TYPE 1 DIABETES MELLITIS – ANTENATAL, INTRAPARTUM AND POSTNATAL CARE

DEFINITION

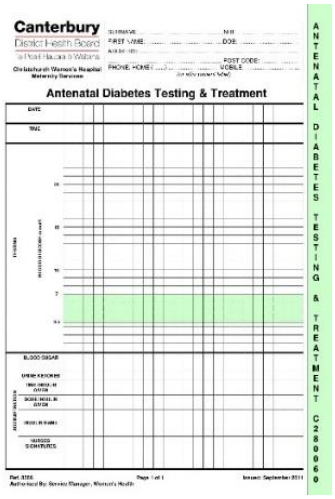
Type 1 Diabetes is a chronic condition in which the pancreas produces little or no insulin. If left untreated, this can result in high glucose levels, polyuria, dehydration, and ketogenesis (ketone bodies produced from fatty acid breakdown).

ANTENATAL CARE – BETAMETHASONE ADMINISTRATION

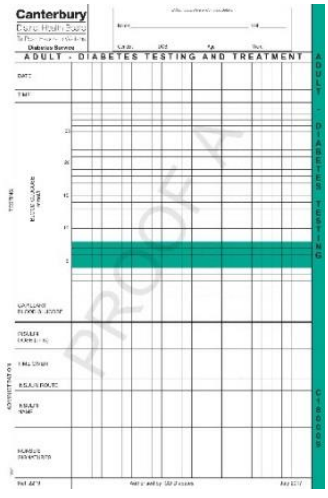
REFER TO: Insulin Infusion following Betamethasone Injections for Women with Diabetes in Pregnancy (C260117, Ref.6466)

MANAGEMENT FOR ALL ADMISSIONS

- Inform the Associate Charge Midwife Manager, Obstetric Team and Neonatal Registrar of the woman's diabetic status.
- Ensure all current medications, including Insulin is charted on MedChart.
- Commence documenting blood glucose levels on the Antenatal Diabetes and Treatment Testing Form (Ref.8566) or Diabetes Testing and Treatment Form (Ref.2219).



Antenatal use (Ref.8566)



Intrapartum and postnatal use (Ref.2219)

- Some women may self-monitor blood glucose by a **Continuous Glucose Monitoring (CGM) system**. CGM consists of a small sensor that sits under the skin (upper arm or abdomen) and measures glucose levels in the fluid surrounding the cells (interstitial fluid), which transmits data to a receiver. Depending on the GDM device used the receiver used can be the display screen of a compatible insulin pump, a smart device or smartphone, or a stand-alone receiver.

CGM using a **FreeStyle Libre Flash Glucose Monitoring System requires that the sensor is scanned with a reader**. This gives a current glucose reading, the last 8-hours of glucose history, and a trend arrow showing if glucose is going up, down, or changing slowly.

Note:

- CGM blood glucose readings of ≤3.5mmol/L or ≥12mmol/L should be confirmed by a finger stick capillary blood glucose reading.
- When treating hypoglycaemia always use finger stick glucose readings to monitor the response to treatment, do not rely on CGM as the response will appear delayed.
- Women who are unwell, in labour, or post surgery may not have the capacity to use CGM and may prefer that hospital staff take over using capillary blood glucose monitoring – please discuss on an individual basis and review the decision every few hours.

- It is important that despite self-monitoring and/or self-medicating, that all blood glucose levels and insulin doses are documented.
- Perform admission CTG as there is an increased risk of fetal hypoxia during labour.

NOTE
For women taking Insulin glargine (Lantus®) or detemir (Levemir®) halve the dose:

a) If in spontaneous labour
b) On the day of an induction of labour until birthed
c) The evening prior to an elective caesarean section

ELECTIVE CAESAREAN SECTION

(see Appendix A)

NOTE
Women should be placed first on the theatre list.

