British Association of Perinatal Medicine

Identification and Management of Neonatal Hypoglycaemia in the Full Term Infant - A Framework for Practice

Consultation comments and responses – May 2017

Consultation closing date: 25 January 2017

Item		Comment	Response
1	1 Executive summary	I am concerned that the maternity system CMIS (Circonia maternity information system) used by many trusts does not identify as low as the 2nd centile. To my current knowledge the lowest centile generated is the 5th centile	We recommend that gestation and sex specific birthweight centiles are used to define IUGR. These are freely available and are familiar to most maternity services because they are part of the BAPM Newborn Early Warning Trigger and Track Framework for Practice.
2	2 Executive summary of recommendations	I think the following groups should be specifically added to the at risk groups list to make it very clear to practitioners that these babies are **"at risk"** not just requiring measurement of blood glucose. This helps to contribute to not missing these babies and risk assessing accordingly. Any baby who has: perinatal acidosis (cord arterial or infant pH ≤ 7.1 and base deficit ≤ -12mmol/l) Hypothermia (<36.5°C) Suspected / confirmed early onset sepsis When used in practice it has been reported that this really does highlight this. Additionally should pre term be added.	See practice point 2, which recommends BG measurement in infants with perinatal acidosis, hypothermia, and suspected / confirmed early onset sepsis. We agree that late preterm infants are at risk and that early energy provision and blood glucose monitoring should form part of the care pathway provided for this group. However, management of the metabolic transition of late preterm infants differs from that of term infants due to duration of risk, type of feeding support required, and potential co-morbidities. Therefore management of metabolic transition should be considered as part of a broader pathway for looking after late preterm infants in a postnatal ward setting. This is beyond the scope of the present FfP, which is targeted at term infants. For the avoidance of doubt among users of the FfP, we have added a line to PP1 to state that late preterm infants are at risk, and that measures to prevent and detect hypoglycaemia should be included as part of the care pathway for this group.
3	3	Addition of "**recommended BAPM / BFI**" in	Amended.

	Background	the following sentence. One third of cases were admitted within four hours of birth1. These observations suggest that compliance with **recommended BAPM / BFI** guidelines for management of the metabolic transition to postnatal nutrition is variable.	
4	6 Section A points (1)(2)	See above comment (page 2) for adding to list of at risk groups. Should pre - term and Family history of MCADD be added here? NB: preterm and babies that are unwell are listed in the appendix 1 parent information sheet as being at risk	See response 2. We agree that there are rare circumstances when risk may be increased because of family history of a genetic disorder associated with neonatal hypoglycaemia, and have added this to the Section B, page 11. Please see response 256.
5	7 point (9)	At the end of the sentence should it be added: **if the baby does not feed teach and encourage the mother to hand express?** This can then be given to the baby. This could be considered proactive in preventing hypoglycaemia in at risk babies.	Stated in PP12.
6	8 first paragraph	It should be added to this sentence, the amount / kg and method. This is what practitioners ask in this situation. If no colostrum is available and after discussion with the mother, consider supplementing with formula milk **(amount/kg and method**) until colostrum is available.	See Amended PP12 and 13 and flowcharts: 10-15ml/kg/feed on day 1.
7	8 point (14)	It should be specified in this sentence (between 2 – 4 instead of no later than 4 hours) after birth to clarify that this should not be done within the first 2 hours during physiological decline as detailed in the first paragraph on page 13. Changed to: Measure blood glucose level before the second feed **(between 2 – 4**) hours after birth Measure blood glucose immediately if there are clinical signs suggestive of hypoglycaemia (**Practice Point 2**).	Amended.
8	10 Section **SECTION B: Synopsis of supporting evidence**	With reference to the sentence re beta blockers see below, Is there any evidence to say what dose of beta blockers? I have often been asked if the woman has one dose of 100mg of labetalol in labour does this count? I do think this needs specifying to help practitioners Exposure to beta-blockers used to treat maternal disease is associated with	Data from Bateman et al indicate that beta blocker exposure during the third trimester and / or at the time of delivery is associated with neonatal hypoglycaemia. We have clarified this in PP1.

		hypoglycaemia due to transplacental transfer of drug and interruption of glycogenolysis in the offspring9,18.	
9	11 ***Management of infants identified to be at risk: general care, feeding support, energy provision and blood glucose monitoring: practice points 7-16***	We need to ensure that this document covers mothers who are breast or formula feeding not just breast feeding. Babies at risk of hypoglycaemia can be either formula or breast fed. Therefore the following sentence needs changing to: The principles of management are: antenatal or immediate postpartum identification of infants at risk for impaired metabolic adaptation; thermal care; early energy provision and ~~breastfeeding~~ **(feeding)** support; monitor blood glucose concentration with an accurate device that provides results in real time; and listen to parents views about infant feeding and wellbeing3,20,28,29.	Amended.
10	12, paragraph 4	See point 7 (page 8, point 14) regarding timing of first blood sugar	See response 7.
11	18 parent information sheet, blood sugar testing	If the timing of the first blood sugar is changed as per point 7 page 8, point 14) regarding timing of first blood sugar, this will need changing here too.	Amended.
12	19 parent information sheet, the following signs that your baby is well	The following sentence needs an addition. **(– 10 adding**) *Is your baby feeding well?* In the first few days your baby should feed effectively at least every 3 hours, until blood sugars are normal and then at least 8 **(needs – 10 adding**) times in 24 hours.	Disagree. We would not set an upper limit to latching on episodes.
13	20 parent information sheet, going home with your baby	As above point: It is important to make sure that your baby feeds effectively **at least 8 times in 24 hours** and most babies feed more often than this.	Agree, no change needed to FfP.
14	20 Appendix 2 Management of reluctant feeding in healthy breastfeeding infants	See last point It is not just breastfed babies that are reluctant to feed. Formula feeding mothers and babies need assessment, advice and support. This was a general staff comment following the consultation of our guideline.	Agree, title amended.
15	21 appendix 2 Syringe feeding	The word oral needs adding to the following: It is useful to give a baby small amounts of colostrum in an **oral** syringe.	Amended.
16	21 appendix 2	Should the following additions in bold be added? Should the volume of formula milk	Amended.

	If the mother chooses not to express colostrum	be appropriate to age but also detailed as 5 – 10 mls **per kg** not just 5 – 10 mls. If the mother cannot, or chooses not to express her colostrum it is the responsibility of the midwife to ensure this is an informed decision based on awareness of the benefits of breastfeeding **and the risks of formula**. This will be documented by the midwife in the woman's notes. The milk should be given by cup in volumes appropriate to the baby's age i.e. first day 5-10mls per feed, second day 10-15mls per feed, third day 20mls per feed. Formula should not exceed 20mls per feed once lactation is established.	
17	22 appendix a	Should the following be added? Additions in **bold** The feed should be pain free and the baby should demonstrate adequate wet and dirty nappies **appropriate to age. For further information see the Baby Friendly Breastfeeding assessment tool or local chart**	Amended.
18	Flow chart A	If Any baby who has: perinatal acidosis (cord arterial or infant pH ≤ 7.1 and base deficit ≤ -12mmol/l) Hypothermia (<36.5^{o}C) Suspected / confirmed early onset sepsis Pre term are added to the at risk groups, box 1 will need updating	See response 2.
19	Flow chart D	It is not just breastfed babies that are reluctant to feed. Formula feeding mothers and babies need assessment, advice and support. This was a general staff comment following the consultation of our guideline. Could the title be changed to "Management of reluctant feeding in healthy ~~breastfed~~ term infants > 37 weeks. The following could be added: **For those babies who are being artificially fed follow flow chart but give artificial milk instead of colostrum.** If this was the case the initiate active feeding plan box on this page may need specifying this is for breastfeeding or an additional one created for formula feeding.	Agree – amended to include formula fed infants.
Singleton neonatal intensive care unit, Swansea. The comments are collective but they have been collated by Dr Carol Sullivan, Consultant Neonatologist.			
20	P6/section A. practice point 1	Overall we feel that this is a very useful document but have some specific queries as below. We are often asked by midwives if only one	See response 8.

		dose of betablocker is sufficient to cause hypoglycaemia in the baby (as they feel that many mothers have just one dose within a few hours of delivery). These are the mothers most likely to complain about the monitoring of their baby's blood glucose. Is there any data on this?	
21	P6/section A practice point 1 - second centile weights	As a unit we are keen to use customised growth charts and with the RCOC promoting customised fetal growth charts we feel we should do the same	See response 1. Customised growth charts are useful for identification and management of suboptimal fetal growth in utero but have not been shown to predict impaired metabolic adaptation after birth.
22	P6 section A practice point 2	We are very supportive of the use of abnormal feeding behaviour and less emphasis on 'jitteriness' as indicator of symptomatic hypoglycaemia	Thank you.
23	P7 section A practice point 3	The support for using the blood gas analyser as the reference standard for whole blood glucose rather than the lab is to be commended as this will speed up confirmation of the blood glucose level.	Thank you.
24	P7 section A practice point 12	There is no recommendation about the minimum volume of colostrum that is considered to be adequate. We were ciriticised in a recent BFI visit that we did not consider 0.5 mls of colostrum in the first 3 hours to be sufficient, yet there are no guidelines on a minimal amount or frequency. This is really important as 0.2 mls or 0.3 mls is still some colostrum but is it enough? We are trying to prevent babies having symptomatic hypoglycaemia rather than acting only once this has occurred. The guideline says: if no colostrum is available and after discussion with the mother, consider supplementing with formula milk. However, if there is no colostrum at all and the mother is still not keen for formula milk what do you do? How long can you leave the baby? How often should you monitor the blood glucose in this group that are at high risk and having no milk at all sometimes for 6 hours or so?	We agree that any colostrum is preferable to none, as stated in practice point 12. As stated in PP9, babies with risk factors should be given energy within 1 hour of birth.
25	P8 section A practice point 15	The glucose levels: essentially no particular action (flowchart) is proposed unless the blood glucose is < 2.0 and only those with a gluc < 1.0 or symptomatic are being admitted. Both these 'cut-offs' are lower levels than we feel comfortable with, especially with medicolegal 'specialists'	See rationale for operational thresholds in section B.

		commenting if such a level is reached, or if the baby is symptomatic, then we should have acted sooner. Acting once you have symptoms or a very low level is too late.	
26	P8 section A practice point 17	The advice that buccal dextrose gel may be given 'alongside' feeding support for first blood glucose 1.0 – 2.0 mmol/L or subsequent measurement <2 mmol/L is confusing. Again is it alright to use this if you are supporting the mother with feeds but she is not producing any milk? Would this be more likely to cause a blood glucose rise which will lead to a rebound hypo if no milk is given (i.e. if no colostrum available)? (The sugar babies study used a definition of hypoglycaemia as < 2.6mmol/L so these babies were not in such a compromised position when the dextrose gel was given)	Dextrose gel should be used alongside a feeding plan which will include breastfeeding support or formula depending on mothers informed choice. It should not be used as a substitute for milk. Rebound hypoglycaemia was not observered in the Sugar Babies trial. Disagree that values 1-1.9mmol in infants without no abnormal signd represents a "compromised position". Refer to Section B for rationale for operational thresholds.
27	Appendix 1 Parent information sheet	We like the parent information sheets	Thank you.
28	Flowchart B	Following the flowchart for a baby with a blood glucose > 2.0 mmol/L it mentions giving expressed breast milk as 3 – 5 mls/Kg. this is the first time any amount is mentioned and it is for a baby whose blood glucose is good, yet this seems a large amount as in theory it could be a baby who is 3 hours old. In the same box, the volume of formula put as 80 – 100 ml/kg/day in 3hourly feeds we know from past experience this causes confusion, and 10 – 12 mls/kg to give every 3 hours is easier to use.	Thank you. We have amended this to all expressed milk / colostrum, setting no minimum volume. We have amended this to 10-15ml/kg every three hours.
The Framework was distributed to the National Infant Feeding Network (England), Unicef UK Baby Friendly Initiative professional team and Designation Committee for feedback.			
29	General	Overall feedback has been very positive, comments commend the project team for providing such a comprehensive and well thought out document that is easy to read, practical and evidence based. Respondents particularly liked the clarity around risk factors, the involvement of parents and the clear and comprehensive flow charts The section on devices for accurate measurement of blood glucose was considered to be very useful.	Thank you.

