

Pain Assessment, Minimisation and Management on the Neonatal Unit.

Description	Network clinical guideline		
Target audience	Thames Valley and Wessex ODN Neonatal Network		
Related documents / policies	Palliative Care Guideline (2016) <u>Guideline framework for neonatal palliative (supportive and end of life) care</u> . Found at; https://www.networks.nhs.uk/nhs-networks/thames-valley-wessex-neonatal-network/documents/clinical-guidelines		
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Policy sponsor			
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1 Version control

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20/06/2022	A.Clifford & J. Samphier	0.6		Update guideline and upload to new format

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3 Executive Summary / Introduction

Pain in newborns is often unrecognised and undertreated. Neonates do feel pain and analgesia should be prescribed when indicated during medical care. Babies cannot localise pain, their perception of pain is more generalized on their bodies and therefore consideration to them is extremely important to reduce painful procedures.

All staff can and must be an advocate for the baby in pain. The baby cannot represent itself, so the nurse, AHP or medical team member must speak up if he/she feels the baby is in pain.

Pain is most effectively assessed by routinely using a validated Neonatal Pain Assessment tool. (See Appendix 1: Pain assessment tools used in our network). When the pain assessment score indicates pain or discomfort, intervention should occur.

The appropriate use of environmental, behavioural and pharmacological interventions can prevent, reduce or eliminate neonatal pain in many clinical situations.

Utilise available non-pharmacological strategies for pain management through;

- Skin to skin care/ cuddling where appropriate.
- Swaddling/ containment/ facilitated tuck position / nesting and boundaries.
- Breast feeding- where appropriate.
- Non-nutritive sucking using a dummy/pacifier.
- Reducing environmental stressors and avoiding overstimulation.
- Parental scent via muslin / cloth.
- Providing opportunities to self-comfort by grasping/ holding finger, bedding or small item

Staff should educate parents in infant pain behaviours and encourage them to participate in their baby's pain assessment and management and make every effort to minimise potentially painful procedures where possible. (See table 2 *Best practice to minimise sources of pain for neonates*). Staff should encourage parents to carry out non-pharmacological measures first- unless the infant has a clearly identifiable cause for pain. If the infant has an identifiable pain source, non-pharmacological measures should only be carried out by parents with support by staff, alongside pharmacological analgesia.

Where local policy allows, oral sucrose can be used to reduce behavioural responses and composite pain scores to painful procedures in newborn and young infants (See example in Appendix 2: Sucrose 24% (Oral) for Procedural Pain in Neonates). Ensure prescriptions for the baby are written up to be given 'regularly' and not 'as required' when pain can be anticipated in particular post-operatively or following a painful procedure.

4 Scope and purpose

This guideline has been produced to direct staff in their care of neonates who may experience discomfort and/or pain. They are based on research findings and/or currently accepted best practice. For accessibility, the guidelines have been collated under distinct subheadings; however, the reader is advised to read the guidelines in full and to seek the advice and support of more senior or experienced colleagues, in the practice setting.

The guideline applies to all neonatal units covered by Thames Valley and Wessex Operational Delivery Neonatal Networks. This includes the following hospitals:

Thames Valley		
TRUST	Hospital	Designation
Oxford University Hospitals NHS Foundation Trust	- John Radcliffe Hospital, Oxford	NICU
Buckinghamshire Healthcare NHS Trust	- Stoke Mandeville Hospital, Aylesbury	LNU
Frimley Health NHS Foundation Trust	- Wexham Park Hospital, Slough	LNU
Milton Keynes University Hospital NHS Foundation Trust	- Milton Keynes General Hospital	LNU
Royal Berkshire NHS Foundation Trust	- Reading	LNU

Wessex		
TRUST	Hospital	Designation
University Hospital Southampton NHS Foundation Trust	- Princess Anne Hospital	NICU
Portsmouth Hospitals NHS Trust	- Queen Alexandra Hospital	NICU
Dorset County Hospital NHS Foundation Trust	- Dorchester	SCU
Hampshire Hospitals Foundation Trust	- Basingstoke	LNU
Hampshire Hospitals Foundation Trust	- Winchester	LNU
Isle of Wight NHS Trust	- St Mary's Hospital	SCU
University Hospitals Dorset NHS Foundation Trust	- Poole	LNU
Salisbury NHS Foundation Trust	- Salisbury	LNU
Western Sussex Hospitals NHS Foundation Trust	- St Richard's Hospital, Chichester	LNU

5 Definitions

- Neonate – Up until 44 weeks corrected
- Neuroanatomical – the anatomy of nervous tissue and the nervous system
- Neuroendocrine – interactions between the nervous system and the endocrine system
- NNU – Neonatal Unit
- NICU – Neonatal Intensive Care Unit
- NNS – Non-nutritive sucking (is the process of allowing a baby to suck without taking any milk. Suckling is well known to be calming in neonates, but the calming effect is often lost once the stimulus is removed).
- Non-Pharmacological – therapies that do not involve drugs
- Pharmacological – the uses, effects, and modes of action of drugs
- Preterm – An infant born before 37 weeks' gestation
- TVW – Thames Valley and Wessex
- ODN – Operational Delivery Network

6 Details of guideline to be followed

6.1 Background Information.

The prevention of pain in neonates should be the goal of all neonatologists/paediatricians and health care professionals who work with neonates. Not only because it is ethical but also because repeated painful exposures have the potential for deleterious consequences. Neonates at greatest risk of neurodevelopmental impairment as a result of preterm birth (ie the smallest and the sickest) are also those most likely to be exposed to the greatest number of painful stimuli in the NICU.