- For women on intermediate acting bedtime insulin (Humulin NPH or Protaphane) the normal dose is given the night before the elective caesarean section. For women taking long-acting insulin, glargine (Lantus®) or detemir (Levemir®) the dose should be halved the evening before.
- Withhold morning insulin on the day the woman is undergoing the elective caesarean section.
- Establish intravenous access and avoid giving glucose containing intravenous fluids except for Plasma-Lyte 148 + 5% glucose (obtain from supply not pharmacy).
- Monitor capillary blood glucose levels before surgery and then hourly and document on the Diabetes Testing and Treatment Form (Ref.2219).
- If capillary blood glucose < 4 mmol/L or > 7 mmol/L commence intravenous Insulin / Plasma-Lyte 148 + 5% glucose infusion with hourly blood glucose monitoring (see Appendix C).
- **For women who have a personal insulin pump, discuss with physician but in general the basal insulin rates are halved immediately prior to surgery.**

INDUCTION OF LABOUR (IOL) OR SPONTANEOUS LABOUR

(see Appendix B)

PRIOR TO LABOUR ESTABLISHING

- Continue usual insulin regime and/or metformin with meals until labour is established**.**
  For women taking insulin, glargine (Lantus®) or detemir (Levernir®) halve the dose on the day of the induction of labour and until birthed.
- Continue to monitor blood glucose levels and document on Antenatal Diabetes and Treatment Testing Form (Ref.8566).

ONCE LABOUR IS ESTABLISHED

- For women on a personal insulin pump, the basal insulin infusion rates should be halved.
- Women may only drink water.
- Establish intravenous access. Take bloods for group and hold and CBC.
- Avoid dextrose containing intravenous fluids unless requiring infusions as below.
- Monitor capillary blood glucose levels hourly and document on the Diabetes Testing and Treatment Form (Ref.2219).
- If capillary blood glucose:
  - < 4 mmol/L – in a conscious patient this can be managed initially with Hypo-Fit
  - (18 g carbohydrate). Give one sachet if weight < 90 kg or two sachets if weight ⩾ 90 kg.
  - Check capillary blood glucose after 10 minutes and repeat Hypo-fit treatment if required.
  - If no response after 30 minutes commence intravenous Plasma-Lyte 148 + 5% glucose infusion with hourly blood glucose monitoring (see Appendix C). Cease infusion when capillary blood glucose reading is above 5mmol/L and recheck capillary blood glucose at hourly intervals.
  - > 7 mmol/L commence intravenous Insulin/Plasma-Lyte 148 + 5% glucose infusion with hourly blood glucose monitoring (see Appendix C).
- Continuous electronic fetal monitoring (EFM).

POSTNATAL MANAGEMENT

NOTE
For women taking Insulin glargine (Lantus®), this insulin is long-acting and if the full dose is given within 24 hours of the birth (rather than the 50% dose reduction that is recommended) then hypoglycaemia can be problematic for some hours after the birth.

- Insulin requirements fall rapidly
  - The insulin infusion rate is halved immediately following birth (postpartum rate).
  - The Plasma-Lyte 148 + 5% glucose infusion remains unchanged.
- If the patient has blood glucose levels > 7 mmol/L after two consecutive readings, then double the infusion rate, i.e. return to the sliding scale for insulin used prior to birth (see Appendix C).
- If < 3.5 mmol/L, stop the insulin infusion and check capillary blood glucose level every 15 minutes until > 4mmol/L and hourly thereafter. Hypo-fit may also be required, administer 2 sachets of Hypo-Fit (36g carbohydrate), this is expected to raise the maternal blood glucose level by 2-3 mmol/l over 10 minutes, the response is dependent on maternal weight. Administer a further 1 sachet of Hypo-fit after 10-15 minutes if required. Restart insulin infusion at postpartum rate once the blood glucose is > 7 mmol/L, or if the mother is going to eat then she can administer her usual short acting insulin at her ***pre-pregnancy dose less 30%.***