30	Page 4	1.1 Background and Introduction While this policy is very clearly about managing hypoglycaemia in term infants, many hospitals have a 'hypoglycaemia protocol' which includes the moderately preterm cared for on the post natal wards. It would perhaps be helpful to include these babies in the guidance so that hospitals can more easily adapt their existing protocols.	See response 2.
31	Page 6	*2. Measurement of blood glucose concentration should be performed for any infant who has one or more of the following conditions or clinical signs:* *o Suspected / confirmed early onset sepsis* Comment: Agree that babies who are symptomatic with suspected sepsis should have blood glucose measurements done as part of the other investigations they undergo. Under recent NICE guidance, quite a few infants now undergo screening for suspected sepsis, when they have risk factors only, but these babies are otherwise well. Requiring these babies to undergo blood glucose screening could lead to over treatment for otherwise well babies.	If antibiotics are initiated it is prudent to measure one BG because of the diagnostic imprecision of early onset sepsis. This should certainly be done if abnormal clinical signs develop.
32	Page 6	*2. Measurement of blood glucose concentration should be performed for any infant who has one or more of the following conditions or clinical signs:* *o Lethargy* Comment: A definition of lethargy would be helpful to prevent babies normal adaptation in the first 24 hours being considered a reason to screen.	Lethargy should be interpreted as excessive sleepiness with or without altered tone.
33	Page 6	*Abnormal feeding behaviour (not waking for feeds, not sucking effectively, appearing unsettled and demanding very frequent feeds)* Comment: This definition is not specific enough and could easily lead to unnecessary screening and intervention of well babies, particularly those who are learning to breastfeed in the first 24-48 hours post birth. Identifying risk factors and frequent monitoring of vital signs should be enough to identify those who are actually at risk.	Disagree. Practitioners need to be skilled in assessing abnormal feeding behaviours. We proposed a practical definition. The assessment needs to be interpreted in the context of previous feeding and other clinical signs.
34	Page 6	*Jitteriness, defined as excessive repetitive movements of one or more limbs, which are unprovoked and not in response to a*	Disagree. We think the clinical description of jitteriness defined by Unicef UK is helpful.

		stimulus, is common and is not by itself an indication to measure blood glucose. Comment: This definition was written by Unicef UK in the 1990s as an attempt to reduce the number of babies screened for a normal startle reflex and was intended to describe a mild convulsion. Therefore, it could be argued that this description does not describe normal new-born behaviour. It is suggested that the statement be amended to - 'Jitteriness is common and not by itself an indication to measure blood glucose'.	
35	Page 8	*12. If no colostrum is available and after discussion with the mother, consider supplementing with formula milk until colostrum is available* Comment: It would be helpful to add the volume of formula to be used and the frequency it should be given here, but with the caveat that colostrum does not need to be given in the same volumes.	See practice point 13 and flowchart A for volumes: no minimum volume if colostrum and 10-15ml/kg 3 hourly if formula.
36	Page 9	*25. A thorough clinical assessment should be made and documented within 6 hours after birth, at which time practitioners should differentiate between a well baby who is reluctant to feed versus a baby whose feeding pattern suggests an abnormal clinical state due to illness.* Comment: This statement would benefit from some clarification including who should carry out the assessment and what it should consist of, as well as when a baby needs to be defined as reluctant to feed. It is very common for healthy, term babies to feed at birth and then sleep for long periods and it is worth noting that the commonly cited requirement for further feeds by 6 hours of age is a misinterpretation of WHO/Unicef guidance. This guidance stated that breastfeeding mothers should be offered further support within 6 hours and was intended as a way of making sure that mothers were not left without help to breastfeed. It did not state that healthy, term babies were at risk if they did not have a second feed within 6 hours of birth.	Disagree. We are not suggesting that healthy babies are at risk if they have not fed twice within 6 hours. The practice point is intended for those infants showing reluctant feeding behaviours, who should be supported to have a second feed within 6 hours.
37	Page 9	*26. Blood glucose should be measured if it is uncertain whether non-effective feeding is due to infant illness or reluctance.* Comment: The definition of reluctance in point 25 includes behaviours common to	The assessment of abnormal feeding versus reluctance requires skill, is subjective, and needs *to be considered in the context of previous feeding behaviour and*

		large numbers of breastfeeding babies in the early post-natal period as they and their mothers learn to breastfeed. This statement may give licence to practitioners to measure such babies blood glucose 'just in case'. The Baby Friendly Initiative has spent many years educating health professionals to measure blood glucose in term babies only when there are clearly defined risk factors or signs of illness. This is because Baby Friendly assessments were revealing that large numbers of breastfed babies were undergoing blood glucose screening simply because they were being judged by staff to be either feeding to little or too much.	*other clinical signs*. Given that abnormal feeding can be a sign of illness, we recommend that measuring BG is the safest option if the practitioner cannot distinguish between reluctant feeding and illness. We agree that Trusts need to provide education to support this assessment and applaud the initiatives that BFI have undertaken in this regard.
38	Page 10	Heading - **clinical signs** repeated.	Amended.
39	Page 10 2nd paragraph	This section describes restricted growth in the antenatal period. Many units now use the GAP/GROW programme to identify the high risk baby in the low risk mother. It may be useful for the team to explore this programme.	See responses 1 and 21.
40	Page 14 2nd paragraph	In the absence of these forms of evidence the group considered that there is no new argument to support a change in the operational thresholds published by Cornblath et al in 2000, reviewed on several occasions since43,46,47: 1. A value <1.0mmol/l at anytime 2. Baby with abnormal clinical signs: single value <2.5mmol/l 3. Baby at risk of impaired metabolic adaptation but without abnormal clinical signs: <2.0 mmol/l and remaining <2.0 mmol/l at next measurement The recommended operational threshold should be 3.5mmol/l in neonates Comment: The original Cornblath paper states: *At very low glucose concentrations (,20–25 mg/ dL, 1.1–1.4 mmol/L), intravenous glucose infusion aimed at raising the plasma glucose levels above 45 mg/dL (2.5 mmol/L) is indicated.* In other words, the 'low' operational threshold in Cornblath is 1.4 mmol/l, not 1.0 mml/l. Subsequent reviewers have revised this lower limit: particularly: Neonatal hypoglycaemia: Clinical and legal aspects. Seminars in Fetal and Neonatal Medicine,	The Cornblath citation is used to establish the operational threshold principle, which proposes levels for intervention based on currently available evidence. The remaining citations are those that have reviewed evidence since the Cornblath et al publication in 2000, concluding that the threshold of 1mmol/l is appropriate.

		Aug 2005. A.F. Williams). If the intention is to make the lower operational threshold 1.0mmol/l, this should be correctly referenced.	
41	Page 16 4th paragraph	See comments above related to Page 9. *Infants whose feeding behaviours are suspected to be a sign of illness rather than reluctance should have blood glucose measured.* As stated above, this statement could encourage blood glucose monitoring in healthy babies, even in the absence of known risk factors and / or abnormal clinical signs.	See response 37.
42	Appendix 1	It is an excellent idea to have written information for parents. However, the leaflet is quite long and so it may be necessary to consider layout and design in order to make the leaflet usable for parents. The information on 'jerky' movements may be too difficult for many parents to interpret accurately and could cause anxiety.	Thank you. The leaflet is intended as suggested information to be provided to parents to enable them to be active partners in the care of their babies. Centres may wish to modify design or other matters of style.
43	Flowchart D	Overall this chart is clear, easy to read and sensible. The title could be amended to prevent confusion as these babies are not at risk from hypoglycaemia in the absence of risk factors or illness. It would be helpful if the title 'Birth' could be large and bold so that the reader knows where to start. It would be helpful if the statement from earlier in the document related to healthy, term babies often feeding at birth and then sleeping for many hours be repeated at the top of the flowchart to help avoid unnecessary anxiety among practitioners. The time scales in the flow chart could lead to a great deal of intervention. Bearing in mind that this chart is for healthy, term babies with no risk factors, it is suggested that a little more time be given to allow them to breastfeed naturally. Perhaps 4-6 hours could be amended to 6-8 hours and the feeding plan amended so that there is not an expectation that babies will feed 8-10 times in the first 24 hours. Bearing in mind that these babies are low risk, monitoring of wellbeing in the first day could also be relaxed a little. Reviewing every 2-4 hours could perhaps be amended to 4 hours.	Thank you. The overall project title has been removed. Done. The guidance is not intended for healthy babies who have fed well – it is for those who have been assessed to be reluctant, for whom an assessment 6-8 hours after birth is warranted. Disagree. Disagree. Reluctant feeding within first 24 hours could be a presenting sign of illness. Frequency of monitoring needs to take account of infant well-being.

Dr Kathryn Beardsall and dr Amanda Ogilvy Stuart on behalf of the Neonatal Unit Cambridge University Hospitals NHS Foundation Trust Cambridge Biomedical Campus			
44		Thank you for all the hard work in compiling the new Framework for practice regarding the management of hypoglycaemia in the term infant. In a field where the evidence base is limited it will be a great asset to have a unifying guideline for clinicians and reassuring to parents. It is also good to see the use of dextrose gel included in these guidelines as this should help support keeping mothers and babies together. We do however have a few concerns regarding the draft document. Whilst we appreciate that the driver for these guidelines is 'reducing term admissions,' in this instance the additional comment that admission to Neonatal care can indicate that harm has taken place seems misleading. Admission to neonatal care for babies considered to be 'at risk from hypoglycaemia' is about balancing risk and benefit, and preventing harm. We would hope that a guideline would focus on preventing harm (even if that means medicalisation) rather than a concern about political perceptions of aetiology. We are unclear of the rationale for the apparent incongruent advice regarding lowering the BG threshold for infants of diabetic mothers, and growth restricted infants, to <2.2mmol/l whilst recommending that in infants with proven hyperinsulinism it is necessary to keep BG > 3.5mmol/l. Our understanding of the pathophysiology for risk in infants of diabetic mothers (as well as some IUGR infants) was their transient hyperinsulinaemic state. Both these groups do not produce ketone bodies as alternative metabolic fuels, hence the low cut of values for intervention could be potentially damaging. It would therefore seem more appropriate to have a consistent threshold for infants with the same 'pathology.'	Thank you. Thank you. We agree that not all term admissions indicate that preventable harm *has* taken place. The document states that term admission *can* indicate that preventable harm has taken place. We advocate the operational threshold of 2.0mmol/l, not 2.2mmol/l. We advocate the threshold of 3.0mmol/l in cases of proven CHI. We agree with this understanding of pathophysiology in some infants of diabetic mothers (notably those with poor control, which is the minority in a UK setting) and some IUGR infants (other pathologies such as low substrate stores contribute to impaired adaptation in this group). It is not possible to identify infants with significant hyperinsulinism based on disease category. We reserve the higher operational threshold for those with confirmed hyperinsulinism, who will be identified early if the FfP investigations practice points are

			followed, or by clinical suspicion - protracted low BG or excessive energy requirements - in the event of delay in sample processing. Maintenance of BG >3.0mmol/l for *all* IUGR infants and *all* infants of diabetic mothers, many of whom will not have significant hyperinsulinism would, in our view, lead to excessive intervention without evidence of benefit.
		In the same context we would like to highlight the studies using dextrose gel had a threshold for hypoglycaemia defined as <2.6mmol/l. The potential for using this intervention at lower glucose threshold has not been assessed.	Although the threshold chosen by the Sugar Babies investigators was 2.6mmol/l, infants with BG <2mmol/l were adequately represented in the study group.
		We share the concerns expressed by the committee about the accuracy of glucose measurements in the 'hypoglycaemic thresholds' used in the newborn. All methodologies have error and lowering thresholds for intervention from <2.6mmol/l, which is current practice in many units, will only increase the relative error in any measure and potentially increase the risk. In addition, there is no comment or advice on the importance of reducing the risk of pre-analytical errors in sampling, a potential significant source of error in neonatal blood sampling. What level of 'low' BG on a hand held meter would the committee recommend needs to be confirmed on an 'accurate' method.	We agree that pre-analytical factors related to sampling are important and have added a line about this to the FfP (PP6). Because we are not advocating use of handheld glucometers, we cannot suggest thresholds that might be considered reassuring. Users of handheld devices must be aware that the ISO standard only requires accuracy +/-0.8mmol/l.
		Some of the terminology may benefit from clarification as IUGR should not be used for infants based on weight centile alone, this simply reflects that they are small for gestational age. The two terms are NOT interchangeable. In this context it is important to consider that an IUGR infant lying on the 50th centile (who might have been destined for the 90th centile) is probably at more risk from hypoglycemia than a smaller SGA infant.	Agree. We have amended PP1 and Section B to emphasise that clinically 'wasted' infants (low subcutaneous fat stores) have experienced fetal growth restriction and are at risk even if their weight is > 2nd centile for age and sex. See response 83.
		We understand from the guideline that expression of colostrum is encouraged to support babies who have a BG recorded	If the first pre-feed BG is 1.0-1.9mmol/l the infant moves to Flowchart B, which advises a plan that includes feeding support and consideration of dextrose gel. We

		1.0-2.0mmol/l, but no volume is suggested, and the baby does not have a repeat BG taken until the next feed (3 hours), with it being considered appropriate to repeat this advice for a second cycle. We are anxious that this level of support/intervention for a baby at risk of impaired metabolic adaption, in particular the possible length of exposure to hypoglycaemia poses a risk. We feel the advice regarding investigations may benefit from moderating in light of the clinical context. We consider the current recommendation as 'overkill' for this group of babies in whom there is a clear reason for hypoglycaemia. For example, it would not be surprising for the infant of a diabetic mother to have a single BG<1.0mmol/l, and it would seem unnecessary to subject this child to multiple further investigations, if the hypoglycaemia responded to appropriate management and was short lived. Similarly, the clinical context will help to guide investigating for other causes of hyperinsulinism as opposed to rarer causes of hypoglycaemia without the need for expensive and difficult to interpret results in these babies.	propose measurement of BG pre-the second feed and third feed If the baby is sucking effectively and has no abnormal clinical signs; and we state that BG should be measured sooner if there are abnormal signs. It is not clear that two measurements pre- second and third feeds of 1-1.9mmol/l in a well infant establishing breast feeding presents material risk of brain injury. We accept that clinicians will have different thresholds for investigation and agree that these may be guided by clinical context. Because of the improved diagnostic yield when samples are taken during a period of low blood glucose, centres have adopted a 'hypoglycaemia screen' approach so staff can collect appropriate samples in an emergency situation. The list is a minimum set of investigations for those centres wishing to use the screening approach to severe (<1mmol/l) or persistent (>2 values 1-1.9mmol/l) hypoglycaemia.
NIFN (National Infant feeding Network). As you can see it's got a great response . It was sent to all regional NIFN leads who were asked to share it with their members (infant feeding leads)			
45	General comments	Generally I like the framework and would be happy to develop guidelines for our trust based on this. I like the threshold of 2 mmols for glucose monitoring, as I think this will save unnecessary formula top-ups being given to babies I like the leaflet for parents. This is clear and will help them understand their baby's needs. **E mids** We have reduced the treatment threshold from 2.6mmol/l to 2.0mmol/l and found this has reduced supplements of formula and increased confidence in mothers. It has taken and is still taking time to get this across to all staff. We have very few babies ever go to NNU with hypoglycaemia due to excellent hand expressing and giving of colostrum. I look forward to improving still further with this excellent framework for	Thank you.

		practice. **E Mids** Fabulous document, so pleased the evidence has been so thoroughly reviewed **Y&H** This document is very clear and the management of hypoglycaemia and the pathways. I look forward to seeing this in practice. I like the flow charts the body of he document is very in depth and useful to share with our paediatricians **SW**	
46	Pg1,	2nd centile, we anticipate that this will be an area of local variation, especially in areas where GAP is used (acknowledge that the Cochrane review didn't give any evidence) Comments from **London** NIFN	See response 1, 21.
47	Pg 2 pt 3 P2 P2 Exec summary	Breastmilk is ideal and recommended for these babies because of it's ability to enhance metabolic adaptation **London** Regarding IUGR - I like the fact that specific gestational centiles are used - otherwise the 2.6kg baby at 42 weeks isn't deemed at risk of hypoglycaemia but the 2.6kg 37 weaker is. I wonder why standard centiles have been used when our mothers have the antenatal personalised growth charts, based on maternal size and ethnicity **west mids** Realise framework is for term babies, but only at risk baby missing is preterm- is it worth having a line about moderately preterm on a postnatal ward and considering inclusion in local guidance **Y&H** IUGR we are using 10th customised bw centile as perinatal institute guidance **e mids** As a trust we have always used the 9th centile figures does latest research suggest the second ? and what about hospitals using GAP what would advice be re this**.Y&H** Identify where the reluctant feeders plan is ie appendix Two **NW**	Agree. See responses 1, 21. See response 2. See responses 1, 21 and section B Amended, point 9.
48	Pg 3& 22 &	Need consistency re if 2.0 mmols or below	<2.0mmol/l.