Although there are major gaps in knowledge regarding the most effective way to prevent and relieve pain in neonates, proven and safe therapies are currently underused for routine, minor yet painful procedures. Therefore, every healthcare facility caring for neonates should implement 1) a pain prevention program, that include strategies for minimising the number of painful procedures performed and 2) a pain assessment and management plan that includes routine assessment of pain, pharmacologic and non-pharmacologic therapies for the prevention of pain associated with routine minor procedures and measures for eliminating pain associated with surgery and other major procedures (Keels et al 2016 p1.)

6.2 General principles (taken from NSW, 2004)

- Neuroanatomical components and neuroendocrine systems are sufficiently developed to allow transmission of painful stimuli in the neonate
- Pain in newborns is often unrecognised and undertreated. Neonates do feel pain and analgesia should be prescribed when indicated during medical care.
- Painful neonatal experiences do have long term consequences and even if not expressed as conscious memory, memories of pain may be recorded biologically and alter brain development and subsequent behaviour.
- If a procedure is painful in adults, then it should be considered painful in newborns, even if they are preterm.
- Compared with older age groups, newborns may experience a greater sensitivity to pain and are more susceptible to the long-term effects of painful stimulation.
- Adequate treatment of pain may be associated with decreased clinical complications and decreased mortality.
- The appropriate use of environmental, behavioural, and pharmacological interventions can prevent, reduce or eliminate neonatal pain in many clinical situations.
- Sedation does not provide pain relief and may mask the neonate's response to pain.

6.3 Clinical practice

- Consider pain another vital sign and assess with each set of vital sign assessments. This is consistent with the likelihood that pain is being experienced in a significant proportion of hospitalised newborns.
- Ensure prescriptions for the baby are written 'regular' and not 'as required' when pain can be anticipated, such as post-operatively or following a painful procedure. This is because better pain control is achieved when pain can be treated pre-emptively by anticipating pain and giving regular doses of analgesia, instead of waiting for signs of pain to be displayed and then treating the pain already being experienced by the baby.
- Evidence shows that not only insertion, but also removal of drains can be very painful. Ensure analgesia is given in such cases and allow time for pain relief to take effect.
- If a baby is ventilated and becomes agitated, remember that agitation can be a sign of sub-optimal ventilation.
- Minimise potentially painful procedures where possible - i.e. arterial lines to reduce repeated IV punctures or utilising non-invasive measures such as transcutaneous bilirubinometer (as appropriate).
- Venepuncture has been shown in some research to be less painful than heel lancing for blood sampling in newborns, particularly when needing larger quantities of blood. Quantity and frequency of blood sampling required should be considered when deciding on appropriate method to avoid multiple skin breaks.
- Some research shows that heel warming is beneficial to support capillary perfusion. If the infant's heel is cold, warming the infant's heel in your warmed hand is effective and safe.
- All staff can and must be an advocate for the baby in pain. The baby cannot represent itself, so the staff member must speak up if he/she feels the baby is in pain. This can also be achieved by asking parents if they feel their child is in pain. Actions that may help with this include; using pain scores, describing what is concerning you, seeking the support of a more senior or more experienced colleague.
- Research shows that breast feeding effectively reduces behavioural and physical responses and composite pain scores, during or following painful procedures.
- Skin to skin care is safe, and a potentially beneficial method of reducing physiological and behavioural responses to pain during heel lance, venepuncture and intramuscular injection.
- It is important to manage the pain of infants receiving palliative or end of life care effectively. For further information see Thames Valley and Wessex Neonatal Palliative Care Guideline.

6.4 Pain assessment.

- Pain is most effectively assessed using a validated neonatal pain assessment tool. *(See examples in Appendix 1: Pain assessment tools used in our network).*
- All pain assessments should be documented in the locally agreed place.
- If the pain assessment score indicates pain or discomfort, intervention should occur. Although pain management may be instituted with lower scores, as clinically appropriate.
- Any intervention taken in response to the pain assessment should be documented in accordance with local policy.
- Reassess the baby's pain score 30-60 minutes after intervention, to identify effectiveness.
- Remember that an absence of response may indicate that the infant's ability to respond has been depleted. This must be carefully differentiated from a lack of pain (e.g. loss of muscle tone in face and limbs, paling, duskiness around mouth/nose).
- If a pain score does not fall after intervention, additional measures and non-pharmacological interventions should be made and the baby re-assessed in another 30-60 minutes.
- Babies with neurological impairment may exhibit altered processing and modulation of pain, and not display the usual behavioural and physiological responses to pain (e.g. facial grimace or increased heart rate). Special consideration should be given to assessing and managing their pain. Care plans should be devised with parents and specialist staff (i.e. Occupational Therapist) to reflect individual behavioural responses.

6.5 Pain management.

- Implement non-pharmacological measures first- unless the infant has a clearly identifiable cause for pain such as a chest drain or surgical wound.
- If the infant has an identifiable pain source, non-pharmacological measures should only be utilised alongside pharmacological analgesia.
- Often, optimal pain relief is achieved by utilising a combination of pharmacological and non-pharmacological pain management techniques.
- Consider the need for an opioid weaning regime if a baby receives opioids for longer than one week, as symptoms of withdrawal are likely.
- Consider increasing opioid doses by 10% every 3-5 days as tolerance will occur and the baby may not demonstrate symptoms of inadequate pain relief. Alongside pharmacological interventions always consider non pharmacological strategies to sooth.