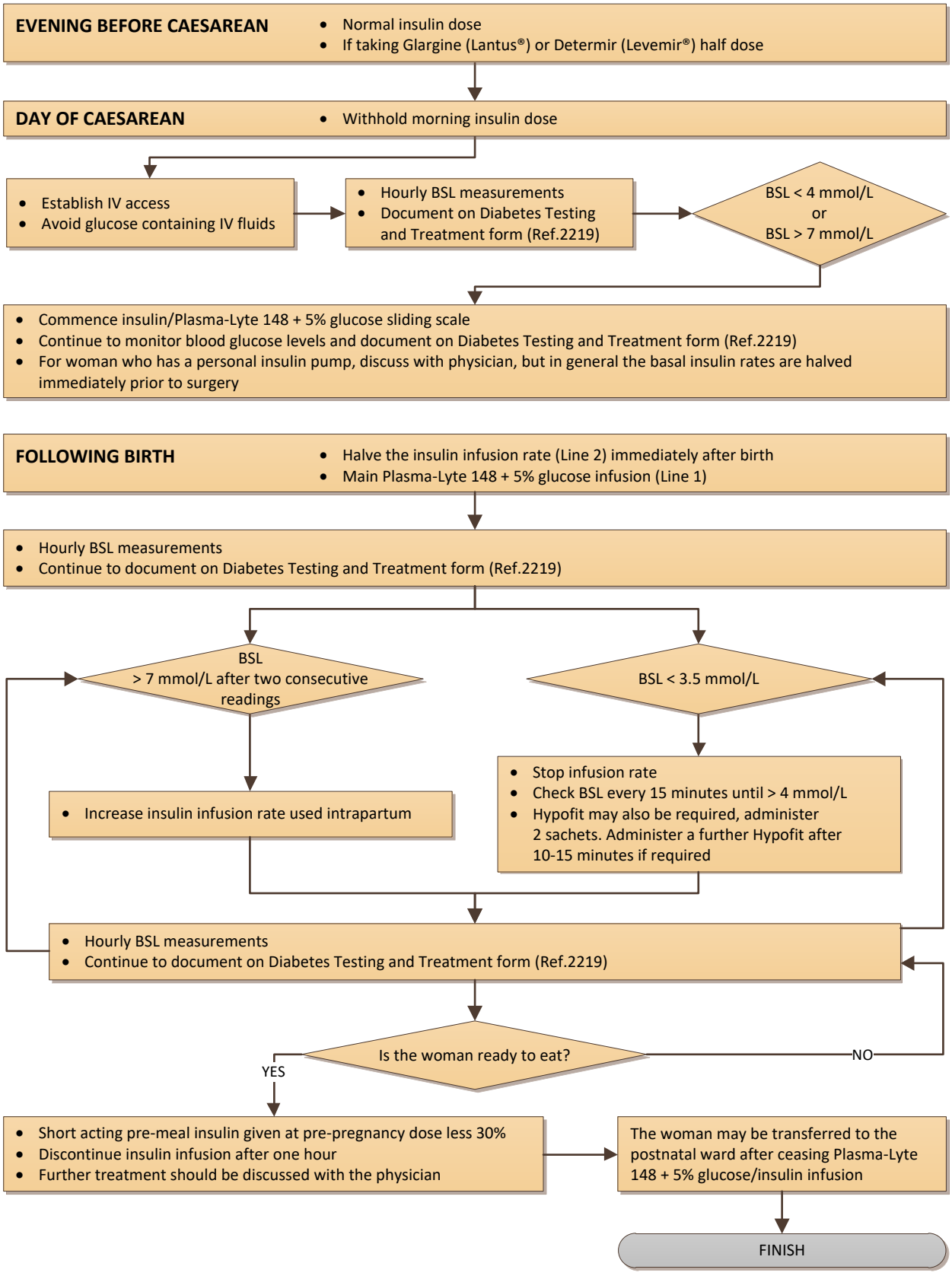
NOTE
Daily monitoring of electrolytes is required for infusions extending beyond 24 hours (risk of hyponatraemia and hypokalaemia).
Insulin infusions must be replaced every 24 hours.