	throughout P3 Pt 5	2 mmols **London** Use of blood gas analysis for reliable blood glucose readings – there will be a cost as not all wards have these. Need to ensure available for rapid results, otherwise there will be a time delay **west mids** The ward is not able to easily access blood gas analyser and so a hand held glucometer is used – any reading less than 2.0mmol/l would be then tested on blood gas analyser whilst treatment is instigated **e mids** I like the use of gel to correct low blood sugars. We do not keep that on the ward. We used handheld monitors we know under 2.5 mmols they can be unreliable but I would still want us to be able to use them as they are easily accessible and give instant result I like the chart that provides the weights of babies staff will appreciate these so they do not have to work it out. **SW**	See revised PP points 3-6, responses 239-242 and be aware that the current ISO standard only requires accuracy +/-0.8mmol/l for values <5.5mmol/l. Thank you.
49	Pg 3, Pt 8	Make the point that this is not necessarily consecutive, very confusing -open to misinterpretation. This took us 20 mins to decide what it actually meant.**London**	This is a set of actions that are required for all newborns, not necessarily consecutive.
50	Pg 6 Pt 1 P6	Some units have Beta Blockers as a risk factor, but we are not convinced as a group that it is justified to put a baby on the BG protocol just on the basis of BB's. 4% risk is too low. We are inclined to say that we wouldn't have beta blockers as sole risk factor, another factor such as IUGR would have to be present A national audit is called for! **London** Re beta blockers- we have only monitiored babies of mums on labetolol more than seven days prior to delivery, should we include any beta blockers, any length of time ? **Y&H** Can they include what dose of betablockers that would warrant monitoring the baby ? Currently our hospital monitors babies whose mother had a week of oral medication but not a one off dose in labour. We haven't found any evidence to measure this by and it would be great to have a definitive answer. **SW**	See response 8. Exposure in third trimester or at time of delivery. Clarified in PP1 See response 8 and section B for evidence We opted to use the conventional terminology.

		Infants of diabetic mothers – could this be re phrased to be infants of mothers with diabetes **w mids** Measurement of blood glucose concentration should be performed for any infant who has one or more of the following conditions or clinical signs: NW	
51	Pg 6 Pt 2	Sepsis- please define suspected (currently this could include babies on prophylactic antibiotics). Define early onset sepsis. Lethargy-needs definition **London** Perinatal acidosis (cord arterial or infant pH <7.1 and base deficit ≤ -12mmol/l)—this should read base deficit ≥ -12 mmol/l. NW Hypothermia - is it one instance of less than 36.5°C? What if the infant warms up well after an hour or so, would blood glucose measurements be required **E Mids** Suspected / confirmed early onset sepsis will raise the number of babies having BG tested and possible supplements we only do BG on babies with confirmed sepsis this would presumably include all babies on IV antibioticsThis is also repeated on page 10 Abnormal feeding behaviour paragraph pretty much covers every baby on PN ward. May be using the wording 'abnormal feeding behaviour especially after a period of feeding well' which is the wording used on the flow chart may be more appropriate? **Y&H**	Standard definitions: suspected is those infants who are started on antibiotics based on risk factors or clinical suspicion; confirmed is culture positive sepsis; and early onset is sepsis presenting within 72 hours of birth. Amended. Hypothermia not attributable to environmental factors. PP2 clarified. Because it is often not possible to distinguish suspected and confirmed early onset sepsis before cultures are back we recommend a single BG measurement. Disagree: not all babies on PNW have abnormal feeding behaviour as defined it in PP2.
52	Pg 6,last but one paragraph	Needs to emphasise abnormal clinical signs. The wording of this is open to reluctant feeders having unnecessary BGs. We aren't aware of any babies that became hypo who simply don't feed-there are always other abnormal signs which admittedly do get missed, but this an education point. Emphasis on decline of feeding pattern after feeding is beginning to be established, especially if this is from the parents(who might have not been aware of clinical signs)**London**	Reluctant feeding in an otherwise well infant does not necessarily require BG measurement. Reluctant feeding after a period of feeding well or if there are any abnormal clinical signs justifies BG measurement.

		Realise this is challenging, but classifying abnormal feeding behaviour could lead to unnecessary intervention. Normal number of feeds in the first 24 hours is 3-4. If a baby is responsive on handling and no risk factors I'm not sure we should be intervening. Observation of colour,, tone etc should be sufficient **Y&H**	
53	Pg 6	We like the comment on jitteriness! **London** Really helpful classification of jitteriness **Y&H**	Thank you.
54	Pg 7 PT 3	Please recommend that blood gas machines should be used, rather than suggest it **London**.	Beyond remit.
55	Pt 4	Last sentence, what is meant by low value- <5.5 mmols (which is when machines might become inaccurate) or 2mmols and below.**London**	<5.5mmol/l.
56	Pt 7	Use <u>should</u> be instead of <u>maybe</u> at beginning of last but one line**London** Written information for parents of baby at risk of hypoglycaemia is really useful **w mids** 'If no colostrum available….. consider formula supplement' – Could a time by added? We have 24 hours (as long as the infant is well)**E mids**	Thank you. Babies at risk of impaired metabolic adaptation should receive energy within 1 hour.
57	Pt 8 Pt 8 pt 10 Pt 11	<u>Birth</u> instead of <u>delivery</u>.**London** Skin to skin should last for at least an hour or until the end of the first feed, as per BFI guidelines. Skin to skin contact is known to help initiate feeding behaviours despite feeding method so should be promoted for both breast and bottle feeding families NW Attention to ambient temps on transfer as well **London** Our delivery suite rooms are draughty. I think it is unachievable to get them draught free, but I think thermo regulation is important, this is also repeated in the flow chart box on flow chart A Y&H Not sure staff would document feeding cues **Y&H** Could 'keep in skin to skin be added to	Amended. Agree. Evidence of feeding assessment through documentation is recommended. Implicit from earlier PPs.

		prompt staff **SW**	
	pt 12	Once 2 at 2.mmols are reached these babies will still need active feeding support until feeding is established (danger of these babies not receiving attention once they pass the BG protocol).**London**	Agree. PP amended to emphasise this.
		Blood gas machines – will there be any funding streams available to help buy the recommended machines? **London**	Determined by local services.
		What happens if baby does not go to the breast and no colostrum is available? "Any colostrum expressed should be fed immediately to baby and continue to express" Mum may only express 0.2ml is this small amount sufficient? Should the possibility of donor breastmilk be included? Is this done in some units? **NW**	See responses 56 and 85.
	pt13	If no colostrum is available – shouldn't we just wait to see how the blood glucose is? Not sure we should supplement a baby as a precaution, all babies will be different and as discussed in P 13 blood glucose is driven by endogenous glucose production rather than feeding, and p 14 'no study has shown that the treatment of asymptomatic hypoglycaemia in 'at risk' babies improves neurological outcome' it appears to be the association with acute neurological dysfunction which is the greatest risk, if the baby is	10-15ml/kg per feed of formula 3 hourly is recommended in the document, consistent throughout document.
	P8 p14	At risk baby not effectively feeding, no EBM consider supplementing with formula but no guidance on amounts, on p 20 On Page 20, healthy term baby, reluctant feeder, no EBM – guidance is give formula 5/10mls per feed (increasing to 10-15mls on day 2 and then 20mls on day 3)Can these same amounts be used **E Mid**	
		If no colostrum is available .. could this be interpreted as an opt out to give formula very early on (no timings or BG mentioned yet **SW**	See response 56 – at risk infants require energy within 1 hour.
		well with good colour, tone , responsiveness should we give formula which has well evidenced risks . **Y&H**	
		The amount could be too much for a beby to take or might inhibit next feed. **London** Formula feed offer 10-15mls/kg (flow chart	Clarified as 10-15ml/kg throughout document.

		A says 12-15mls/kg **Y&H** Needs greater clarification We are concerned about these amounts, they don't correlate with stomach size, in our clinical experience newborns are unlikely to take large amounts or if they do will vomit or not be able to take subsequent feeds. Where is the evidence for these amounts of formula? This is ignoring the recommendation for response bottle feeding.London Is a blood glucose reading taken before 2 hours of age not accurate? Ie indicative of mother's blood sugar? Should it not therefore read as take a blood sugar reading between 2-4 hours of age unless there are clinical signs of hypoglycaemia earlier. **Y&H** Risk of performing the BG too early, could this read no earlier than 3 hrs and no later than 4 hrs? Need to be more explicit about the purpose of regular BGs. Staff get very caught up in pre and post feed BGs and sometimes restrict the feeding to comply with pre-feed BGs.London Which pathway are they placed on if first BG is over 2? Do they stay on Pathway A? Have to read to end – clear then that they stay on / how monitored and come off. **SW**	Recommended intake in standard texts is 80ml/kg/day for formula fed infants with risk factors for impaired transition e.g Rennie and Roberton. First measure is recommended pre-second feed and by 2-4 hours in babies with risk factors but no abnormal signs. In babies with risk factors who are well it is the nadir that is important to capture as babies establish a fast-feed cycle. Post intervention measurements are used in the emergency situation of severe or symptomatic hypoglycaemia, when they are needed to assess response to treatment and determine frequency of subsequent interventions such as bolus glucose or increased infusion rates.
58	P8 pt 16	Re IDM not being discharged until 24hr old – perhaps need a reason for heis – might be in parents info (not in p 12 of evidence **SW** Feeding effectively, instead of well. Use breastfeeding assessment tool. Diabetic-may have an issues with multips staying for a full 24 hrs **London**	Hypoglycaemia can occur after the first 12 hours in this group. The advice is consistent with NICE guidance, cited in FfP. Added to information leaflet. Assessment tool added to information leaflet.
59	P8 pt 17	What happens if the first BG is >2 **SW** No earlier than 3 hrs and no later than 4 hrs **London** Bringing a hypoglycaemic baby's blood sugar up wth sugar is a marvellous idea. It avoids the need to introduce bovine milk protein and the increased risks of auto immune disease for the baby. Very important in light of the current diabetes epidemic. And of course the findings of the Sugarbabes study that babies are less likely to stop breastfeeding if dextrose	Continue to support feeding.

		rather than formula is used.	
60	P 18	Is you baby warm enough? …… the temperature should be between 36.5 & 37.5°C, could this be amended to ≥36.6°C **e mids** How to avoid low blood sugars – Put a hat on your baby for **the first few days** would go against current SIDs prevention advice **e mids** The option of buccal dextrose, as opposed to using formula (aware EBM is the best option, not easy for a stressed mum who has been told she needs to express due to low BG). Why was this chosen as opposed to glucose? Glucose water bypasses the need for enzymes so theoretically will raise blood sugar more quickly. **W mids**	Normal baby temperature is 36.5-37.5 inclusive We recommend use of dry hat as part of thermal care of newborns in hospital. SIDS data refers to later infancy. See evidence base described in section B
61	Pt 21	Should read 1-1.9mmols. see 3rd point.**London**	Amended
62	Pt 25	Suggest get rid of this paragraph and say instead follow reluctant feeder guideline which include assessing clinical signs. Any record of abnormal clinical signs should lead to a BG assessment.**London** Skin contact releases baby's innate reflex – could mention laid back nursing (it's mentioned later) **SW**	Disagree. Amended
63	Pt 26	This would be used as an excuse for random BGs. See comments above. Please remove.**London**	Amended.
64	P 10	No evidence for LGA – great!! **SW**	We recognise controversies arising from the current evidence base and these have been discussed in section B.
65	Pg 11	Seems to be a discrepancy between the 0.83 mmols difference and .5mmols stated on page 7 **London**	Thank you – consistency of 0.8mmol/l has been made throughout document.
66	Pg 11	In summary….use recommended instead of consideration. Might also be worth pointing out the economics of avoiding a NNU admission **London** I think staff find the assessment or review useful if it is on the flow chart. Most staff will not read the full guidance, and this is different to signs that may indicate hypoglycaemia. Monitoring wellbeing is on flow chart D and highlights need to get parents input. **Y&H**	No change. The document needs to be read in its entirety by users.
67	Pg 12	4th paragraph, these are at risk babies so they are on the BG protocol anyway-so this paragraph isn't needed. Open to	Disagree.

		misinterpretation-non risk babies could be included by those with minimal knowledge. **London**	
68	Pg 12	3rd paragraph needs more prominence. Move/copy it to pg 7, under Infants identified as at risk. Also suggest the wording is more emphatic, we are concerned that no one will understand the implications as it is currently worded. Suggest wording such as Breast milk feeds can (/appear to) enhance the baby' ability to produce ketones, an important alternative brain fuel, and formula feeds or mixed feeds may inhibit the production of ketones. So in order to reduce the risk of hypoglycaemia in formula fed babies, we recommend … 80-100ml/kg/day. **London** Many units do support antenatal colostrum collection and we look forward to the DAME trial results.**W mids**	Disagree that duplication or change is needed. The group considers that evidence is required before the practice can be recommended.
69	P 16	Assessment needs to be clarified and should be within 6-8 hours in the context of a general assessment of wellbeing' is a good statement **Y&H** I have recently had cause to reflect on the use of language after a mum's feedback about our "reluctant feeder policy" ….she felt her baby had been labelled with an eating problem at birth! We are considering calling it a sleepy baby guideline in next review. Could this protocol use sleepy baby instead of reluctant feeder ?? **SW**	Amended No.
70	Pg 17	Info sheet for parents. We would absolutely recommend that this leaflet is presented to user groups. This will not be accepted by any Trust without user group comments. Therefore there is little point in us commenting on this in detail. London NIFN can send this out to their individual user groups. Use blood glucose as standard and put sugar and hypoglycaemia in brackets. Certain drugs-might need to mention specific drugs e.g. Beta Blockers Also to add about AN hand expressing once DAME study is published Hat on baby for first few days – if blood sugars and clinical signs stable should this discontinue earlier in line with SIDS info	The information sheet provides information that the group considers parents would find helpful. BLISS contributed to its content by way of the FfP consultation. Local services may wish to alter style, points of language, and to gain local user group feedback. Cannot pre-empt evidence. See response 60.