6.6 Oral sucrose

- Extensive research provides indisputable evidence that small volumes of oral sucrose significantly reduces behavioural responses and composite pain scores to painful procedures in newborn and young infants.
- Sucrose should always be prescribed by a qualified prescriber prior to administration and follow local guidelines. (See example in Appendix 2: Sucrose 24% (Oral) for Procedural Pain in Neonates).
- Accurate documentation should be used to ensure maximum dosing is not exceeded in a 24-hour period. (See example in Appendix 3: Sucrose 24% (Oral) for Procedural Pain in Neonates Version 5.0).
- Oral sucrose is not appropriate for the management of continuing pain or distress. It may be used as a bridge for infants in distress to be examined and to assess the cause of the inconsolability. However support measures should precede oral sucrose administration.
- Oral sucrose should not be used for babies below 32 weeks gestation, due to evidence of potential harm (neurobehavioural and physiological).
- It is usual practice to get medical approval for administering oral sucrose in babies with; suspected necrotising enterocolitis, unrepaired trachea-oesophageal fistula, nil by mouth status, altered gag or swallow reflex, hypoglycaemia or hyperglycaemia. Oral sucrose can be measured out and given in small doses via syringe or applied to gauze and applied to tongue.
- Babies of mothers maintained on methadone may have altered endogenous opiate systems resulting in a lack of analgesic effect from oral sucrose. It is important to assess the effectiveness of oral sucrose in these infants and to use alternative comfort measures until the infant's endogenous system normalises.

6.7 Non-Pharmacological Supportive Measures.

- Reduce environmental stressors such as noxious stimuli (e.g. noise, lighting) and avoid excessive handling. Support parents in preparing and positioning the infant with their hands or through swaddling.
- Remove boundaries only when the infant is calm and just before the procedure starts.
- Avoid overstimulation before and after the procedure.
- Avoid interruptions once commencing the procedure.
- Non-nutritive sucking using a dummy/pacifier may be used only when known to be part of the infants' care and when the baby can suck. Dummies/pacifiers can also be dipped in expressed breast milk or sucrose to aid with painful stimuli.

- Neonates are best supported by a second person to provide developmentally appropriate support.
- Supporting the infant into a ‘facilitated tuck position’ – preferably in side lying – is shown to reduce pain responses. Cup the infant’s head and use the other hand against feet, bringing knees and hips into flexion, arms close to the midline of body and hands towards mouth.
- Use of a swaddle can facilitate optimal positioning and could be used in preparation before a procedure.
- Infants > 6 months are best supported in an upright position, which provides the infant with greater sense of control. Distraction such as toys or singing can also be used.

6.8 Parents.

- Staff should educate parents in infant pain behaviours and encourage them to participate in their baby’s pain assessment and management.
- Research has shown that where mothers were present during painful procedures, the infants were more likely to receive effective pain management strategies than those mothers who were not present. Highlighting a positive influence of parents.
- Parents should always be encouraged to provide non-pharmacological pain management, strategies such as comfort holding, non-nutritive sucking, breastfeeding, cuddles and parental skin to skin care. However, these parent driven strategies require nursing staff to support parents through education, so staff need to be aware of their responsibility to facilitate such beneficial interactions between parent and child.

6.9 Staff.

- All staff should receive training in the assessment and management of pain in neonates. This should begin during their orientation to the unit and continue to be updated as new evidence for and understanding of best practice develops.
- Staff should work together with their employers, to take responsibility for updating their knowledge and skills in pain assessment and pain management practice. This is likely, but not exclusively, to include e-learning, reading research papers, keeping up to date with unit guidelines, attending study days/ conferences/ seminars/ webinars covering this area of practice.

Table 1 An example of Comfort and Medical checks: *potential causes of discomfort to be excluded / addressed.*

Comfort Check	Medical check
Wet/soiled nappy/ bedding	Airway: obstructed ETT/dislodged ETT
Position (eg twisted/ trapped limb/ retracted shoulder)	Airway compromised by head position
Baby struggling to change position	Airway blocked by large nasal prongs
Noise: excessive background or peak noise e.g., loud talking, doors/draws slamming, bins not soft closing, placing things on top of the incubators, alarms not being answered	Abnormal movements: seizures
Noise: from CPAP pressure, oscillation	Breathing: irregular, inadequate MAP
Light: direct in face, flickering, frequent variations	Breathing: pneumothorax
Bedding: lumpy, rough, laying on wires	Breathing: grunting/ fast, needs more assistance
Lack of supportive boundaries	Circulation: poor due to sepsis/ shock
Movements to restricted	Cold or hypothermic baby
Many sleep interruptions	Digestion: reflux
Fast or unsupported movement and handling	Digestion: NEC
Hunger	Digestion: perianal/nappy rash
Response to soothing strategies (eg soothing voice): grasping, still holding, bracing, sucking.	Dislodged NG tube
Baby naked	Distended abdomen: gaseous
Weighing on cold scales	Drug withdrawal: neonatal abstinence
	Drug: rapid withdrawal of morphine
	Temperature- hyper/ hypothermic baby
	Trauma: IV extravasation
	Trauma at birth following forceps? Ventouse delivery
	Trauma: ischaemic injury to extremities/fingers/toes
	Trauma: fractures

Table 2. *Best practice to minimise sources of pain for neonates.*

Taken from Kariholu et al (2014)

Using skin protection barriers under tapes.
Use of gel based monitoring leads
Removing adhesive by using an adhesive removal product safe for neonates.
Using heel prick lancet designed for neonates.
Use an automated lancet, rather than a manual one.
Use venepuncture rather than a heel prick in term neonates, as it is potentially less painful
For venepuncture use a 24-26l gauge trocar/ cannula whenever possible.
Using appropriate skin cleaning products that are alcohol free.
Using gentle steady touch when handling babies to avoid skin trauma and bruising, especially when taking 'squeezed' blood samples.