- The infusion is continued until the woman is ready to eat.
  - A one-hour overlap is required between giving the subcutaneous insulin and stopping the intravenous insulin / Plasma-Lyte 148 + 5% glucose infusion.
  - Short acting pre-meal insulin can be commenced at the ***pre-pregnancy dose less 30%.***
  - Depending on the time the infusion is stopped and when the woman had her last dose of intermediate or long acting insulin a small dose of intermediate acting insulin (Humulin NPH or Protaphane) or long acting insulin (glargine) may also be required in consultation with the physician (the dose is usually approximates the ***pre-pregnancy dose less 30% in the first 24 hours after the birth***).
  - The woman may be transferred to the postnatal ward after ceasing the Plasma-Lyte 148 + 5% glucose/insulin infusion. **For women on a personal insulin pump consult a physician regarding insulin dosage.**
- For women on a personal insulin pump, the half-dose basal infusion rates should continue. The bolus doses will commence at the pre-pregnancy dose less 30%.
- Contact on-call Physician if problems arise.

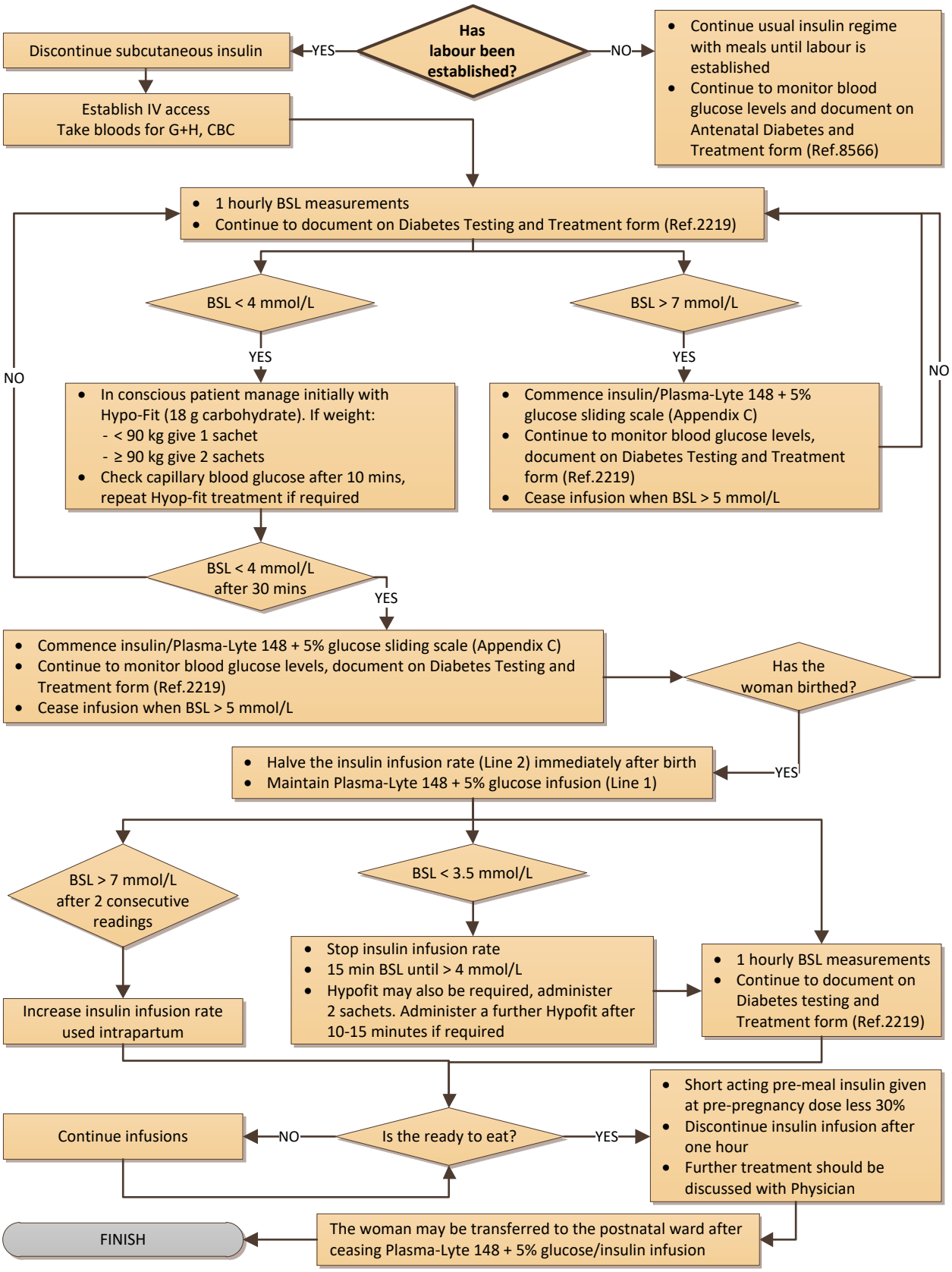
REFERENCES

1. McLaughlin C and McCance DR: Diabetic management in labor delivery and post-delivery. In A Practical Manual of Diabetes in Pregnancy Editors McCance DR, Maresh M and Sacks DA; Wiley-Blackwell 2010
2. National Institute for Health and Care Excellence (NICE) guideline (2011): CG63 Diabetes in pregnancy http://www.nice.org.uk/nicemedia/live/11946/41320/41320.pdf

APPENDIX A TYPE 1 DIABETES MELLITUS – ELECTIVE CAESAREAN SECTION INTRAPARTUM AND POSTNATAL MANAGEMENT



APPENDIX B TYPE 1 DIABETES MELLITUS - INDUCTION OF LABOUR/ SPONTANEOUS LABOUR AND POSTNATAL MANAGEMENT



APPENDIX C INSULIN/PLASMA-LYTE 148 + 5% GLUCOSE SLIDING SCALE

INSULIN/PLASMA-LYTE 148 + 5% GLUCOSE SLIDING SCALE

- Two intravenous lines are to be sited. One for Insulin/Plasma-Lyte 148 + 5% glucose and one for oxytocin/anaesthetic/analgesic requirements.