		Cues should be same as p 20 including rapid eye movements Add in crying is a late sign of hunger **Y&H** Concerned that parents may find some of the wording alarming – "brain injury" - Could be "can Also some of the details about the baby's condition could cause some parents to be overly worried. For example: "strong, repeated jerky movements" being not normal compared to "light brief jerky movements" – not sure a new parent would be confident in knowing the difference "more than 60 breaths per minute" – very medical be dangerous" or "can be harmful" instead? **E Mid**	Amended. Crying is too non-specific to be defined in this way. Disagree.
71	P 18	Should jerky movements be in leaflet? Could add in that this might be response to sudden noise /movement **Y&H**	Yes. Jerky movements are distinct from the normal startle response.
72	Pg 19	Additional notes from Gillian Meldrum (sent the next day, but reflecting our thoughts) Why is the para about "sugar" gel worded "In some hospitals the team may prescribe … "when nothing else is worded like that. We have commented that the flow chart B should say "Give 40% buccal dextrose" so the parents leaflet should say "Dextrose gel (sugar gel) may be given to your baby, massaged inside their cheek, to increase their blood glucose." **London** 'if you are breastfeeding' should it read' if your baby is not maintaining blood sugar levels you may be asked to give formula' or in some hospitals a dose of sugar gel Under going home should it include diabetic mothers staying for 24 hours ? **Y&H** The information about dextrose comes after EBM and formula supps – implies that the baby will have dextrose after formula ? Formula feeding – allow baby to take as much as he wants – chance here to put in about paced feeding. Might be interpreted as finishing the bottle **SW**	The leaflet cannot state a treatment will happen if it is not used in all hospitals. No. 24 hours is recommended (NICE). Dextrose is described as being part of a feeding plan. The advice is to feed responsively and there is a cautionary line about over-feeding.
73	Pg 20	Appendix 2, we aren't sure why this exists. The paragraph on if the mother chooses to not express colostrum mentions formula- why? **London** Are we offering formula to reluctant to feed	Management of the reluctant feeder was included in the remit of the FfP because it is relevant to the overall ambition of the Framework. The FfP suggests use of formula for

		healthy term babies if mum isn't able to give EBM? Has the thinking changed that these babies cannot counter regulate. "to prevent a potential negative effect on a baby's wellbeing" Are we worried that the baby will energy from no intake at this stage? "The milk should be given by cup in volumes appropriate to the baby's age i.e. first day 5-10mls per feed, second day 10-15mls per feed, third day 20mls per feed. Formula should not exceed 20mls per feed once lactation is established." How often are we feeding the baby? If it is reluctant to feed then it may show no signs of feeding cues. If it is showing no clinical signs of hypoglycaemia then aren't we giving an unnecessary supplement of formula? **E mids** Feeding cues – 'some babies will develop their readiness to feed following delivery' doesn't really make sense **Y&H** Under hand expression – starting within 6 hours – evidence? If not breastfeeding should be encouraged to express frequently 8-10 times in 24 hours and replace formula with breastmilk when available .**Y&H** Chooses not to give colostrum – don't understand why there would be different volumes of formula for this baby – if the mother has breasted then no need for formula. If hasn't breastfed then ? (clinical need of formula fed baby who may not be counterregulating) should initial volumes required for a formula fed baby – 10-15mls/kg first feed and hten 80-100mls/kg. If we are defining these babies as different because the mother is choosing to breastfeed is there evidence for the volume? If yes should this information be on p 7 (12)**Y&H**	women who chose not to express breast milk. Follow flowchart D. Agree. Sentence removed. Agree. Amended to soon after birth. See section B for rationale of 10-15ml/kg per feed on day 1 if formula fed.
74	P 22	Does this mean discuss with a neonatal team or a neonatal or paediatric team ? **Y&H**	Those responsible for providing medical care to newborns within the service.
75	Flow chart A	1st box, 4th point, not consistent with previous 10-15 mls recommendation. 3rd point add effective feeding 2nd box see prior comments re timing Need consistency re if 2.0 mmols or below	Amended. Effective is implied by 'support breast feeding'. Amended. Amended.

		2 mmols 3rd box, use responsive frequent feeding instead of baby led 3rd box last point, this is not consistent with responsive feeding (we appreciate that not all at risk babies will responsively feed) but feel that using hours of age eliminates confusion about the timing of BGs because the third feed might be as early as 3 hours! 3-4 hrs and 6-7 hrs is much clearer. Don't assume babies feed 3 hrly! Amount of formula stated could be unrealistically high-see previous comments. Last box responsive feeding not just breastfeeding Is there a length of time Box 2 missed out acidosis and sepsis Box 2 Last comment remove <u>especially</u>, although is this actually needed as a newborn baby won't have had a period of feeding well? Need a reminder that these babies need their feeding to be carefully monitored even once they have passed the protocol. Also what about the rare at risk baby who doesn't really feed effectively, but achieves good BGs? Would suggest adding <u>As a minimum complete at least one recorded breastfeeding assessment using local/BFI tool prior to transfer home.</u> **<u>London</u>** 3rd box down – We currently say ensure minimum 3 hourly feeds for 48hours for a baby at risk and then move on to responsive feeding if no concerns after this time but this box does not state 48 hours. Does that mean that we only need to ensure 2 blood sugars above 2.0 and ensure the baby is waking and feeding responsively and not stipulate continuing to feed at least every 3 hours for 48 hours? **Y&H** Like the fact it states feed by cue, at least 3 hourly (I've come across people delaying feeds so the pre-feed blood sugar is 3 hourly). In fact something may need to be said about this - 3 hourly blood sugars, or prefeed blood sugars **w mids**	Amended. Need to ensure frequent energy provision in babies with risk factors. See section B for rationale Amended No – two consecutive pre-feed measurements Acidosis and sepsis are not clinical signs of hypoglycaemia No need. There is a line: "Continue to support responsive breast feeding" Amended. Correct: 2 BG measurements >2.0mmol, then stop. But continue to observe for effective feeding for 24 hours over several fast-feed cycles in babies with risk factors, because some cases of hypoglycaemia can occur after the first 12 hours after birth Thank you. 10-15ml/kg - amended

		12-15mls/kg or 10-15mls/kg? **Y&H**	
76	Flow B	Why state first pre feed, doesn't this apply to any BG 1-2mmols, and do you mean 1-1.9mmols	1-1.9mmol/l
		1st box remove <u>consistent</u> and use <u>indicative</u>	No – signs are not specific. Not all centres are using dextrose gel
		3rd point state <u>give</u>, not <u>consider</u> otherwise there is no alternative for BF babies	
		4th point state when in hours	
		3rd box, 1st comment –unrealistic amounts-setting most mums up to fail.	
		3rd point state when in hours	3rd feed, should be less < 8 hours
		Last box responsive feeding	Amended.
		Add use blood gas machines for testing **London**	Covered elsewhere in FfP
		Is there evidence for 3-5mls/kg of colostrum – we presently give any colostrum when BG below 2.0 and it works very effectively – never observed a relationship between volumes and effect .	Amended.
		Should the bottom box say feed on demand ensuring 8 feeds in 24 hours? **Y&H**	Amended – volume removed.
		At risk baby, pre-feed BG 1.0-2.0 – give EBM 3-5mls/kg - Is this per feed? - If so this requires the mother to hand express a large volume of colostrum. For example 15mls, which most will struggle to achieve on day 1 **E Mid**	It refers to Box 2 which states offering the breast.
		First bullet point in second box down. Support BF (see box2) may be read as get the mother to express without offering the breast, it may be over 2 hours since the baby fed so this may need to be clearer.**Y&H**	See above.
		Offering BM 3-5 ml/Kg may prove interesting, and the next question from staff would be if 3ml/kg isn't available do we supplement with formula? Do we have any evidence that 3-5ml/kg is necessary? Don't remember discussing this last phone conference, but might be wrong **Y&H**	Amended.
		Says feed on demand, might be better to put feed responsively **Y&H**	Amended.
		3rd box has a phrase 'feed on demand ? change to breastfeed responsively. Should there be some follow up now that the baby is no longer on the pathway eg a	Agree.

		breastfeeding assessment to take place the next day What happens if 3-5kg /k cant be expressed? I presume you follow the loop which leads to another dose of gel (some staff might supplement instead) **SW**	
77	Flow C	Heading remove consistent replace with may indicate **London**	Unnecessary.
78	1st box	Move admit to NNU to top of box **London**	No – emergency management should be initiated on PNW.
79	Flow D	Change header-we think this is a formatting error **london** header says at risk of hypoglycaemia **Y&H** Birth should be in bold.. not sure where to start on flow chart **Y&H** Could this read 'plan for up to 4-6 hours following delivery' otherwise it could be interpreted as the plan at 4-6 hours after delivery? **Y&H** 4-6 hours following delivery ? evidence as before where it says 6 hours should be 6-8 if not fed unwrap, waken , skin to skin and offer breast, if doesn't feed hand express. The feeding plan feels very heavy handed, if a baby is not feeding 8 times after 24hours old then a feeding plan would be appropriate, but in the first 24 hours?? Monitoring of wellbeing in the first day as well as every 4 hours/ Bearing in mind any baby with risk factors is on observations – meconium, strep b , prolonged rupture, maternal antibiotics and maternal pyrexia etc, so the ones we are talking about here are the well babies with no risk factors. Suggest remove review every 2-4 hours and leave monitor wellbeing every 4-6 hours. Think we need to consider that some of these babies will be at home after a home delivery so are we sending midwives in? they're normal healthy babies that we are categorising and turning in to at risk with effects that might interfere with bf . Need to add paediatrician for units that don't have neonatologists. **Y&H** Position birth box higher – to make it clear it is the first box Well being box-Any concerns about Hypoglycaemia or <u>ill health</u> refer to relevant guideline Initiate active feeding plan box-5th point when milk comes in rather than 48 hrs 6th point- need to be cautious as staff often	Amended. Amended. Amended to 6-8 hours. Amended. Amended. Amended. Ok.

		assume all is Ok because baby is receiving EBM so don't actively support BF. Also add refer to BF team/IFL 9th point-Discuss with Neonatologist rather than review to neonatologist Please clarify use of * **London** Initiate active feeding plan has review every 2-4 hours and monitor wellbeing of baby every 4 hours - this monitoring box should be on all flow charts? **Y&H** Box headed 4-6 hours following delivery, could be misinterpreted as not necessary to put baby to breast just give EBM **Y&H** Box headed responsive feeding - this is not about responsive feeding? **Y&H** Initiate active feeding plan* but there is no sign of what this active feeding plan is. Has this been missed from the guideline or is it for each Trust to determine at this point? **E mids** Flowchart D – I am not sure if this is about a baby who is at risk of hypoglycaemia, eg because their mother is diabetic, but is well, term and born with good weight and apgars, or if they are not at risk of hypoglycaemia as they or their mother has no risk factors. If this is a term healthy risk free baby, I am not sure it is helpful to have this chart in the hypoglycaemia guidelines as it may confuse staff and encourage more active management than necessary. **E mids** Term neonates at risk of hypoglycaemia Flowchart D. Management of reluctant feeding in healthy breastfed infants > 37 weeks If the infant is healthy and term then how can it also be at risk of hypoglycaemia. If it is an at risk baby we will need to do pre feed BMs. Do you need to change the overarching header for this flow chart? **E mids**	Amended to refer to Neonatal team. * and ** link to boxes on flow chart NEWT monitoring is recommended for the at risk groups (Flowcahrts A-C). Unlikely. Amended. Box headed 'Active feeding plan' No, not for babies with risk factors. Management of reluctant feeding was considered part of the overall strategy for avoiding term admissions. As above – for reluctant feeders, not infants with risk factors. Title amended.
80	P 33 (parents info p 2)	Implies that the baby will be given formula then gel is mentioned 'for some hospitals' is this an appropriate place to turn this around giving the expectation that gel will bw offered 1st and formula is only if the hospital is not doing this? If we want all hsopitals to change practice and be offereing gel (its often the parents that can provide a push for change. **SW**	See response 72; dextrose may be used as part of a feeding plan.
Dr Jonathan Cusack (Leicester Neonatal Service)			

81	General Comments	Thanks for producing this: it has clearly taken a lot of work and is well written, referenced and easy to understand. My only comment is regarding LBW / large for gestational age. You have provided suggestions for which babies to worry about, but these are different in different ethnic groups. We have had issues in Leicester, where an Indian baby might be considered macrosomic at 3.5 Kg and normally grown at 2.5 Not quite sure of the best solution for this: might just need an acknowledgement in the text. (I have a trainee doing a PhD on this topic if you need more info!)	Thank you. We agree that further research on this topic is required.
Unidentified			
82		This is a fine piece of work: pragmatic, sensible, and avoiding extrapolation into evidence free territory.	Thank you.
Dr M P Ward-Platt			
83	Page 6 Section A	My only comment is that it is a shame that no mention is made of the thin, scrawny 'wasted' baby, who may not be all that small on the centiles and therefore may not be identified as growth restricted, though this is probably the case. These babies are relatively easy to identify (visible ribs because of very little body fat, loose skin looking a size too big for the baby) but are often missed at birth. It is a few of these ones which in recent years have come to my attention when they have developed symptomatic hypoglycaemia and gone on to have neurological sequelae.	Agree. We have qualified the first risk factor (IUGR) by adding ‘clinically wasted’ as a possible manisfestation of growth restriction.
Dr Merran Thomson			
84	General	An excellent framework – good combination of evidence and common sense. Will there be an education package to support implementation?	Thank you. There is an intention to support implementation of the guidance through the national Maternal and Neonatal Health Safety Collaborative, which is including avoidance of hypoglycaemia in its package of interventions.
Tracey M Jones			
85	General	Having reviewed the above document I would like to offer some feedback. I found the guidance to be easy to follow and informative I will certainly direct the student midwives and neonatal nurses to it once published. However I was disappointed to	We are not aware of evidence for use of donor milk to prevent neonatal hypoglycaemia (safety, efficacy, health economics), so have not recommended it.