Table 3. Procedures and actions widely accepted to cause pain in neonates.
Taken from Kariholu et al (2014)

Procedures and actions widely accepted to cause pain in neonates.
Heel prick.
Venepuncture for blood sampling.
Siting venous peripheral lines.
Siting peripheral arterial catheters.
Central venous line placement.
Endotracheal intubation.
Endotracheal suction.
Lumbar puncture.
Insertion and removal of chest drain.
Insertion and removal of abdominal drain.
Immunisation.
Circumcision.
Reduction of bowel into abdomen, for gastroschisis patient with silo.
Eye screening for ROP.
Laser treatment for ROP.
Siting nasogastric (or orogastric) tube.
Changing a colostomy bag.

6.10 Guide to carrying out procedures.

Pre-procedure

- Medical and nursing colleagues should communicate and co-operate to create the optimal experience for the baby alongside parents.
- Where possible, reduce the number of procedures performed by combining blood tests, so less skin punctures are required. Also utilise non-invasive monitoring such as trans-cutaneous monitoring.
- Does the baby have an arterial line for blood sampling- avoiding the need for venepuncture.
- Have someone available to help you and comfort the baby (this could be the parent if appropriate.)
- When possible do not interrupt the baby's sleep, the ideal state is when the baby is in a state of quiet wakefulness.
- When possible avoid procedures immediately after a baby has been fed.
- Reduce environmental stressors such as noise and light to help the baby cope.
- Give preventative pain relief and allow time to work;
 - Sucrose 2 minutes
 - Morphine iv 10 minutes
 - Fentanyl iv 2-3 minutes
 - Breast milk- instant effect (Can be dummy dip or actual breast feeding)
 - Kangaroo care- starting 15 minutes before procedure begins.

During procedure

- Conduct the procedure in a calm and relaxed manner
- Prepare the baby
- Introduce self by soft voice then still, gentle touch.
- Consider repositioning into side lying to support hands to midline/face of the baby to facilitate grasping and self-comfort measures.
- Contain rather than restrain the baby - comfort holding, facilitated tucking and/or swaddling may all be appropriate methods.
- Offer a soother for non-nutritive sucking where appropriate. (Consider oral sucrose or EBM as local policy allows.)
- Where possible and if appropriate a parent can cuddle/ give kangaroo care or breast feed the baby before/during and after the procedure.
- Monitor the babies pain response and cues, adjust accordingly throughout the procedure to ensure they are comfortable at each stage.
- Return the baby to a comfortable and developmentally appropriate position, unless already being cuddled/held/ having Kangaroo Care. If samples/ specimens need to be dealt with urgently, then ask a colleague to either stay with the baby or sort the specimens for you.

Post-procedure

- Stay with the baby offering a comfort hold until the baby is calm and free from distress. To gain the full benefits of kangaroo care at least an hours 'skin to skin' should occur.
- Document the baby's response to the pain management strategies used, what was effective and what was not, documenting in the baby's developmental care plan. This will assist health care practitioners in their future care of that baby.
- Whenever possible, plan no other invasive procedure for at least 2 hours after the procedure.

7 Roles and responsibilities

This guideline applies to all clinical staff working within the Thames Valley and Wessex Neonatal ODN. Staff have a responsibility to ensure that they are aware of this guideline and its contents. They should clearly document their rationale if they have not complied with the recommendations detailed in this guideline. It is the responsibility of department managers, consultants, team leaders and education leaders to ensure staff are aware of this guideline.

8 Communication and training plans

The guideline will be displayed on the Thames Valley and Wessex Neonatal ODN and sent to the relevant Care Group clinical teams. The team leaders will be expected to cascade to all relevant staff groups. All medical, nursing staff caring for newborns should have support and training in implementing the contents of the guideline. In addition, the guidelines will be included in local induction programs for all new staff members.

9 Process for monitoring compliance

The purpose of monitoring is to provide assurance that the agreed approach is being followed. This ensures that we get things right for patients, use resources well and protect our reputation. Our monitoring will therefore be proportionate, achievable and deal with specifics that can be assessed or measured.

Key aspects of this policy will be monitored: (copy this table & insert below if further tables are required)

Element to be monitored	Pain assessment tool; pharmacological interventions; use of sucrose
Lead (name/job title)	TVW Neonatal ODN
Frequency	3 yearly
Reporting arrangements	Updates shared to all Clinical and Nurse Leads to disseminate.

Where monitoring identifies deficiencies, actions plans will be developed to address them.

10 Document review

Guideline to be reviewed after three years or sooner as a result of audit findings or as any changes to practice occurs.

