In suspected cases of DKA.Refer to Appendix 4 for the management process.

After confirmation of diagnosis in Women's and Children's Hospital the woman will be immediately admitted to a high dependency unit where they will receive both medical and obstetric care. The attending Obstetric Registrar or Consultant will liaise with the on-call Medical Registrar, the Outreach team and consult with the on-call Consultant Endocrinologist regarding the management of the woman.

If the woman is located elsewhere in the hospital, other than the Women and Children's Hospital (e.g. AAU), the on-call Medical Registrar & Outreach Team will be immediately contacted via on-call bleep (through Switchboard) for immediate assessment and management. The on-call Consultant Endocrinologist must be informed by the Medical Registrar.

The Labour Ward Co-ordinator and/or On-call Obstetric Registrar/Consultant will be contacted by the Medical Registrar.

6 PROCESS FOR MONITORING COMPLIANCE
The process for monitoring compliance with this guideline is detailed in Appendix 1.

7 REFERENCES

- 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.cemach.org.uk ;
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8 APPENDICES

- Appendix 1 - Monitoring Overview template
- Appendix 2 - Care of Diabetic Women Receiving Antenatal Corticosteroids & Ready Reckoner
- Appendix 3 - Antenatal appointment schedule
- Appendix 4 - Management of symptomatic pregnant women with diabetes
- Appendix 5 - Pregnancy Diabetic Ketoacidosis Care Pathway & Diabetic Ketoacidosis
- Appendix 6 - Elective Admission for induction of Labour or LSCS
- Appendix 7- Blood glucose monitoring chart