		see no mention of the use of donor expressed breast milk for the treatment of low grade hypoglycaemia specifically page 19 which offers advice for parents and mentions the use of formula milk. Many neonatal and post natal units within the UK and internationally are now utilising donor breast milk for the avoidance of administration of formula milk to term and pre term infants whose mothers are unable to supply breast milk where there is a risk of hypoglycaemia. I can see that there was an infant feeding advisor on the panel please can you clarify is she has experience with the use of donor milk as there is a leading professional who could be a valuable resource in relation to reviewing and contributing to this document her name is Linda Coulter I can pass on details if required.	
Elizabeth.Pilling			
86	General	This reads really well and seems a pragmatic approach. The flow charts appear easy to follow and clear.	Thank you.
87	Page 6, 2	This specifies suspected or confirmed sepsis as a risk factor for sepsis, however does not appear in the flow chart A box 1. I would suggest it means clinically suspected sepsis (rather than all the infants who get antibiotics for maternal risk factors as per NICE)? I think it seems OK not to be in flow chart A, as unwell infants would get glucose monitoring for other reasons listed.	Agree.
88	Flow chart C	Is there space for a box to help calculate how to increase glucose delivery by 2mg/kg/min (eg how many ml/hr of 10% increase needed?). I'd be worried that this might be tricky for some to calculate.	We have added Appendix 4 to assist practitioners with accurate dosing.
Elizabeth Gunn			
89	7, point 12 and flow charts	There is mention on a number of occasions about putting a hat straight on. I thought there was emerging evidence to suggest this was not best practice due to the baby needing the ability to regulate temperature and a wet, sticky hat left on could do more damage than good.	We advocate use of a dry hat to aid thermal control in hospital only. See response 60.
90		Will the dex gel be expected to be kept on the postnatal ward and will a midwife be able to administer as part of their care (midwives exemptions)? Is there any evidence that shows having increased their CBG with gel that it won't then suddenly	Services will make their own arrangements for storage, use and prescription of dextrose gel. The evidence of safety is described in section B.

		drop further due to the sharp rise? There is no mention of donor milk which although not accessible in all areas it would be great to be mentioned as best practice if available and something to work towards.	See response 85.
91		If the recommendation is to stay in for 24 hours does that include all babies born to diabetic mothers (including only diet controlled)	Yes, this is consistent with NICE guidance. See response 75.
92		Could we have some clearer guidance around beta blockers as we have had them added, removed and added again and we are told different things such as ' only if they are on x total dose or only if x given on day of deliver' etc.	See response 8.
93		This is guidance for term babies but we are getting so many more borderline 35-37 weekers on the pn ward. Will there be separate guidance coming out for those babies?	See response 2.
94	page 19	Suggests giving colostrum by finger/cup/syringe and then in the next paragraph it says cup or bottle	Inconsistency removed.
95		Suggestion of reluctant feeder is made at 4-6 hours and although we want these babies to feed regularly and they are at risk is that too tight a time frame from birth?	Amended to 6-8.
Dr Simon Clark			
96	Page 30	I think this would lead to more admissions on our unit, from the comments in box 3 I have attached our guideline, which has, I think a better flow charts on pages 9 to 13	Thank you for sharing your guideline.
Dr Porus Bustani			
97	11	Regarding the use of handheld meters: It is stated that below 2mmol/L these may not be reliable and that gas analyser measures should be conducted instead. In reality, when a glucose of e.g. 1.8mmol/l is found in a well at-risk infant on a glucose meter, it is unlikely that a "true" glucose is then conducted in this baby, but instead an appropriate measure e.g. feed is proceeded with. For the next glucose, it may be worth carrying out a gas machine glucose to see if it has increased at the same time as a meter glucose. Glucose meters tend to under-read rather than overread making overtreatment more likely than undertreatment. Where overtreatment only consists of giving a feed as was planned, repeating the glucose immediately may not be mandated.	Ward based blood gas analysers are the gold standard because of expected correspondence with laboratory based measures. If a handheld glucometer must be used then it should conform to the ISO 15197:2013 standard and users should be aware of the limits of agreement inherent to that standard (possible error of +/-0.8mmol/l for values <5.5mmol/l). We welcome research efforts to evaluate and improve the accuracy of point of care testing including the study of Makaya et al. We note that although the negative predictive value of the Novastrip at thresholds of 1mmol/l, 2mmol/l and 2.5mmol/l was very high in the cited study, the

		We published the accuracay of glucose meters (Statstrip) below 2.6mmol in 2011 demonstrating the interpretation of handheld glucose measurements in neonates (Makaya T, Memmott A, Bustani P Journal of paediatrics and child health; Point of care glucose monitoring on the neonatal unit)	PPV was low (30%, 36% and 59% respectively). The problems of uncertainty and repeat testing required with such low PPV would be overcome by use of ward blood gas analyser. We have amended practice points 3-6 to clarify these issues.
98	Investigating hypoglycaemia	Agree with the list of investigations. However, the need for investigating hyoglycaemic infants who were born to a poorly controlled diabetic mother seems unnecessary when hyperinsulism is an obvious diagnosis. Can this be inserted as a caveat unless it is particularly prolonged and pronounced?	See response 44.
Dr Alan C Fenton			
99	Flowsheet B	There is a 'gap' in the advice as follows. If a baby remains with a blood glucose level of 1.0-2.0mmol/l on 2 occasions, Box 3 suggests 'consider NNU admission'. Do we assume that babies should then be treated as per Flowchart C? Would 2 hourly or continuous feeds be a reasonable step before i/v access for these asymptomatic babies with a blood glucose >1mmol/l?	Agree. We have amended Box 3 to: "If more than 2 measurements 1.0-1.9mmol/l, inform Neonatal team. • Screen for causes of hyopglycaemia, consider sepsis. • Consider increased feed frequency, nasogastric tube insertion or i.v. infusion of 10% glucose." (Because of variations in services with respect to transitional acre facilities, we have not specified place of ongoing care, which might be TC, postnatal ward or NNU).
Jo Lincoln, Infant feeding Coordinator			
100	p2 Exec sum 1	IUGR we are using 10th customised birth weight centile as perinatal institute guidance	See responses 1, 21.
101	P3 Point 5	The ward is not able to easily access blood gas analyser and so a hand held glucometer is used – any reading less than 2.0mmol/l would be then tested on blood gas analyser whilst treatment is instigated	See responses 97, 113 and 239-242.
102	P6 Point 2	Hypothermia - is it one instance of less than 36.5°C? What if the infant warms up well after an hour or so, would blood glucose measurements be required	See response 51.
103	P7 Point 7	'If no colostrum available….. consider formula supplement' – Could a time by added? We have 24 hours (as long as the infant is well)	Infants at risk need energy provision within 1 hour.
104	P9 Point 26	Recommending blood glucose be tested on a baby with no risk factors for impaired	Clarified that the recommendation applies to reluctant feeders with

		adaption is against current practice and could lead to routine/regular testing in babies that are just sleepy. A blood glucose is just something we can measure relatively easily but we can't measure counter regulatory response – generate Ketone bodies, inhibit insulin etc	abnormal clinical signs.
105	P17	How to avoid low blood sugars – Put a hat on your baby for the **first few days** would go against current SIDs prevention advice	See response 60.
106		We have reduced the treatment threshold from 2.6mmol/l to 2.0mmol/l and found this has reduced supplements of formula and increased confidence in mothers. It has taken and is still taking time to get this across to all staff. We have very few babies ever go to NNU with hypoglycaemia due to excellent hand expressing and giving of colostrum. I look forward to improving still further with this excellent framework for practice.	Thank you.
Anne Marie Rennie, Infant Feeding Coordinator			
107	mentioned at point 11 but not emphasised in the rest of the document	Please consider maintaining feeding at 3 hourly intervals until blood glucose is stable and the baby is feeding well. This would ensure no baby is 'forgotten about' or left too long between feeds, particularly during busy periods.	This frequency is listed in the PP and flowcharts.
108	ALL	Overall, change delivery to birth for more sensitive woman-centred language.	Amended.
109		Parent information leaflets to include a statement about exclusive breastfeeding being the best for optimal health for mothers and babies in first 6 months etc.	The tone of the leaflet promotes breast feeding as preferred.
110	8 section 12	Consider donor breast milk for diabetic mothers rather than formula milk (if available).	See responses 56 and 85.
111	12	4 hours for 2nd feed for a well baby (effect of morphine, pethidine etc during labour on babies and breastfeeding). Evidence suggests that opiates delay breastfeeding.	Evidence not sufficiently robust to provide separate guidance for babies exposed to opioids.
Royal College of Nursing			
112	General comment	This is a very welcome framework, the unnecessary admission to the neonatal Unit for the investigation and treatment of a term or near term infant with suspected or borderline hypoglycaemia can result in very significant risk to the bonding process, unnecessary invasive intervention and interruption to the establishment of a good feeding routine. Consequently, such	Thank you.

		admissions were often counterproductive, detrimental to developing family relationships, a mother's confidence and were an expensive use of neonatal resources. This framework should go a long way to prevent these situations, largely by providing a National Benchmark and treatment algorithms, avoiding the variability of practice between units based on local determination of what was regarded as hypoglycaemia and what the local care pathway should be. I agree with the evidence where cited and the general ethos of practice where the evidence is sparse or non-existent.	
113	Page 7 Point 3	I am in full agreement that a blood gas biosensor should be considered as the gold standard reference for measuring whole blood glucose it is more accurate and is quick. However, I feel that there should be recommendations made for infant who have had a home delivery or delivered in small midwifery units where a BG analyser may not be available. This may include the recommendations that given that there is a recognised margin of error infants with the lower end value should be transferred to a maternity unit for observation, investigation and potential management and not to an NNU or a children's ward. That way admission to an NNU could still be avoided if the rest of the guidance is followed.	Point 4 covers this situation by recommending that in the absence of blood gas biosensors in such situations, devices must conform to ISO 15197:2013 standard, and be validated for neonatal use. The limitations of these devices should be understood by the user (possible error of +/-0.5mmol/l for values < 5.5mmol/l). Most planned home births and MLU deliveries are for low risk women whose babies are not at risk of impaired metabolic adaptation. Therefore routine screening should not be warranted and early postnatal skin to skin and feeding interventions should take place. If there are concerns about infant wellbeing, a thorough clinical assessment should take place with blood glucose measured if it is uncertain whether non-effective feeding is due to infant illness or reluctance. If illness is suspected then transfer for medical review should be prompt and where possible, take place in a setting which keeps mother and baby together.
114	Page 7 Point 5	Should the impact of dehydration also be considered with regards to PCV.	We agree dehydration can be a cause of raised haematocrit in older children / adults, but is not the cause in the first 48 hours after

			birth.
115	Page 7 Point 9	Should the signs of effective attachment be provided? From speaking to student midwives and neonatal nurses there seems to be some confusion about this.	The scope of this document does not include guidance on breastfeeding and attachment. There is an expectation that this will be covered as part of the education and raining of staff.
116	Page 7 Point 10	Assess and document feeding cues and feeding effectiveness, say where as information entered on bedside charts is at risk of not being entered into the mother or infant's notes.	This is for local decision.
117	Page 8 Point 16	What is recommended for infants already in the community as admission to an NNU should not be an automatic default position.	The general principles of the FfP apply to all babies. Babies who are predicted to have, or are found to risk factors for impaired adaptation at the time of birth, should be cared for in a setting where energy provision and blood glucose can be monitored.
118	Page 11	"In centres where hand held devices are used to screen for low blood glucose, health care providers must be aware of the lack of reliability of these devices and low values should be confirmed by accurate measurement to ensure infants are assigned to the appropriate care pathway". Should an example of an appropriate care pathway be provided? Again, I am thinking along the lines of an infant born at home or in a small midwifery unit who could still be retained there with the appropriate early intervention and a safe wait and see approach. Final paragraph related to practice points 3-6 not all infants are born where there is ward based technology or in clinical settings.	See responses 44, 48, 97, 113, 244
119	Page 11	"Cold stress is associated with hypoglycaemia, and should be avoided by looking after mother and baby in a warm environment free from drafts with skin-to-skin contact, and placement of a hat". Should a temperature range be cited? Warm environment seems a bit vague.	WHO recommends infants are delivered in ambient temperature of 25°C and free of draughts.
120	Page 12	The statement "exclusive formula feeding has been associated with lower availability of alternative cerebral fuels needs a reference for credibility as there were earlier studies which suggested the	Thank you. We have corrected the typo. The supporting evidence is cited in section B.

		opposite example (Saint 1984). Saint L, Smith M, Hartmann PE.(1984) The yield and nutrient content of colostrum and milk of women from giving birth to 1 month post-partum. British Journal of Nutrition 52(1):87-95 Also there is a typo present in this sentence "wth"	
121	Page 13 and 14	Appreciate the professional debate and the synthesis of the evidence however I would be nervous of suggesting that hypoglycaemia at X value in an otherwise normal breast feeding infant is OK but the same value in a formula fed infant was not. The operational values need in my view to be set out clearly early on in this section and the debate cited later, if used at all. Appreciate this might be house style. This document is already 34 pages and as stated the debate is present elsewhere. These values are a professional consensus. Dextrose gel applied to the inside of the cheek would be a simple and safe initial treatment for infants with low blood glucose levels. However, it would represent a radical departure from many current care pathways, maternity and neonatal policies. The Cochrane review itself stated that the review was limited by lack of data for the important outcomes of effectiveness of treatment for individual episodes of low blood glucose levels and effects on brain injury. They recommended that further research was required. That stated, the desire to keep mother and baby together, improve the potential for successful breast feeding and avoid admission to an NNU is of very significant importance. How quickly is it proposed that this framework if adopted is reviewed?	We are not advocating different thresholds for breast and formula fed infants. The thresholds are clear in the flowcharts OK The group considered that current data support the use of dextrose gel as part of a feeding plan because of evident benefits and apparent safety, as outlined in section B. This decision will be made by the BAPM executive.
122		Appendix 3 Only oral syringes should be used. Any references to a needle should be omitted. Personally, I would have much fewer reservations about admitting infants under 2 kg to an NNU if hypoglycaemic as these infants are in my view at much more at risk and more likely to get cold as well. They have fewer functional reserves on which to draw.	We have clarified that oral syringes only should be used. We agree that infants <2kg have a different risk profile to term infants