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12 Appendices

Appendix 1: Pain assessment tools used in our network - PAT

<div style="border: 1px solid black; padding: 5px; width: fit-content;"> Insert Patient label </div>	NEONATAL PAIN ASSESSMENT TOOL (PAT)									
Date:										
Time:										
Posture/tone:	Relaxed	0								
	Extended	1								
	Flexed &/or tense	2								
Sleep pattern:	Relaxed	0								
	Agitated or withdrawn	2								
Expression:	Relaxed	0								
	Frown	1								
	Grimace	2								
Colour:	Pink, well perfused	0								
	Pale/dusky/flushed	2								
Cry:	No	0								
	Yes	2								
Respirations:	Normal	0								
	Tachypnoea	1								
	Apnoea	2								
Heart rate:	Normal	0								
	Tachycardia	1								
	Fluctuating	2								
O2 saturations:	Normal	0								
	Decapitated +/- handling	2								
Blood pressure:	Normal	0								
	Hypohypertension	2								
Nurse perception:	No	0								
	Yes	2								
Total Score /20:										
Nursing Comfort Measures Code:										
Nurse Action/s Code:										
Nurse's Initials:										
Comments:										
<p>Nursing Comfort Measures (NCM) Codes:</p> <p>R Gently repositioning the infant to make more comfortable W Wrapping / containment of the infant to provide support for limbs E Decreasing environmental stressors eg. reducing noise, shading baby from light, reducing activity around the baby V Talking softly to the baby/ soft appropriate music N Nappy change D Using a pacifier/dummy to provide non-nutritive sucking K Kangaroo care by parent B Breastfeeding</p> <p>Nurse Action Codes:</p> <p>N No action taken P Oral Paracetamol given M Oral morphine given S Sucrose PP Pre-procedure score AP After-procedure score</p>										

Instructions for completing assessment:

- Nurse should stand where the infant's body and face can be seen clearly
- Observation should last for a full two minutes without interruption
- Review the parameter descriptors table and assign a score for each parameter that best describes the infant's behaviour or state (Note that not every descriptor in each box below needs to be present)

Explanation of PAT scoring terms

	0	1	2
Posture / Tone	Relaxed	Extended - Digits widespread - Trunk rigid - Limbs drawn out - Shoulders raised off bed	Flexed and/or tense - Fists clenched - Trunk guarding - Limbs drawn to midline - Head and shoulders resist positioning
Sleep pattern	Relaxed -Asleep -Quiet alert -Drowsy		Agitated or withdrawn - Wakes with startle - Easily woken - Restless - Squirming - No clear sleep/wake transition - Eye aversion 'shut out'
Expression	Relaxed	Frown - Shallow furrows - Eyes lightly closed	Grimace - Deep furrows - Eyes tightly closed - Pupils dilated
Colour	Pink, Well perfused		Pale / dusky / flushed - Palmar sweating (term infant)
Cry	No		Yes - When disturbed - Doesn't settle after handling - Loud - Whimpering - Whining
Respirations	Normal for gestation	Tachypnoea At rest	Apnoea - At rest or with handling
Heart rate	Normal for gestation	Tachycardia At rest	Fluctuating - Spontaneous or at rest
Oxygen saturation	Normal for gestation		Desaturation - with or without handling
Blood pressure	Normal for gestation		Hypo/hypertension* at rest

When to assess:

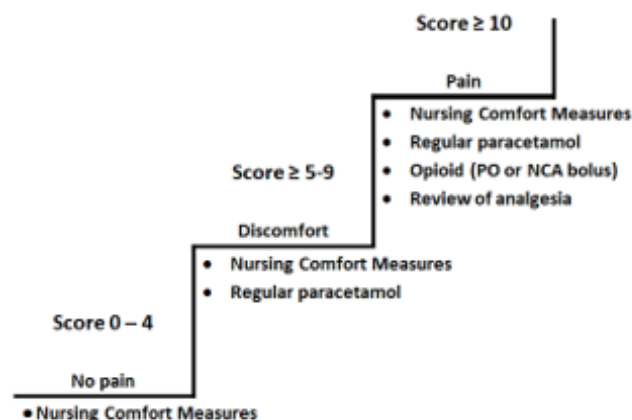
- On admission
- Once per shift Then adjust frequency according to score generated
- Any changes in physiology or behavior
- If Nurse/HCP perceives baby is in pain
- Pre and post painful procedures such as LP or ROP

The score the neonate generates will influence the frequency of assessment:

- Score 0-4: 4 hourly assessment
- Score 5-9: 2 hourly assessment
- Scores ≥ 10 : hourly assessment until score is less than 10
Repeat assessment 30 minutes after any pharmacological intervention

Clinical Management

- Scores 0-4: Nursing comfort measures (NCM), continue with current management or consider weaning analgesia
- Scores $\geq 5-9$: NCM, paracetamol
- Scores ≥ 10 : NCM, paracetamol, opioid (PO or IV bolus), review of analgesia



Appendix 1: Pain assessment tools used in our network - SCREAMS

SCREAMS			
There are five categories to score and each category can be scored from 0-2. The maximum total score is 10			
	SCORE 0	SCORE 1	SCORE 2
Signs (if monitored)	HR &/or BP Within normal range for baby	HR &/or BP 10 – 25% above normal range	HR &/or BP >25% above normal range
Cry	None	Audible or silent (ventilated)	Inconsolable
Expression	Relaxed	Grimace	Anguished or inert
And Movement	Relaxed	Restless	Exaggerated or inert
Sleep state	Asleep or quietly alert	Disturbed sleep pattern	Constantly awake