APPENDIX 1

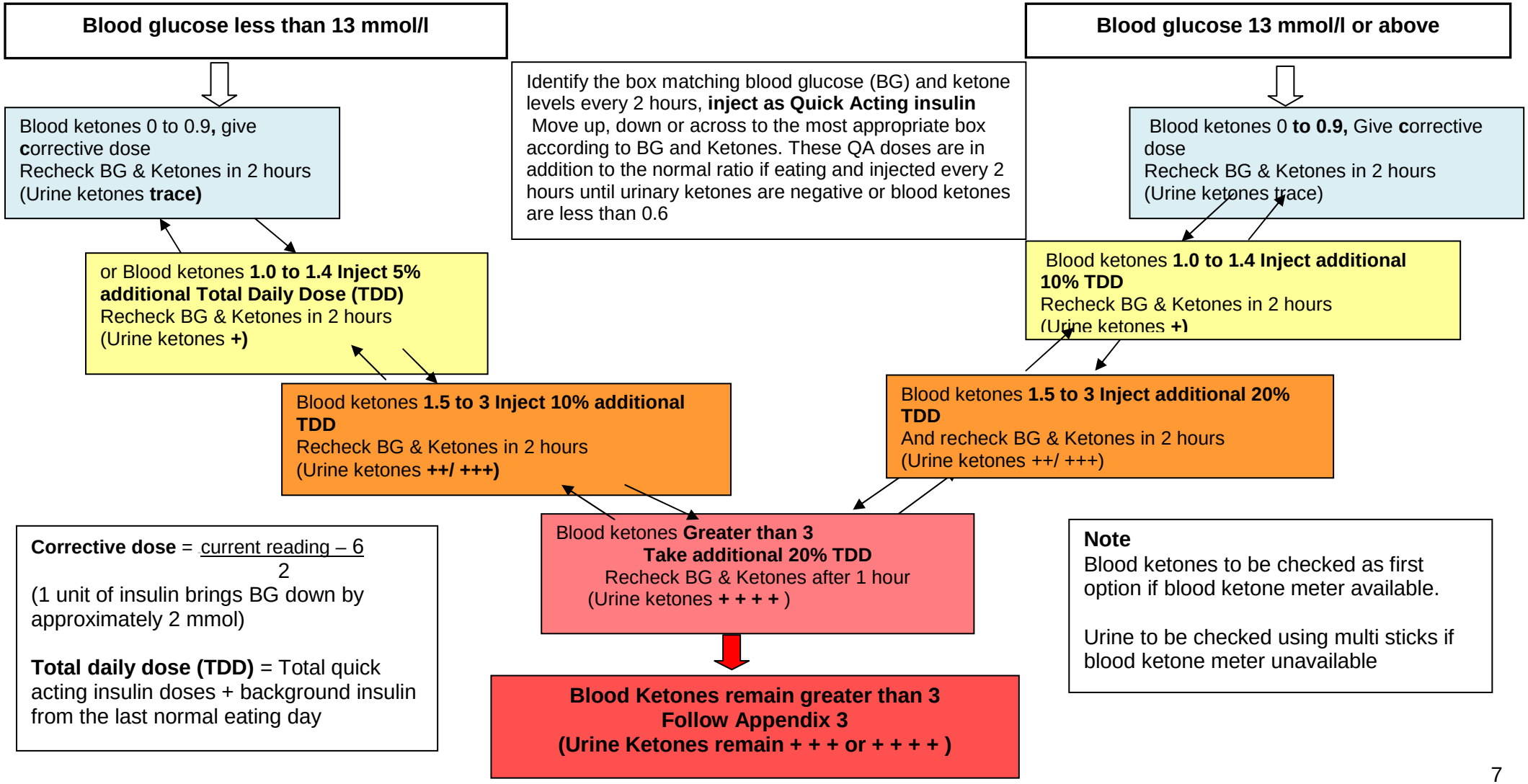
MONITORING OVERVIEW

Element to be monitored	Lead	Tool	Frequency	Reporting arrangements	Acting on recommendations and Lead(s)	Change in practice and lessons to be shared
a. Involvement of the multidisciplinary team including the obstetrician, midwife, diabetes physician, diabetes specialist nurses and dietician in the provision of care where appropriate. b. Timetable of antenatal appointments c. Requirement to document an individual management plan in the health records that covers the pregnancy and postnatal period up to six weeks d. Targets for glycaemia control e. Advising women with Type 1 diabetes of the risks of hypoglycaemia and hypoglycaemia unawareness in pregnancy f. Offering antenatal ultrasound examination of the four chamber view of the fetal heart and outflow tracts at 20 weeks g. How women who are suspect of having diabetic ketoacidosis are admitted immediately to a high dependence unit where they can receive both medical and obstetric care	Medical Obstetric Team	Audit proforma to monitor compliance with this guideline as described in elements a-g	Once within the cycle of the guideline or as required following an identified reason from a risk management episode.	Perinatal Mortality Meeting	Required actions will be identified and completed in a specified timeframe. by the medical/obstetric team	Changes in practice to be decided at senior Obstetric/medical level Changes to be communicated through Maternity managers meetings Labour Ward Forum Obstetric & gynaecology governance meeting Senior staff meetings Diabetes clinical governance meeting

APPENDIX 2

CARE OF DIABETIC WOMEN RECEIVING ANTENATAL CORTICOSTEROIDS

- Women with diabetes in pregnancy who are at risk of preterm delivery should receive antenatal corticosteroids as an inpatient.
- Blood glucose checked at a minimum of 4 pre-meal and pre bedtime, aiming for a target of 4 to 6 mmol/l



Care of Diabetic Women Receiving Antenatal Corticosteroids

Ready Reckoner

TDD	5%	10%	20%
15	1	2	3
20	1	2	4
25	1	3	5
30	2	3	6
35	2	4	7
40	2	4	8
45	2	5	9
50	3	5	10
55	3	6	11
60	3	6	12
65	3	7	13
70	4	7	14
75	4	8	16
80	4	8	16
85	4	9	18
90	5	10	18
95	5	10	20
100	5	10	20
105	5	10	21
110	6	11	22
115	6	11	22
120	6	12	24
125	6	12	24
130	6	13	26
135	7	13	26
140	7	14	28

TDD	5%	10%	20%
145	7	14	28
150	7	15	30
155	8	15	30
160	8	16	32
165	8	16	32
170	9	17	34
175	9	17	34
180	9	18	36
185	9	18	36
190	10	19	38
195	10	19	38
200	10	20	40
205	10	20	40
210	10	21	42
215	11	21	42
220	11	22	44
225	11	22	44
230	11	23	46
235	12	23	46
240	12	24	48
245	12	24	48
250	12	25	50
255	13	25	50
260	13	26	52
265	13	26	52
270	14	27	54