		Equally so the macro-somatic infants with very high birthweight are less likely to be straight forward. Perhaps the extreme ends of the table could be usefully removed to avoid undue risks to these infants.	
123		The flowcharts are very good, they will be very useful.	Thank you.
124		The feedback received indicates that the document is very clear and outlines the management of hypoglycaemia and respective pathways. The flowcharts are particularly welcomed. We would suggest consideration of a list of contents to be inserted, along with a summary/list of practice points.	Thank you. This document follows standard BAPM formatting. An executive summary is already included on pages 2 and 3.
Rachel Jarmy, Senior Information and Content Officer, Bliss			
125	General	A general comment would be re-read from a point of view of literacy. It's helpful for broad audiences with wide ranging literacy levels to use more plain English. For example, 'very' rather than 'extremely' or explain what you mean by words like 'observations'. The average reading age for the UK is around 9-12 years old. There are several online tools you can use to check the reading age of your content.	Thank you. We have made some changes and are satisfied that the language is clear. See response 42.
126	General	Skin to skin is generally hyphenated (Skin-to-skin). It's also sometimes called kangaroo care, so it might be helpful for some parents to put this in brackets.	Amended.
127	General	Suggest adding images. This is currently very text heavy and from a literacy perspective images or graphics help make information more accessible and readable.	See response 42 on matters of style. There were no resources available to produce an infographic.
128	General	This should be made available online as well as in print	It will be on BAPM website.
129	Page 3	**Possible typo in point 4 (top of the page).** "Parents are partners…". If it's not a typo I suggest rewriting as I could not quite glean the meaning of this point.	Not a typo.
130	Page 18	**2nd paragraph.** Suggest changing 'have taken certain drugs' to something more like 'taken certain medication'. The word 'drug' often has an association with illegal or recreational. It depends whether you mean prescribed medication, or whether this risk applies to all drugs.	Amended.
131		**2nd paragraph.** This is a very long sentence, which a lot of parents may find hard to read. Suggest breaking this up into shorter sentences.	Amended.
132		**3rd paragraph.** Suggest changing	Amended.

		'some/several/a series' to just 'some'. The extra clarification is not needed or clear.	
133		**Blood sugar testing.** Suggest changing 'The blood test result is available immediately' to something like 'You will know the results of the test straight away'.	Amended.
134		**How to avoid low blood sugars.** Suggest using bullet points to make the sections clearer. Also suggest bolding the key message rather than italicising. This will help make it more readable.	Amended.
135		**Skin-to-skin contact.** Be consistent with the use of 'your baby'. It's best to use this rather than just 'baby' which can be slightly cold forparents.	Amended.
136		**Feed as soon as possible after birth**. Suggest changing 'make sure you understand' to something like 'make sure you feel confident' to avoid patronising parents.	Amended.
137		**Express your milk.** Suggest rewriting 'and your baby does not feed well' to something like 'and your baby sometimes struggles to feed' just to avoid any feelings of guilt the mother has (using language like not doing something 'well' often increases those feelings of guilt in parents).	Amended.
138		**Express your milk**. Rather than add the whole URL, suggest maybe writing what parents should search for? 'or see the hand expressing video available from Unicef. Search Baby friendly hand expression' or whatever brings up the video in Google. If this is to be made available online, this should be hyperlinked.	Amended
139		**Express your milk**. Suggest rewording the advice of expressing in between feeds to sound slightly more understanding of the pressures of doing this in hospital, and the fact that many women find expressing very hard. Something like 'If possible, it's good to have some expressed breast milk saved in case you need it later. If you can, try to express a little extra…'	Amended.
140		**Don't hesitate to tell staff**…Parent's should be parents' to include both parents in this.	Amended.
141		**Signs that your baby are well**. Again, suggest using bullet points and bold	Amended.
142		**Is your baby feeding well?** 'Effectively' won't be understood by all parents	Amended.
143		**Is your baby's muscle tone normal?** I	Amended.

		would use something more understandable than ‘muscle tone’ in the subtitle and also explain what you mean by this more. Also I wouldn’t ever suggest using ‘normal’ as a measure in a parent’s leaflet. This is because they might not feel confident in what ‘normal’ is but also that saying their baby isn’t ‘normal’ when they’re unwell has negative and impacting connotations. Instead you could say ‘Is your baby more floppy than usual?’ or ‘If your baby’s lips are blue or pale, you should ask your health professional for help.’	
144		**Is your baby’s colour normal?** As above re use of normal.	Amended.
145		**Is your baby’s breathing normal?** As above re use of normal.	Amended.
146		**Who to call if you are worried.** Suggest using bullet points and bolding.	Amended.
147	Page 19	**Low blood glucose test result.** This isn’t very clear. Suggest rewording this subtitle to ‘What to do if your baby’s blood sugar is low.’	Amended.
148		**Low blood glucose test result, last paragraph**. ‘End of the problem’ sounds quite conversational in comparison to the rest of the tone. Suggest something like ‘and usually will stay at a healthy level.’	Amended.
149		**Going home with your baby**. As above re use of normal.	Amended.
150		**Going home with your baby**. As above re use of understand.	Amended.
151		**Going home with your baby.** Where can people access the Baby friendly chart? This isn’t clear.	Amended.
152		**Going home with your baby**. See above re use of effective.	Amended.
153		**Going home with your baby**. Suggest rewording ‘your midwife will explain what this means’ to empower the parents slightly more.	Amended.
154		**Going home with your baby**. Suggest explaining how you can tell if you are overfeeding, and also what the downsides of this are.	Previous paragraph covers responsive feeding.
155		**Going home with your baby**. Suggest changing ‘no special care is needed’ to something which will be more widely understood. Something like ‘you don’t need to change the care you give your baby.’	Amended.
156		**Going home with your baby**. ‘Observe for’ is grammatically incorrect. It should	Amended.

		either be 'observe signs' or (as I suggested above to aid understanding) 'look for'.	
Nicola Firth – Bliss – senior project officer			
157	General	There is a focus on breastfeeding mothers and of the importance of establishing breastfeeding, but it will also be important to acknowledge those mothers that cannot/choose not to breastfeed and to consider how they are supported.	Agree, the FfP is inclusive of parents choosing to formula feed.
158	Appendix (general)	For the resources that are designed to be shared directly with parents, such as the parent information sheet (appendix 1), it would be useful to tailor the language so that it is more family – friendly e.g. using plain English and images. It will also be useful to acknowledge to Healthcare professionals that any written information that they share with parents should always be accompanied by a verbal discussion (in a private space if the parent chooses).	See response 42 and 127.
159	Page 7, point 10	It may be worth adding in here that parents should also be encouraged to carry out their own observations of their baby through the support of their Healthcare professional. Parents could be taught how to interpret their baby's cues with the aid of an observation cue card, for example, with visual images of key cues	This is at discretion of local services.
160	Page 10, paragraph 3	While we recognise that the baby will need to be monitored for *diabetic* mothers, it will be important to acknowledge in this section that mothers should always be explained why their baby is being monitored and the possible health implications that may arise.	This is stated in PP7
161	p.11, paragraph 6	"…and listen to parents views about infant feeding and wellbeing" I would be inclined to add "and listen **and respond** to…"	Amended.
162	p. 21	When talking about the management of reluctant feeding in healthy breast feeding infants, it may be worth including a section on the facilities that are available to parents here to support them with breastfeeding. This might look at what facilities are in place to allow the mother privacy during breastfeeding – e.g. curtains around the cot, screens, breast feeding aprons etc.	Agree, needs to be tailored to local services.
Mehali Patel, Research Engagement Officer, BLISS			
163	General	The framework refers to full term babies, however the parent information sheet seems to be aimed at all groups of parents	Target group for the entire Framework, including information sheet, is term infants.

		whose baby may have low blood sugar. It may aid you to provide clearer and specific advice by aiming the information to a more clearly defined audience.	
164	General	Further clarification about what blood sugar levels are and why they are important might help understanding of hypoglycaemia.	No specific suggestions given; we think these issues are covered in the Framework.
165	Page 18	**3rd paragraph** suggest changing "extremely low blood sugar, if not treated, can cause brain injury resulting in developmental problems. If low blood sugars is identified quickly, it can be treated" To something like "it is important to quickly identify if a baby has low blood sugar levels so it can be treated, as extremely low blood sugar levels can affect a baby's long term development." as this sounds less alarming.	See response 42.
166	Page 19	**Don't hesitate to tell staff if you are worried about your baby.** Suggest removing "as you are with your baby all the time so you know your baby best" and amending the sentence to "… but your observations are also important, if you are worried that there is something wrong with your baby please do tell a member of staff as parent's instincts are often correct." The current wording may make parents feel guilty if they don't spot cues from their baby.	Amended.
167	Page 19	**Is your baby feeding well?** Add clarity to this sentence "in the first few days your baby should feed effectively at least every three hours, until blood sugars are normal and then at least 8 times in 24 hours." To me this sounds like there should be no change in frequency of feeding as feeding every three hours would be 8 times in 24 hours. Please clarify what is meant by this.	In the first 24 hours, spacing should be no more than 3 hourly. After metabolic transition the rhythm of the fast-fed cycle can vary as long as there are 8 feeds in a 24 hour period
168	Page 20	**Low blood glucose test result**. Suggest removal of value "(below 2.0mmol/l)" as parents will not know what this means. Also suggest the following amendment "if the blood glucose test result is low, you should feed your baby as soon as possible and provide skin to skin contact."	Amended.
Hilary Farrow – Improvement Manager, Y&H			
169		Well done on an excellent document to all involved. I have no comments (clinically outside my expertise) but wish to state that it makes for easy understanding and is clear to follow.	Thank you.

Dr Jane Hawdon - neonatologist – Royal Free, Chair Atain hypoglycaemia group			
170		Need to consider the IUGR baby who does not meet centile threshold ie long and skinny, something about clinical assessment of fetal nutrition. I have grave concerns about syringe feeding. Experience and my SALT colleagues inform me that a baby who has not got act together to feed orally often can't coordinate safe swallow especially if milk enthusiastically squirted into mouth by syringe. Therefore SALT advise cup, and if can't get act together to cup feed only safe way is tube.	Agree. See responses 44 and 83. Syringe feeding for reluctant feeders is advocated by several NHS Trusts and other authoritative bodies, and is practised widely. The group considered that women are very likely to have an awareness of this modality and may wish to use it. We did not find evidence that the practice is unsafe. Therefore we opted to include a section on 'best method' based on expert opinion within the group. The group proposes that 0.2ml aliquots are instilled between the gum and the cheek, with the baby in mother's arms slightly upright, allowing the baby time to taste the milk and swallow in between aliquots, with response assessed. The advice is to move onto cup once 5ml have been taken in 0.2ml aliquots and / or the baby begins to suck. We agree that the verb 'squirt' does not capture the correct manner and have removed it. We have added a section on safe cup feeding.
Donna Southam – Midwife - Basildon			
171		The document is very clear and the management of hypoglycaemia and the pathways. I look forward to seeing this in practise.	Thank you.
Stephanie Michaelides – Midwifery tutor Middlesex university – Chair jaundice group Atain			
172	Page 2 Executive summary of recommendations for either No or NO 2	2nd centile is recognise however this paragraph should also include the asymmetrical growth restricted baby	Agree. See responses 44 and 83.
173	Page 2 No 3	Colostrum is produced in the first of 24 to 48 is this the ideal energy source or should it be considered as require additional calories.	No change required.
174	Apendix 1 Page 18	During skin to skin contact baby should wear a hat and be kept warm "with a cover	Disagree. Suggested terminology is unclear. We do not think it is

	Parent information "Skin to Skin" contact	enveloped round both mother and baby" Please delete blanket or towel as this is incorrect information Please also note articles attached in regard to Post-natal collapse	'incorrect' to use a warm towel or blanket in the first 48 hours.
175	Appendix 1 p.18	Please change to the following italicised text: ***Keep baby warm.*** Put a hat on your baby for the first few days. Keep your baby in skin contact '*by enveloping yourself in a long cover with the baby on your chest maintaining eye contact with your baby to check he or she is breathing while in this position, or keep warm with two layers of clothing and a blanket if left in a cot (SIDS)'* . *http://www.nhs.uk/Conditions/Sudden-infant-death-syndrome/Pages/Introduction.aspx*	Eye-contact added.
176	Appendix 1 p.18	Please ensure both numbers read 3 hours as suggested below otherwise this is confusing to parents. *Feed as often as baby wants, but do not let your baby go for more than 3 hours between feeds***.** If your baby is not showing any feeding cues yet, hold him/her skin to skin and start to offer a feed about **3** hours after the start of the previous feed.	Amended.
177	Appendix 1 p.18-19	*Express your milk*- This paragraph assumes the baby is more than 48 hrs age and will be at home. What about the baby who is less than 24-48 hrs who is only receiving colostrum?	Amended to colostrum.
178	Appendix 1 p.20	Please insert the italicised text: Another blood glucose test will be done *in 3 hours* before the next feed.	Amended to 2-4 hours throughout the FfP
179	Appendix 1 p.20	Please insert the following italicised text: If you are breastfeeding and your baby does not breastfeed straight away, a member of staff will support you to *breast feed. If your baby is sleepy or not feeding your baby should be reviewed by a professional practitioner to identify the cause.* I do not agree that a sleepy baby should be syringe-fed due to the risk of aspiration. It also medicalises what should be a normal physiological process.	See response 170.
180	Appendix 1 p.20	Please ad italicised text below to this paragraph: Very occasionally, if babies are too sleepy or unwell to feed, or if the blood sugar is still low after feeding, he/she may need to	Amended to 'staff'.