Guide to behavioural terms used in the SCREAMS pain assessment tool

Expression	Score	Definition	Movement	Score	Definition
Relaxed	0	Deep sleep or quietly alert	Relaxed	0	Relaxed trunk and limbs, body in tucked position, hands cupped
Grimace	1	Frown, wandering gaze, narrowed eyes, pursed or parted lips	Restless	1	Startles with jerky or uncoordinated limb movement, flexion or extension of limb to withdraw from trauma
Anguished	2	Crumpled face, brow bulge, pronounced naso-labial furrow, eyes squeezed, cupped tongue	Exaggerated	2	Abnormal limb & neck extension, arching back, splaying of digits, swiping or thrashing of limbs
Inert	2	No response to trauma, no cry, staring, gaze avoidance (only seen during or immediately following trauma)	Inert	2	No response to trauma, still and inert, limp or rigid (only seen during or immediately following trauma)

Procedure codes

NP = no procedures	HP = heel prick	VP = venepuncture/cannulation
CVL = long line	AS = arterial stab	I = intubation
CD = chest drain	SPA = suprapubic aspiration	LP = lumbar puncture
POP = postoperative pain	PTD = post traumatic delivery	O = other (please specify)

Action codes

A = no action	F = Morphine infusion or regular oral Morphine
B = non-pharmacological consolation	G = increase in Morphine dose
C = 24% sucrose	H = topical anaesthetic e.g. Ametop, Lignocaine
D = regular or PRN Paracetamol	I = other, please specify
E = stat dose of Morphine, Fentanyl	

Adapted from Department of Neonatology, BSUH, 2007 in 2020

Interpretation of scores

For babies receiving chronic painful stimuli

e.g. ventilation, NEC, postoperative pain

- 0-2 Minimal pain or distress
Current management is appropriate. Continue regular assessment.
- 3-4 Mild pain or distress
Review current management of baby. May require non-pharmacological analgesia.
- 5-6 Moderate pain or distress
Review current management of baby. Requires analgesics or increased dose.
- 7-10 Severe pain or distress
Review current management of baby. Should receive analgesics or increased dose.

N.B.: Babies receiving paralysing agents cannot be accurately assessed.
They should receive continuous analgesia.

For babies receiving acute painful stimuli

e.g. invasive procedures

- 0-2 Minimal pain or distress, i.e. ultrasound
Baby should return to relaxed state without further intervention.
- 3-4 Mild pain or distress, i.e., SPA, venous cannulation/puncture, heel prick
Baby requires non pharmacological analgesia to return to relaxed state.
- 5-6 Moderate pain or distress, i.e. Intubation, LP, arterial sampling/cannulation
Baby requires analgesics or further analgesics to return to relaxed state.
- 7-10 Severe pain or distress, i.e. chest drain
Baby requires analgesics or further analgesics to return to relaxed state.

N.B.: Anticipate pain prior to any invasive procedure and administer analgesics, as per protocol.

Treatment options

For dose please refer to local neonatal prescribing guideline.

SEVERE PAIN		IV MORPHINE
	AND	PO/IPR PARACETAMOL
		IV/PO MORPHINE
MODERATE PAIN	OR	PO/IPR PARACETAMOL
	AND	PO/IPR PARACETAMOL
	AND/OR	ORAL SUCROSE
MILD PAIN COMBINE WITH	<input type="checkbox"/> LIGNOCAINE 1% INFILTRATION for chest drain, extravasation injury	

Adapted from Department of Neonatology, BSUH, 2007 in 2020

Astrid Lindgren and Lund Children’s Hospitals Pain and Stress Assessment

Scale for Preterm and sick Newborn Infants ALPS-Neo

	0	1	2
FACIAL EXPRESSION	Peaceful	Distressed expression May grimace slightly	Distressed expression, may cry Chin drop
BREATHING PATTERN	Calm effortless breathing	Slightly strained breathing Breathing pauses	Strained breathing Fast breathing Apneus
TONE OF EXTREMITIES	Normal tone	Varied tone	Tense or flaccid
HAND/FOOT ACTIVITY	Relaxed	Slightly clenched May try to grasp Hand on face	Tightly clenched Fingers/toes spread Flaccid
LEVEL OF ACTIVITY	Calmly awake Calmly asleep	Occasional motor restlessness	Persistent motor restlessness Exhausted

Kleberg Agneta, Astrid Lindgren Children’s Hospital, Stockholm, Sweden
Larsson Björn A, Astrid Lindgren Children’s Hospital, Stockholm, Sweden
Lundqvist Pia, Department of Health Sciences, Lund University, Sweden

Appendix 2: Example of Unit Sucrose guideline

Sucrose 24% (Oral) for Procedural Pain in Neonates

SUCROSE 24% (ORAL) FOR PROCEDURAL PAIN IN NEONATES

AUGUST 2021

written by Jo Hemmings

(Advanced Neonatal Nurse Practitioner at University Hospital Southampton)

THIS IS A NEW GUIDELINE

KEY INFORMATION WILL BE PROVIDED HERE, BUT IT IS YOUR RESPONSIBILITY TO FAMILIARISE YOURSELF WITH THE ACTUAL GUIDELINE

The body of the text provides the evidence base behind the guideline

Key changes/information:

- Sucrose is suitable for infants 32 weeks' gestation and above
- The dose is dependent on the infant's weight

WEIGHT OF INFANT MLS PER DOSE

less than 1.5kg 0.2mls

From 1.5kg to 2kg 0.3mls

From 2kg to 2.5kg 0.5mls

From 2.5kg to 3kg 1ml

From 3kg (less than 4 months) 2mls

- A maximum number of 4 doses for preterm (<37/40) and 8 doses for term infants (37/40+) can be administered in a 24-hour period
- Sucrose is for procedural pain and should not be used for chronic pain management, nor should it be used to settle an irritable baby
- It is more effective when used with other methods of comfort or developmental care
- Every dose should be recorded either on MetaVision if baby is NNU inpatient, or on Badger if baby is not an inpatient on NNU
- Sucrose can be used before checking blood sugar levels as the dose is so small it is not likely to affect the blood sugar result
- Any dose less than 2mls should be drawn up using an enteral syringe and enteral straw

You should ensure the twist cap of the sucrose vial is fully removed before administering to the infants as there has been an NPSA following an infant being given a dose with the twist cap loosened but still in-situ.

Appendix 3: Appendix 2: Example of Unit Sucrose guideline

Sucrose 24% (Oral) for Procedural Pain in Neonates Version 5.0.

Sucrose 24% (Oral) for Procedural Pain in Neonates Version 5.0

Description	W&N Guideline		
Target audience	Neonatal Unit, Maternity Services		
Related documents / policies (do not include those listed as appendices)	<ul style="list-style-type: none"> • Developmental Care for the Neonate Guideline • Lactation and Breastfeeding on the NNU Guideline • Guideline for the Practice of Kangaroo Care 		
Author(s) (names and job titles)	Christina Humphry – Staff Nurse Joanne Hemmings - ANNP		
Policy sponsor	Freya Pearson – Divisional Clinical Director		
Is there any non-compliance with NICE guidance?	No		
First Consultation	12 th June 2020 - W&N Neonatal Guideline Consultation Group		
Second Consultation	29 th June 2020 - W&N Neonatal Guideline Consultation Group		
Third Consultation	15 th January 2021 – Version 0.1 Neonatal Consultants, Neonatal Band 8 & 7, Neonatal Education Team W&N Anaesthetic Guideline Consultation Group, W&N Midwifery Guideline Consultation Group, W&N Obstetric Guideline Consultation Group		
Approval committee	Approval date		
Women and Newborn Governance Steering Group	02/07/2021		
Drugs Committee	16/06/2021		
UHS reference	Version	Publication date	Next review due
N/A	1	July 2021	July 2024

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1 Version control

Date	Consultation / Comments	Version created	Page	Key changes
12/06/2020 29/06/2020 15/01/2021	F Lawson, J Hemmings, C Pugh, S Davidson, K Brown, V Puddy, S Potter, J Thorne, K Rutherford, M Drewett, N Ringrose, L Anderson, H Wells, C Nurmahi, L Smith, A Pearson	0.4		New guideline
21/05/21	Jonathan Hall & Andy Fox	0.5		Clarity on who can check and how to draw up. Uploaded into new format.

2 Index

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3 Executive Summary / Introduction

As neonatal specialists, we are advocates for the infants in our care and strive to provide quality health care to our patients and their families. The use of both pharmacological and non-pharmacological pain management methods is essential to optimise comfort and promote a safe, pain-free environment for our unique service users. The analgesic properties of oral sucrose are well documented in both term and preterm infants and should therefore be incorporated into routine practice on the Neonatal Unit. This guideline is consistent with our philosophies of care and should therefore enable staff to deliver best practice.

Recommended Dosage

ALGOPEDOL (Sucrose 24%) is suitable for use from 32 weeks gestation and can be administered up to 4 times per 24 hours in preterm infants (<36+6 weeks gestation) and 8 times per 24 hours in term infants (>37 weeks' gestation).

WEIGHT OF INFANT	MLS PER DOSE OF ALGOPEDOL
less than 1.5kg	0.2mls
From 1.5kg to 2kg	0.3mls
From 2kg to 2.5kg	0.5mls
From 2.5kg to 3kg	1ml
From 3kg (less than 4 months)	2mls

4 Scope and purpose

Purpose

The aim of this guideline is to provide information on the safe use of oral sucrose prior to painful procedures to all staff involved in the care of neonates.

To determine the efficacy, effect of dose, method of administration and safety of sucrose for relieving procedural pain in infants.

Scope

This guideline is applicable to all staff caring for infants at the Princess Anne Hospital. Staff who can check the dose of oral sucrose prior to administration are either 2 registered staff (nurse, midwife, doctor) OR one registered staff and one Band 4 with medical competencies signed off.

5 Definitions

- ALGOPEDOL (Sucrose solution 24%) – A liquid containing diluted sugar (24%)
- Endogenous – growing or originating from within an organism
- Neonate – Up until 44 weeks corrected
- NNU – Neonatal Unit
- NNS – Non-nutritive sucking (is the process of allowing a baby to suck without taking any milk. Suckling is well known to be calming in neonates, but the calming effect is often lost once the stimulus is removed).
- Preterm – An infant born before 37 weeks' gestation

6 Details of policy/procedure to be followed

6.1 Background to Pain

Pain is defined as an unpleasant sensory and emotional experience associated with actual and potential tissue damage (IASP, 2003).