APPENDIX 3

PRE-CONCEPTION AND SPECIFIC ANTENATAL CARE FOR WOMEN WITH DIABETES TYPE 1 & 2

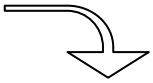
Appointment	**Care for women with diabetes during pregnancy**
Pre Conception appointment.	Offer information, advice and support in relation to optimising glycaemic control – aiming for pre-meal blood glucose levels 4~6 if clinically safe Take a clinical history to establish the extent of diabetes-related complications. Review medications for diabetes and its complications Offer retinal and/or renal assessment if these have not been undertaken in the previous 12 months.
Receipt of referral	Appointment to be offered at the next MOT clinic
Booking appointment (ideally by 10 weeks)	Follow Trust Booking guideline available at ……(hyperlink). Discuss information, education and advice about how diabetes will affect the pregnancy, birth and early parenting.
Approximately 16 weeks	Ensure women have been included in retinal screening pregnancy pathway. (hyperlink)
18-21+6 weeks	Offer fetal anomaly scan including four-chamber view of the fetal heart and outflow tracts
Approximately 28 weeks	Offer ultrasound monitoring of fetal growth and amniotic fluid volume as per clinical judgement. Check the woman has attended retinal screening
Approximately 32 weeks	Offer ultrasound monitoring of fetal growth and amniotic fluid volume as per clinical judgement.
Approximately 36 weeks	Offer ultrasound monitoring of fetal growth and amniotic fluid volume as per clinical judgement. 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, and start regular tests of fetal well-being for women with diabetes who are awaiting spontaneous labour.
39 weeks	Offer tests of fetal well-being.
40 weeks	Offer tests of fetal well-being.
41 weeks	Offer tests of fetal well-being.
1. All women receive individual antenatal appointments, however the above chart identifies the minimum number of appointments they will be offered. 2. Women are seen by the Community Midwives (CMW)/ General Practitioner(GP) between 20-28 weeks if stable	

MANAGEMENT OF SYMPTOMATIC PREGNANT WOMEN WITH DIABETES

Pregnant women with diabetes admitted with any illness are at risk of diabetic ketoacidosis (DKA).

- Check blood glucose and blood ketones or urine ketones on admission.
- A minimum of 4 (pre-meal) capillary blood glucose tests should be continued daily simultaneously with blood ketones, or urine ketones checked at each void.
- Capillary blood glucose > 7mmol/L at any time, check urinary and/or blood ketones
- Capillary blood glucose levels are > 7mmol/L, refer to flow chart in appendix 2.
- Women who present
  - symptomatic
  - with a capillary blood glucose >14mmol/L not responding to corrective doses of insulin (appendix 2)
  - with urine ketones persistently > +++ and/or blood ketones persistently $\geq$ 3mmol despite a corrective dose of insulin, exclude DKA URGENTLY…

Refer to management below



Venous Access Urgent BCP, FBC, Plasma Glucose, venous blood gas unless SaO_2 <95% in which case request arterial blood gas (ABG) Start IV saline 0.9%, rate 1 litre/hour SEEK ADVICE FROM MEDICAL TEAM	
VBG < ph.7.3 HCO_3 < 20mmol/L pCO_2 < 4.5Pa **KETOACIDOSIS** Seek urgent medical advice Inform the on-call Consultant Endocrinologist Use DKA Care Pathway	VBG > ph 7.3 HCO_3 > 20mmol/L pCO_2 = normal (4.5-6.1Pa) **KETOSIS WITHOUT ACIDOSIS** Seek Urgent Medical Advice Treat as per DKA Care Pathway if patient unable to eat and drink or is vomiting Seek Consultant Endocrinologist advice if uncertain how to proceed

The fetus is very sensitive to acidosis.If pregnancy > 26 weeks, commence CTG immediately

Pregnancy Diabetic Ketoacidosis Care Pathway

Name:
DOB:
Address:

Patient details or sticker

Hosp/A&E No:

[August 2011]

DIAGNOSTIC CRITERIA

Diabetic Ketoacidosis (DKA)

The presence of all of the following criteria is required to make a diagnosis of DKA:

- Hyperglycaemia*
- Venous bicarbonate <15mmol/L and/or pH <7.3
- Ketonuria (+++/++++) / Ketonaemia >3mmol/L (blood ketone fingerprick test)

N.B. Normoglycaemic ketoacidosis* (glucose can be normal)

Initial Blood Gas

	ABG or	VBG
Time		
pH		
pCO_2		
pO_2		
HCO_3^-		
BE		
K^+		
Glu		
Lactate		
FiO_2		

Guidelines Blood Ketones

Blood ketones mmols/L		Blood Ketones during DKA treatment
Less than 0.6 (urine:negative)	No Concern If blood glucose > 10mmols May need dose adjustment	Resolved
0.6 to 0.9 (urine: trace)	Minor concern May need dose adjustment	
1.0 to 1.4 (urine: +)	Concerned Will need extra fast acting insulin Check in 2hours	
1.5 to 3 (urine: .++)	Concerned Will need extra fast acting insulin / May need IVI's and admission Check in 2hours	
Greater than 3 (urine; +++/++++)	At RISK of DKA Venous Blood Gas If DKA follow pathway If not DKA see above	During DKA treatment expect blood ketones level to fall by 0.5 to 1.0 mmols /hour

Glucose and Potassium monitoring

	O hours	2 hours	4 hours
Time			
Lab Glucose			
Na^+			
***K^+**			
Cl^-			
HCO_3^-			

* **ALWAYS obtain a baseline laboratory biochemical profile**. It is acceptable to request venous gas potassium levels at 2 and 4 hours. If result discordant with previous reading **ALWAYS** request a lab BCP to confirm.

Blood Gas Measurement

Information for potassium and bicarbonate can be sufficiently obtained from **VENOUS** blood sampled in the blood gas machine **i.e. venous blood gas (VBG).** This can be used for immediate management of K^+ replacement until laboratory results available. Arterial blood gases (ABG's) are NOT indicated unless patient is not responding to treatment, has respiratory compromise (SaO_2<95%) or has decreased conscious level (GCS<13).

Doctor	Initials	Bleep	Signature

Diabetic ketoacidosis

Diagnostic criteria in pregnancy:

- **Hyperglycaemia***
- **Venous bicarbonate <15mmol/L and/or pH <7.3**
- **Ketonuria / Ketonaemia ≥3mmol/L**

N.B. *Normoglycaemic ketoacidosis (glucose can be normal esp. in pregnancy)

Where should the patient be managed?

All pregnant women with DKA require monitoring within a High Dependency Setting. Liaise with Medical Registrar on-call & Outreach. The patient should be managed jointly by the Obstetric and Diabetes Teams. In women ≥26 weeks gestation fetal monitoring by CTG is required no less than 6 hourly. In women <26 weeks gestation fetal heart rate auscultation is required daily. Consultant Endocronologist and Consultant Obstetrician MUST be informed of all DKA admissions

ASSESSMENT

Step 1- hour 0 to1

Doctor

1) IV Cannula **x 2** ..... ❑
2) BCP, Lab Blood glucose, FBC, CRP.. ❑
3) **Venous Blood Gas** (if SaO_2<95% then perform Arterial Blood Gas)
4) **ECG**
5) Consider Nasogastric tube if protracted

Nurse/Midwife

Monitor ½ hourly to hourly dependent on patients condition and severity of shock

-TPR, BP, O_2 Sats, GCS..... ❑
-Capillary BG..... ❑
-Fluid balance..... ❑
-Blood ketones..... ❑

Step 2 - hours 2 to 4

1) **Repeat U & E's and lab blood glucose** (the latter only if baseline blood glucose >26mmol/L)

AND

2) **VENOUS blood gas**

…….At **end of hours 2 and 4**

3) Consider precipitants
   - **a.** CXR
   - **b.** MSSU
   - **c.** Blood cultures