		go to the Neonatal Unit / Special Care Baby Unit. The doctors, *midwives* and nurses will explain any treatment that might be needed. In most cases, low blood sugars quickly improve within 24-48 hours and that is usually the end of the problem	
181	p.3. Para 6	Have the CEMACH 2007 values for the infant of a diabetic mother i.e. 3.5 mmol/l cut off been superseded by other reports?.	3.0mmol/l is reserved for proven hyperinsulinism. See section B for rationale for thresholds.
182	p.6. para 1	Practice Points The asymmetrical growth restricted baby and babies with polycythaemia are missing from the list of bullet points. Should these be considered?	Agree, see response 83, 170.
183	p.6. Table 1.	Should the reference for this weight chart also include the WHO Weight Charts as these are nationally accepted?	More than one set of charts is unnecessary.
184	Flowchart A First Pink Box	Please remove 'cover with a warm blanket' and insert the following: '*Envelope the baby and mother securely with a long cover to ensure safe application of skin to skin care'*	See response 174.
185	Flowchart A 2nd Pink Box	Please insert '*no longer than 10 hours of age'* after 'prior to third feed'	Amended.
186	Flowchart A Box 1	As above The asymmetrical growth restricted baby and babies with polycythaemia are missing from the list of bullet points. Should these be considered?	See responses 83 and 170. Amended
187	Flowchart B 2nd Pink Box	What is the evidence for waiting a 3 hr interval before the next feed if Blood Glucose 1-2mmol/l. Should this baby be on hourly NG feeds?	See response 248 and section B
188	Flowchart B General point	Please insert time intervals in addition to 'next feed' to assist in clarity and safe clinical management	Amended.
189	Flowchart B 3rd Pink Box	Hand expressing 15mls per feed every 3 hours in the first 24-48 hours is not an achievable amount for most women. Are we setting up women to fail if this guidance is published?	Amended.
190	Flowchart B Box 2	Skin to Skin contact continuously is unrealistic in the first 24 hours if the mother is unwell, long labour, C/S, PPH etc. Please replace with *'Skin to Skin should be encouraged appropriate to maternal and neonatal condition'*	Continuous removed.
191	Flowchart B Box 3	Please add 'if more than two measurements *within 6 hours…..'*	Unnecessary.
192	Flowchart B Box 3 General	Is this baby already on transitional care or should this be considered first?	There are variations in TC availability across UK units, Centres should identify best place of care for

	Point		delivering the various components of the framework in their setting.
193	Flowchart D 2nd Blue Box	Change to: 'Encourage responsiveness with *mother*' (not 'mum')	Amended.
194	Flowchart D 3rd Blue Box	Change to: '4-6 hours following *birth'* (not delivery) Add 'Maintain skin to skin contact *depending on maternal condition'* Remove 'encourage mother to hand express….' And replace with *'support the mother to breast feed'*	Amended.
195	Flowchart D Pink Box	Monitor well-being of baby: Add an extra bullet point entitled *'respiratory well-being''* above 'temperature'	Amended.
196	Flowchart D Pink Box	Complete initial Breastfeeding assessment: Change 'delivery' to '*birth'*	Amended.
197	Flowchart D Pink Box	Initiate active feeding plan: 'Review every four hours'… what is being reviewed? Unclear statement. 3rd bullet point should be replaced by '*actively encourage breast feeding'* as current bullet point confusing.	Feeding and well-being. Amended.
198	Flowchart D Pink Box	General point Blue asterisks not explained on Chart.	Amended
199	p.7 Para 12	'……encourage skin to skin contact……' as above please replace with *'Skin to Skin should be encouraged appropriate to maternal and neonatal condition'*	Unnecessary qualification.
200	p.8 Para 16	Replace the word 'discharge' with '*transfer*' if the baby is being transferred to the care of the community midwife employed by the acute NHS Trust. (Discharge implies transfer to the care of the GP and Health Visitor i.e. at 10 days plus)	Amended.
201	p.11 Penultimate para	Please insert additional word '*appropriate* skin to skin….'	Unnecessary qualification.
202	p.12 penultimate para	Remove the word 'discharge' and replace with *'transfer 'to the community.*	Amended.
203	Appendix 2	Syringe Feeding: This paragraph should be removed as there is no hard evidence about its benefits and could result in less time for the professional to support breast feeding. If the baby is conscious and is able to suck swallow and breathe he or she should be supported to breast feed directly. However, if the baby is sleepy and thus not able to co-ordinate suck, swallow and breathing	See response 170.

		effectively he or she should be given NG tube feeding as this is the only safe method in such a situation.	
204	Appendix 2	Boosting Confidence: This paragraph is questionable. Please note the above points. Breast feeding should not be medicalised but supported at all times by the professional. The mother needs to feel confident in her care by the professionals and not be distracted by the use of adjuncts.	Thank you.
205	Appendix 2	If the mother does not want to hand express: Please remove final sentence as there is no evidence for unsuccessful breastfeeding if this is not carried out. Women should not be challenged at such a vulnerable time during the first 24hrs.	Agree, final sentence is not required in that section. The emphasis on communication is enabling women to make informed choices, rather then 'challenging' them.
206	Appendix 2	If the mother chooses not to express colostrum: There is no evidence to support regular expressing of colostrum as a benefit to breast feeding and therefore the mother should not be forced to participate or be made to feel guilty if she declines. Instead, the midwife should spend time assisting with latching the baby onto the breast.	See response 205.
Dr Janet Rennie – neonatologist - UCLH			
207		Using weight of 2nd centile is the most pragmatic solution I agree and is what we decided to use for the NEWTT chart (I was on the group and I got Tim Cole to double check the thresholds) This will miss the long and skinny baby, but in my view you can't capture these	Thank you.
Royal College of Midwives			
208	Comment No 1.	Thank you for developing this important practice framework which will be of considerable interest to midwives. We have focussed on the Executive summary, introduction and framework and flowcharts	Thank you.
209	2. P2 & 3	The executive summary is succinct, accessible and clear – we suggest for consistency text from this section should be used in relevant sections in the framework eg copy this section on page 3 5. Ward based blood gas analysers provide accurate and rapid measurement of neonatal blood glucose concentration, which supports real-time clinical decision	Disagree. The executive summary is designed to provide overview statements - duplication in Sections A and B would lengthen the document and is not necessary.

	P7	making. Most handheld glucometers are not sufficiently accurate in the range of 0-2.0mmol/l so should not be used to guide the management of neonatal hypoglycaemia. and use instead of : 3. Accurate measurement of blood glucose level is essential for diagnosis and management of neonatal hypoglycaemia. Current cot side technology is prone to significant inaccuracy, particularly in the range 0-2.0mmol/l. The ward-based blood gas biosensor should be considered the reference standard for measuring whole blood glucose based on accuracy and speed of result availability. (page 7.	
210	3. P 4 1.2. Target users	Insert the timeframe you mean this guidance applies to ie does it refer to care of infants in the first 48 hours after birth? or some other timeframe?	Thank you. We have added the first 48 hours to qualify the statement.
211	4. P6 Section A: Practice points 1.	Change 'maternal beta-blockers' to 'Mother taking beta-blockers'	Amended.
212	5. P6 Section A: Practice points Table 1	Change text so that text below table says: Table 1: 'Second centile birthweights...'	Amended.
213	6. P6 Section A: 2.	Add timescale after birth for observation of these clinical signs see comment 3. re P 4 1.2.Target users	See response 210.
214	7. P7; 3.	See comment 2 re P 3	Ok
215	8. P7: 4.	Change text: 4. If handheld glucometers are being used to screen for low blood glucose Only those devices conforming....	See amended practice points.
216	9 P7: 5	Change text Be aware that the neonatal packed cell volume (PCV) is a source of error in blood glucose meters, which will produce ...	See amended practice points.
217	Comment 10 P7: 8	...show mother safe positioning [insert ...of the baby...]	Amended.
218	11 P7: 10	Assess and document feeding cues and feeding effectiveness.- how often? at each feed? every 3 hours?	At each feed.
219	12 P7 12	clarify what is meant by '..using a method that is best suited to the infant's capabilities and parents preferences' – do you mean spoon feeding? preference for spoon or bottle feeding?	No change. Preferences to be determined case by case (cup, oral syringe, spoon).
220	13 P 8: 13	Suggest changing text as follows: 13. For women who choose to formula feed offer	Amended.

		10-15ml/kg within the first hour and plan to give 80-100ml/kg/day. Feed responsively when blood glucose measurements have been above 2.0mmol/l on two consecutive occasions. If the baby does not show feeding cues, i.e. is a reluctant feeder and has with no signs of illness, refer to Practice Points 25 and 26.	
221	14 P8:15	15. Based on the result of the first blood glucose measurement [insert 'BG'- so that acronym in text below clear], place the baby on one of the following care pathways: [insert 'See' in front of Flowchart] Flowchart B: First pre-feed BG 1.0-2.0mmol/l, and no abnormal signs [Insert 'See'] Flowchart C: First pre-feed BG <1.0mmol/l and / or clinical signs consistent with hypoglycaemia at higher BG concentration	We have added BG.
222	15 P8:16	16. Do not transfer babies with risk factors for impaired metabolic adaptation and hypoglycaemia to community care before [insert: until] you are satisfied that the baby is maintaining blood glucose levels >2.0mmol/l on at least two consecutive occasions and is feeding well. Infants of diabetic mothers should not be discharged until they are at least 24 hours old.	OK
223	16 P8 :18	Capitalise i.v and i.m	Amended.
224	Flowcharts	These are excellent – clear and concise	Thank you.
225	Appendix 1 Parent information sheet	Changes suggested in red: l If your baby is in one of these "at risk" groups, it is recommended that they have some/several/a series of blood tests to check their blood sugar level. Extremely low blood sugars, if not treated, can cause brain injury resulting in developmental problems. If low blood sugar is identified quickly, it can be treated so that the baby recovers. l Ask a member of the maternity staff to support you with feeding and make sure you understand how to tell if breastfeeding is going well, or how much formula to give your baby Before you go home, make sure you understand how to tell if your baby is getting enough milk. A member of the maternity staff will explain the normal pattern of changes in the colour of dirty nappies and number of wet/dirty nappies. For further information, see the Baby Friendly chart or local chart How Do I Know	Amended. We have suggested search terms that direct users to the document on the BFI website. It is one of the UNICEF BFI tools.

		My Baby is Getting Enough Milk? –Don't know what chart this is – don't think there is such a chart in BFI– suggest putting a web link in	
Guy's and St Thomas' Zoe Chadderton BF lead, Susan Lawrence Inpatient services matron, Radomska Malgorzata-Neonatal Consultant (PN ward liaison), Neonatal nurse responsible for guidelines and policies.			
226	Pg 6 pt 1.	We are inclined to say that we wouldn't have beta Blockers as a sole risk factor, another factor such as IUGR would have to be present.	Disagree. See response 8.
227	Pg 8 pt 13	The amount could be too much for a baby to take or might inhibit the next feed	See section B for rationale.
228	Pg 8 pt 14	Needs greater clarification-see London NIFN comments.	
229	Pg 9 pt 25	Suggest get rid of this paragraph and say instead follow reluctant feeder guideline which include assessing clinical signs. Any record of abnormal clinical signs should lead to a BG assessment	The paragraph refers to the reluctant feeder guideline.
230	Pg 11	Blood gas machines-will there be any funding streams available to help buy the recommended machines?	This will be determined by local services.
231	Flow chart A	See London NIFN comments	
232	Flow chart B	Why state first pre feed, doesn't this apply to any BG 1-2mmols, and do you mean 1-1.9mmols 3rd point state give, not consider otherwise there is no alternative for BF babies 4th point state when in hours 3rd box, 1st comment –unrealistic amounts-setting most mums up to fail. 3rd point state when in hours Add use blood gas machines for testing	See response 76.
Comments from Denise Kelleher-IFL for University College Hospital			
233	6	References hypothermia as <36.5 therefore requiring BG monitoring. Could be environmental. Should try skin to skin first?	Amended to say 'not attributed to environmental factors.'
234	7 point 12	Method of feeding to include as directed by hospital policy	Amended.
235	7 point 13	Good that they recommend 10-15 mls/kg	Thank you.
236	10	Worrying that they advocate monitoring babies of ALL diabetics. We currently only monitor if maternal readings were 2 over 8 at any stage of pregnancy regardless of type of diabetes or method of control	Disagree that neonatal risk can be stratified in this way.
Dr P McEwan, Poole			
237	General comment also at p 12 para 3	The threshold value for treatment of 2.0mmol/L seems to be new. Until publication of guideline for management of women in pregnancy and care of their newborns when mother suffering from	The thresholds are not new or specific to this FfP. Please see rationale for their use on pp13-15 of Section B and supporting citations. These thresholds are also given in

		diabetes, (National Collaborating Centre for Women's and Children's Health Diabetes in Pregnancy 2015 pp 495) I was unaware of a use of a threshold value of less than 2.6mmol/L. The accompanying evidence in this document is at references 33, 54 and 55, dated 1992, 1994 and 2002. The document mentions the 2015 Pediatric Endocrine Society document from 2015, which seems to uphold the British practice of maintaining blood glucose values for babies less then 48 hours in a range including as low as 2.8mmol/L. The CHYLD study document seems to be the only recent source which is being drawn on, and it includes normal findings at two year development follow up for all those who were observed to have values in the lower range (less than 2.7mmol/L) but whose carers aimed to maintain them above 2.6mmol/L. I can't see why there has been a change to the recommendation for what blood glucose value to aim for in the screened population.	standard UK texts (e.g. Rennie and Roberton 5th ed.).
238	Page 6, para 1, "identification of infants"	The use of centiles (2nd) to place the baby in the "at risk" category: In the CHYLD study population, they looked at babies weighing less than 2500g as well as less than the 10th centile. I wonder why, and if the data is available from studies which looked at babies captured under either heading to interpret causation of low blood glucose (ie does it happen to all of those who are small, or only to those who are small and also inappropriately so)?	The most accurate way of detecting babies who have experienced significant fetal growth restriction is to adjust for sex and age. For example, the threshold of 2.5kg would miss babies of 40-42 weeks who are chronologically mature but <2nd centile.
Dr Kerry Whiting, consultant clinical scientist, Royal Berkshire Hospitals NHS Foundation Trust			
239	7	Item number 4 states possible error of ±0.5 mmol/l if conforming to ISO 15197:2013 but this should be 0.8 mmol/l, as mentioned later in the document.	Thank you – amended.
240	7	Item number 5 suggests that blood glucose meters will always produce erroneous results with extreme haematocrits. This is not strictly true as some meters actually measure the haematocrit and correct for it so perhaps this should refer to the potential to produce erroneous results here rather than stating it as a consistent fact.	Thank you – amended.