- No glucose containing infusions, other than the fixed rate of Plasma-Lyte 148 + 5% glucose, should be administered.
- The intravenous line for the Plasma-Lyte 148 + 5% glucose/insulin should be kept patent with a small amount of saline while the infusions are prepared.

Prepare the prescribed Insulin / Plasma-Lyte 148 + 5% glucose infusion as follows:

- The Plasma-Lyte 148 + 5% glucose is mainlined to the woman with the insulin infusion attached to the mainline via Y-site.
- Plasma-Lyte 148 + 5% glucose – mainline
- Run one litre of Plasma-Lyte 148 + 5% glucose at a rate of 125 mLs per hour via an infusion pump. DO NOT ALTER.
- Insulin via Y-site on main line
  - Add 100 units Actrapid insulin using an insulin syringe to 100 mLs Saline and run via an Alaris infusion pump.
  - Run 10 mLs through the tubing before attaching the tubing to the mainline via the Y-site. This will prime the tubing and minimise subsequent binding of insulin to the plastic of the giving set.
  - The insulin is drawn up as directed by the Fluid and Medication Management Manual Volume 12 and checked by two midwives (one of whom must be intravenous certificated).
  - Run according to the Blood Glucose/Sliding Scale of Insulin Prior to Birth.

- Blood glucose should be checked immediately prior to starting the infusions and then hourly until the surgeon has directed the woman is ready to eat.
- Document blood glucose level on the Diabetes Testing and Treatment form (Ref.2219) and fluid input on the Fluid Balance 24-Hour Sheet (Ref.887).

Capillary Blood Glucose Level (mmol/L)	Infusion rate in mLs per hour (= units of Actrapid insulin per hour)
< 3.5	No insulin Increase the rate of Plasma-Lyte 148 + 5% glucose to 125 mLs/hour Check BSL every 15 minutes Call physician for advice
3.5 – 5.0	0.5
5.1 – 7.0	1
7.1 – 9.0	2
9.1 – 11.0	3
11.1 – 13.0	4
13.1 -15.0	5 Stop the Plasma-Lyte 148 + 5% glucose
> 15.0	6 Stop the Plasma-Lyte 148 + 5% glucose Call physician for advice