Step 3 - hour 5 & beyond

-U & E's for HCO_3^- twice daily until >19mmol/L
- Allow oral intake if bowel sounds present
- Vital signs stable & improving consider monitoring 4 hourly
-Prescribe patient's usual insulin - suspend whilst on IV insulin **UNLESS pt. takes Lantus or Levemir (=basal insulin 'BI') in which case give 'BI' as normal, concurrent with insulin infusion.**

If woman fails to improve or deteriorates within first 4 hours contact the on call consultant

TREATMENT

STEP 1 (0-1hr) **STEP 2 (2-4hr)** **STEP (5hrs and beyond)**

FLUIDS

BAG
1st - 0.9% saline, 500ml STAT
2nd - 0.9% saline, 500ml over 30 mins
3rd - 0.9% saline, 500mls over 1 hour

BAG
4th- 0.9% saline, 500mls over 1 hour
5th - 0.9% saline, 500mls over 1 hour
6th - 0.9% saline, 500mls over 2 hour
Add potassium unless anuric.

continue with
-0.9% saline 500ml over 2 hours **until** HCO_3 > 15mmol/L **then:-**
-0.9%saline 500ml over 4 hours **until**

INSULIN

1. 50 units Humulin S in 50ml 0.9% saline via syringe driver.
2. Set rate at 6ml/hour I.V. **until or if** blood glucose is below 14mmol/L **then change** to labour ward protocol. **If blood glucose is <7mmol/L initially do not commence insulin infusion - instead start I.V. 5% dextrose 100ml/hour to run concurrent with saline via separate I.V. lines. When blood glucose >7mmol/L on 2 separate occasions 1 hour apart convert to labour ward protocol.**
3. Target blood glucose: 7 - 11mmol/L. Avoid drop in BG>5mmol/hr as risk of **CEREBRAL OEDEMA (↓GCS – CALL CONSULTANT)**

Convert back to usual subcutaneous insulin When:-
❑ HCO_3^- ≥20mmol/L
❑ &blood ketones <0.3mmol/L
❑ & reliably eating and drinking
❑ administration of usual s/c insulin usually at meal time **then...**
❑ after 30 minutes stop insulin infusion administration of usual s/c insulin

Name:	Unit Number:	Date of Birth: / /	Ward:	Normal BP mmHg
				Admission Weight Kg

DATE:																
TIME [24 hr]:																
FREQUENCY:																

BLOOD PRESSURE & PULSE

240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40

TEMPERATURE

40° C
39° C
38° C
37° C
36° C
35° C

Respiratory Rate																	bpm
Oxygen																	% or lpm
O2 Saturation																	%
O2 Delivery System																	

RESPIRATORY

MAP																	mmHG
CVP																	mmHG
PERIPHERAL																	W = warm C = cool
Glucose	Use Blood Glucose chart to record capillary glucose levels																mmol/l

CARDIOVASCULAR

PAIN SCORE																	0 - 3
SITE																	abc
SEDATION																	0 - 3
NAUSEA																	0 - 3
PAIN SITE	a					b						c					
ANALGESIA GIVEN																	✓

PAIN / NAUSEA / SEDATION

AVPU																		
E W S																		
	RECORD EARLY WARNING SCORE EVERY SET OF OBSERVATIONS AND USE LAMINATED SHEET FOR GRADED RESPONSE																	

OTHER

NURSE SIGN																	INITIAL

PAIN SCORE: 0 = no pain, 1 = slight pain*, 2 = moderate pain*, 3 = severe pain* * = on movement

SEDATION SCORE: 0 = awake, 1 = occasionally drowsy*, 2 = frequently drowsy*, 3 = difficult to wake up, S = asleep * = easy to wake up

NAUSEA / VOMITING SCORE: 0 = none, 1 = nausea, 2 = vomited once*, 3 = vomited more than* * = last hour

OUTREACH EARLY WARNING SCORE - BLEEP 075 [HRI] OR 471 [CHH]