241	7	Item number 6: There is an opportunity here to educate on the importance of distinguishing what a “whole blood glucose” result really is. Whole blood glucose strictly refers to the sum of glucose in the plasma and the glucose inside the red blood cells. Although there is an equilibrium between the amount of glucose present in the plasma and the red blood cells, the concentration of glucose in these two compartments is not the same due to their differing protein content. If the red cells are lysed and the contents mixed with the plasma the resulting “whole blood” glucose level can be measured. Very few methods actually measure this true whole blood glucose concentration so use of the terminology is usually inappropriate. Although “whole blood” as a sample is applied to glucose meters or a blood gas analyser for analysis, the devices actually measure the glucose concentration or activity in the plasma fraction of the sample. Through the use of algorithms within the device, results produced are given as plasma glucose concentration equivalents. It is correct that true whole blood glucose results may be 10-15% lower than plasma glucose (as mentioned in the text), but the majority of clinicians will actually be generating plasma glucose equivalent results from their devices. As it stands I feel that item No 6 is misleading.	We have amended PPs 3-6 (and the supporting text in Section B) to clarify these issues.
242	11	Sentence at the end of the 3rd paragraph: “Handheld glucometers are available that meet the ISO standard; however, none have undergone clinical evaluation in a real world neonatal setting”. This is not strictly true. As acknowledged at the beginning of this paragraph, the ISO standard is aimed at meters used for patients self- testing their glucose at home.	Thank you. Sentence removed and replaced with a caution that the user must understand the limits of accuracy of handheld devices.

		Manufacturers producing meters for professional use still have to apply for a CE mark and demonstrate compliance to the European In-vitro Diagnostic Devices Directive but they are able to self-certificate so you could argue that they are not as strictly regulated. However, if a CE mark is awarded for a device that claims to be suitable for measuring blood glucose levels in neonates then the manufacturer has to have the data to evidence this. It is certainly true that we must exercise caution when interpreting neonatal blood glucose results from point of care meters as it can be difficult to obtain a good quality sample from this patient group and the results coming out of the device can only be as good as the sample going in. Blood gas analysers use larger samples of blood that can reduce such errors but care must be taken to ensure adequate mixing and avoidance of air bubbles.	
NHS England Highly Specialised Services team to provide the Congenital Hyperinsulism (CHI) service, forwarded by Dr Pratik Shah Consultant in Paediatric Endocrinology and Honorary Clinical Lecturer			
243		This is well-drafted document on Identification and management of Neonatal hypoglycaemia in the full term infant. Blood glucose concentration has been a hot topic for years and unfortunately there is still not enough evidence of what is the safest blood glucose concentration that is acceptable in normal term babies. While it is understandable that a large proportion of neonates have non-significant hypoglycaemia in the first 1-2 days, it is well recognised that those with poor metabolic adaptation are at increased risk of hypoglycaemic brain injury. The document sets out to address both issues by balancing the risk of unnecessary overtreatment of large number of babies and the risks of hypoglycaemic brain injury in a relatively smaller number of babies. This is a difficult balancing act, considering the limited evidence base. However, as paediatric endocrinologists managing children with Congenital Hyperinsulinism in 2 highly specialised centres in London and	Thank you. We are grateful that the CHI specialist service contributed to the consultation because CHI is an important, although rare cause of neonatal hypoglycaemia (estimated prevalence 1:40,000-50,000, raising to 1:2500 in consanguineous populations [NHS England Commissioning Board 2013]). Our interpretation of the evidence summarised in section B is that the operational thresholds we propose, that were first published by Cornblath and colleagues in 2000, do not “tip the balance towards greater probability of injury.”

		Manchester, we are somewhat concerned that the numerical cut-offs of hypoglycaemia and frequency of blood glucose monitoring may tip the balance towards a greater probability of brain injury.	
244	7 (point no 4)	It is appropriate to state that handheld glucometers are unreliable in the lower range of glucose levels. While blood gas biosensor testing have been suggested as a relative gold standard, there is no mention of point of care testing devices using the glucose oxidase method which are validated and correct for high haematocrit and hyperbilirubinaemia. Most hospitals in the UK have adopted POC devices such as the NovaBiomedical which requires lesser quantities of blood and provides a swifter result. Another advantage of a POC testing device is the ability to measure ketones, which means less reliance on obtaining a urine sample, which is practically difficult to achieve.	We state that handheld devices that conform to ISO 15197:2013 and validated for neonatal use may be used but that their limitations should be understood (possible error of +/- 0.8mmol/l for values < 5.5mmol/l). Please see response 97 regarding the NovaBiomedical device.
245	8 (point no 20)	The document suggests checking BG as per flowcharts. While there is clear guidance on checking BG, there's no information to recheck after treatment. It is usual practice to recheck BG 15-30 minutes after feed/treatment; should the authors consider clarifying the need to retest to ensure an inordinately long interval does not occur to induce high risk of hypoglycaemic brain injury?	It is necessary to measure blood glucose concentration pre-feed in at risk neonates during the establishment of the fast-feed cycle in order to capture the lowest BG concentration before the next feed. A measurement post feed would miss the expected nadir. Measuring 15-30 minutes post treatment is reserved for infants with BG <1mmol/l or infants with acute neurological dysfunction. Either scenario constitutes an emergency that requires intervention. Post-intervention measurements are needed for assessing response to treatment and guiding management.
246	8 (Point no 16)	The text suggests babies with BG 2.0 mmol/L and with risk factors are safe to be discharged. We agree that there is no safe limit of BG in early life and most evidence points towards lower BG as "normal". However, in the presence of risk factors, a "higher ground" would be preferred to safeguard against potential risk of hyperinsulinism induced hypoglycaemia. We would therefore prefer to have prefeed BG >3.0 mmol/ as a safer cut off in first 48	Disagree. The rationale for thresholds is driven by knowledge of BG concentration in the 48 hours after birth in healthy term breast fed infants, and lack of known benefit for targeting a value of 3mmol/l.

		hours.	
247	8 (point no 17)	The decision to treat BG 1.0-2.0 mmol/L ignores BG levels <1.0 mmol/L. After treatment, it is important to recheck (at a specified time, which is missing) BG. It is not appropriate to give 40% dextrose gel and refeed without seeking medical opinion. This contravenes standard medical practice.	Disagree, We have a clear pathway for BG <1mmol/l, which is a neonatal emergency and involves input by the medical team.
248	Page 9 (point no 23)	There is no rationale to wait for 3 BG measurements <2.0 mmol/L before considering the possibility of hyperinsulinism. Standard practice in most centres is to act after 2 abnormal BG. The longer time to treat in hyperinsulinism, the more likely the risk of hypoglycaemic brain injury. Again, it is important to specify time to repeat BG which is missing in this document. Measuring BG before a next feed may be delayed by 3-4 hours (if breast feeding), which would be contrary to common sense.	The works of Hawdon et al, Swenne et al, Srinivasan et al and Diwakar et al. and observations from the Sugar Babies trial show that BG < 2mmol/l in the first 24 hours after birth is frequent, and it occurs in the absence of neurological dysfunction or other concerns about well-being. We have stated that in the well infant who is feeding effectively, the next BG should be pre third feed (and within 8 hours of birth). Consistent with previous advice, the group maintains that BG <2mmol/l on more than two occasions is an appropriate trigger for increased substrate provision and investigation including for hyperinsulinism.
249	Page 10 (Section B)	There has to be common clinical sense in understanding severity of hypoglycaemia. Borderline BG (e.g., 2.5 mmol/L) should not be construed as completely normal. The authors should consider monitoring of low BG levels, although this will involve more medical input and prolong medical intervention. We would also like to highlight that LGA babies should be considered for blood glucose monitoring (Ref- Ute M. Schaefer Graf et al 2002 Annual Meeting of the Society for Maternal-Fetal Medicine, New Orleans, La, January 14-19, 2002; Araz N et al. Acta Medica 2006;49(4):237-9). It is evident in the literature that LGA babies are at higher risk of hypoglycaemia that AGA babies. It is also noted that mothers of LGA babies had impaired OGTT but not treated or not been tested for diabetes during pregnancy.	Disagree: “borderline BG (e.g. 2.5mmol/l)” on day one is an arbitrary definition of “abnormal” that is not supported by the studies that show values <2.5mmol/l are common in the hours after birth. It is controversial whether infants who are large-for-gestational age (LGA, >90th centile) are at risk of hypoglycaemia: data from a registry and a case series have been interpreted by some to suggest that LGA is a risk factor for hypoglycaemia, but features of study design including retrospective data collection, inconsistent case definition, use of different measurement devices, variations in timing of sampling, and limited clinical phenotyping of study groups, leave doubt about causation. The working group

			considers that if there is no evidence of maternal diabetes and the baby does not have dysmorphic features suggestive of Beckwith-Wiedemann syndrome (or another rare genetic disorder associated with neonatal hypoglycaemia), then routine screening of LGA infants above 90th centile is not indicated.
250	Page 10 (Practice points 3-6)	The authors may wish to add the fallacy of drawing blood from catheters running dextrose solutions.	We agree this is poor practice, and have mentioned this along side other general advice about optimal sampling in practice point 6.
251	Page 10 (Practice points 3-6)	The sentence glucose biosensors which might permit non-invasive continuous transdermal glucose is redundant. There is no evidence current are useful in the management of any form of hypoglycaemia.	We have not recommended their use; but rather, highlighted an area for future research.
252	Page 12	The uncertainties of safe lower BG have been discussed extensively. All evidence draws on date from “normal” children. No mention is made of the high risk (a third of children affected) by Congenital Hyperinsulinism [References: Menni F et al, Pediatrics 2001; Meissner T, et al, Eur J Endocrinol 2003; Avatapalle H, et al, Front Endocrinol 2013].	See response 243. Menni et al reported 90 infants / children with persistent hypersinsulinaemic hypoglycaemia of infancy. 19 out of 90 were determined retrospectively to have ‘severe retardation’ or ‘intermediate disability’. Of these, 13 presented in the first 48 hours after birth and acute neurological dysfunction (seizures, hypotonia, cyanosis, coma) was documented in all but 1 case. This study emphasises the importance of clinical assessment of all infants with low blood glucose, and early testing for CHI. We have added this citation. Meissner et al reported information about children with CHI born 1975-2002. Cases were held on a database and information was obtained by questionnaire. Of 74 neonatal presentations, the large majority had abnormal signs with hypoglycaemia (“lethargy, hypotonia, apnoea, tremor”). The authors reported an association with LGA but 73% of cases with neonatal onset did not have birth weight > 2sd above the mean. From these data, we did not consider that LGA alone is sufficiently predictive

			to be used to screen for CHI. The observational study by Avatapelle et al was not designed to investigate the relationship between neonatal BG values and neurodevelopmental impairment in CHI.
253	Page 15 (practice points 20-21)	The authors should clarify that transient hypoglycaemia is not the same as mild hypoglycaemia. It is well recognized that severe hypoglycaemia in children with congenital hyperinsulinism (CHI) may be transient and cause long-term brain damage [Avatapalle et al, Fron Endocrinol 2013]. It is not appropriate to use historical data that shows only 2 cases of CHI brain injury received legal compensation. The vast majority of children who end up with brain injury do not claim damages. It is important to remember that the term "transient" is only in retrospect. It is not possible to predict if hypoglycaemia is transient unless serial BG is performed.	We have not used the term 'mild hypoglycaemia' because there is no agreed definition. This query arises due to different uses of the term Transient. Avatapalle et al define Transient-CHI as children with confirmed CHI in whom "medical treatment was stopped" in contrast with those who stay on medical treatment or require surgery "Persistent-CHI". Our use of the term transient is specified as BG 1.0-2.0mmol/l on 1 or 2 occasions during the first 48 hours after birth. This is suggested as a pragmatic threshold for considering testing for CHI: we recommend that values that persist in this range on three pre-feed measurements despite adequate substrate intake should prompt investigation.
254	Page 15 (practice points 20-21)	The term "clinical signs" is misleading. Neonates do not demonstrate Whipple's triad [Thornton et al, J Pediatr 2015]. The authors should clarify with as much detail what constitutes the threshold to act in BG is borderline. As discussed above, transient CHI is a common cause of long-term adverse neurodevelopment.	Disagree. Neonatologists, midwives, and neonatal nurses are trained to recognise signs of acute neurological dysfunction. We have listed the signs that should raise concern in practice point 2 and the flowcharts.
255	Page 16 (practice points 22-24)	HH (or CHI) is a rare but important cause of hypoglycaemia, which the authors have acknowledged. CHI can be associated with BWS and rarely with Turner syndrome and Sotos syndrome. For a BAPM guideline, where the clinical diagnosis of Costello syndrome is unlikely to be made by a midwife, it is not appropriate to mention syndromes other than BWS. We are not certain why the authors include mosaic but not the usual Turner syndrome.	We listed dysmorphic syndromes that are associated with neonatal hypoglycaemia. Examination for dysmorphic features is standard care in children admitted to neonatal units with signs that could reflect a syndromic diagnosis. We have removed mosaic, as suggested.
256		Those with risk factors for CHI have to be monitored closely. In our experience with the published literature in CHI, BG >3	We have amended the threshold to 3.0mmol/l when CHI is suspected in the first 48 hours (and 3.5 mmol/l

		mmol/l in first 48 hours is usually preferred. Also there is enough evidence that children with transient CHI are equally at risk of neurodevelopmental delay (as mentioned above). We would also like the authors to consider adding statement on closely monitoring babies who have siblings with CHI/metabolic conditions predisposing them to hypoglycaemia. We have also noted that some CHI patients with no risk factors may have mild hypoglycaemia (2-3 mmol/L) in the first 48 hours, so it is important to be aware of the possibility of CHI with their glucose infusion rate (GIR) is > 8 mg/kg/min.	after the first 48 hours based on Rozenkova et al 2015) We have added a line to state that screening may be indicated in cases of first degree relatives with a heritable disorder associated with neonatal hypoglycaemia, and that this should be planned before birth. We have added a box to Flowchart C which suggests considering CHI if GIR >8mg/kg/min (although this will have been tested for already if earlier parts of the FfP have been followed).