RESPIRATORY	CARDIOVASCULAR / RENAL	NEUROLOGICAL	OTHER
FiO2 > 50% or SpO2 < 94% [continuous monitoring] Respiratory rate > 25 [or trend quickly worsening] Inability to expectorate [inform physio] Tracheostomy Patient [humidification / support]	Urine output < 30 ml / hr for > 2 hrs Systolic < 100 [or 30 below normal for > 2 hours] Heart Rate > 140	Abnormal Mentation [confusion /aggression] None Responsive to Voice	Gut Feeling [unhappy with patient] Multiple adverse trends, but not fulfilling other referral criteria

INTRAVENOUS FLUID PRESCRIPTION

(VIA INFUSION PUMP)

Name:
DOB: **Age:**
Address:

Patient details or sticker

Hosp. No:
Consultant: **Ward:**

PRESCRIPTION						ADMINISTRATION				
Date	**Fluid Type**	**Vol**	**Additives**	**Rate**	**Signature**	**Batch No.**	**Start Time**	**Signature** **Witness**	**End time**	**Volume Infused**
	0.9% Sodium chloride	**500ml**		**Stat**						
	0.9% Sodium chloride		**mmol KCL**	**500mls over 30 mins.**						
	0.9% Sodium chloride		**mmol KCL**							
	0.9% Sodium chloride		**mmol KCL**							
	0.9% Sodium chloride		**mmol KCL**							

APPENDIX 6

ELECTIVE ADMISSION FOR INDUCTION OF LABOUR OR LSCS

Commence

1. Dextrose 5% at 125mls per hour via infusion pump
2. Humulin S Insulin 50 units made up to 50mls with normal saline via syringe driver (= 1unit in 1ml)

Insulin requirements

Plan to give half the present 24-hour insulin requirement over 24 hours

Calculate the present 24-hour insulin requirement.

Example 1: 96 units per day = 48 units over 24 hours = 2 units/mls per hour

Example 2: 68 units per day = 34 units over 24 hours = 1.4mls/units per hour

If the calculation for insulin requirements os less than 1 unit per hour then this should be discussed with the medical staff

Management for labour and birth

- Offer oral fluids only
- Perform hourly blood glucose monitoring (or more frequently if the dose requires adjustment)
- Aim to maintain the blood glucose level between 4 and 7mmol/l

Increase or decrease the insulin infusion rate by 0.5 units per hour increments to maintain the above values

If hypoglycaemia accidentally induced

- Maintain insulin infusion at 0.5 units per hour
- Give supplemental IV 150-200ml 5% glucose or 150-200mls oral glucose (fresh juice, lucozade or dextrose drink), then continue to titrate as above.

Management following birth

Diet, tablet or incretin mimetic injections

↓

Resume usual diabetes treatment after delivery when patient is eating and drinking normally
Monitor capillary blood glucose 2-4 hourly

Insulin-treated

↓

Insulin requirements will be approximately halved immediately following the birth (IV dose of insulin reduced by half)
e.g. prior to birth 48 units over 24 hours following the birth 24 units over 24 hours

- Record blood glucose 2-4 hourly for 24 hours
- When eating and drinking recommence the pre pregnancy doses of subcut insulin and discontinue IV insulin approximately 30 mins after starting the meal

NB: If a woman is on an insulin pump (CS11) she may continue to use it for labour or LSCS providing her or her partner are able to continue to adjust it. Immediately post delivery the rate should be adjusted to pre-pregnancy settings

Inform Diabetes team if blood glucose persistently over 9mmol/L post delivery

Blood Glucose (BG) Monitoring Chart

Patient Name.. **Ward**................ **Hospital**...............

Date of Birth.....................................**Unit Number**......................................

Monitoring instructions in DKA:

BG hourly whilst on 50:50 insulin pump
During GKI consider 2hrly. monitoring but only when BG levels are 7 - 11mmol/L and stable.
Blood Ketones: hourly for first 4 hours (expect ketones to fall by 0.5-1.0mmol per hour). Then monitor 4 hourly until blood ketones are less than 0.6mmol/L.

CHECK KETONES if there are any interruptions in IV insulin therapy or if BG >14 and rising for 2 consecutive readings

		Blood	Blood	Insulin		Comments or Continuous		
Date	Time	Glucose	Ketones	Type	Units	Infusion	Rate	Signature