Historically, a lack of knowledge and understanding on neonatal pain has hindered the development of comprehensive pain management strategies in the clinical area (Rouzan, 2001).

Pain in the neonatal period is often unrecognised and undertreated despite infants being frequently exposed to acute, repetitive, and chronic pain. Research has shown an association between the higher the numbers of painful procedures, infants born prematurely are exposed to; with poor early neurodevelopment, delayed postnatal growth and higher cortical activation (Beatriz et al, 2015).

Infants cannot verbally communicate their discomfort; however, evidence suggests that infants do experience pain. Infants express their vulnerability through specific behaviours and with physiological and biochemical responses to pain (Anand et al, 2007).

Infants manifest physiologic changes in their endocrine and metabolic systems, cardiovascular and respiratory systems and have been shown to exhibit a more prolonged stress response than adults, as measured by an increase in cortisol.

Nociception is measured by various biologic components that assess pain as opposed to assessing only external, physical signs of pain. Infants display a change in hormonal response, including an increase in the catecholamines, epinephrine and norepinephrine. The production of

insulin suppressed and glucagon is released from the pancreas. Growth hormone and prolactin are secreted more frequently when pain management is not used in infants.

In addition, nociception is measured by increased heart rate, blood pressure and respiratory rate, intracranial pressure and sweating, and decreased oxygen saturations and vagal tone.

An infant's behavioural response to pain include crying, facial grimacing, chin quivering, eye squeezing, open and/or stretched mouth, lip purse and agitation.

Infants may experience an increased sensitivity to pain and preterm infants may have a more pronounced sensitivity than term infants (Coleman et al, 2002).

The best approach to management of neonatal pain is prevention

Potential painful procedures need to be limited and when pain is anticipated, the use of appropriate analgesics should be used, in conjunction with developmental care and comfort measures.

Developmental care measures that have demonstrated effective pain reduction include:

- Breast milk
- Breast feeding
- Swaddling, kangaroo care, and facilitated tuck
- Parental involvement
- Non-nutritive sucking (NNS)

Comfort measures should be considered firstly, prior to any procedures that may cause discomfort, which can be found in the **Developmental Care for the Neonate Guideline**.

In addition to comfort measures, maternal breast milk must be given as a priority, however, if unavailable, small amounts of oral sucrose have been shown to reduce procedural pain.

6.2 Literature and Evidence base background to Sucrose

Both pharmacologic and nonpharmacological methods have been studied to alleviate neonatal pain, and the research is extensive.

The two most commonly studied have been sucrose and non-nutritive sucking (NNS).

The physiological effects of oral sucrose and NNS are thought to be mediated by both endogenous opioid and non-opioid systems (Stevens, 2001). However, the underlying mechanisms are believed to differ and are likely to be dependent on the normal functioning of central mechanisms; these may be synergistic or additive.

The administration of oral sucrose with or without NNS has been reviewed for its effect in crying babies (Thakkar et al, 2016) and its pain-relieving effects for procedures (Stevens et al, 2010). There is increasing evidence that the synergistic effect of sucrose and NNS is more effective than the effect of sucrose alone (Taddio et al, 2009).

6.3 Indications for Use

Oral sucrose is safe and effective for reducing minor procedural pain, in conjunction with non-nutritive sucking, from single events such as:

- Venepuncture/ cannulation/ heel stabs/ arterial puncture
- Lumbar puncture

- Eye examination
- Echo, ECG
- Suture removal
- Intramuscular/ subcutaneous injection
- Immunisations
- Adhesive tape removal
- Rectal biopsy
- Dressing change
- X-ray providing discomfort
- Nasogastric tube insertion

Sucrose is not suitable for the management of chronic pain, nor is it suitable for use for consoling irritable infants.

Contraindications:

- Infants with known fructose or sucrose intolerance
- Glucose-galactose malabsorption
- Muscle relaxed neonates
- Critically ill infants receiving appropriate intravenous analgesia
- Pre-operative infants with oesophageal atresia
- Pre-operative infants with tracheal-oesophageal fistula
- Confirmed or suspected gastrointestinal pathology at high risk for necrotising enterocolitis (NEC)
- Infants unable to swallow.
- Infants who are Nil by Mouth (however can be discussed with the clinical team, but must be clearly documented in the patient's notes if to be considered).
- Neonates and infants of mothers maintained on methadone may have altered endogenous opiate systems, resulting in a lack of analgesic effect of oral sucrose in the first days to weeks of life. It is important to assess the effectiveness of oral sucrose in these infants and to use alternative comfort measures until the infants' endogenous opiate system normalises.

Sucrose can be used before checking glucose level as it is not likely to affect the result as the dose of oral sucrose used is too small.

6.4 Administration

ALGOPEDOL is a preservative- free, oral solution of sucrose 24% for paediatric, pre-term and term neonate use. ALGOPEDOL allows a safe administration of sucrose and simplifies clinician workflow by allowing the administration of sucrose directly onto the tip of an infant's tongue or buccal surface. Ramenghi et al (1999) reported that the administration of sucrose to the stomach via a nasogastric tube was not an effective analgesia as there is not enough time for absorption to occur.

Studies have reported that the optimum effect is achieved from either administering sucrose on to the tongue followed by a dummy (Gibbons et al, 2002) or by giving a dummy dipped in the sucrose solution (Stevens et al, 2010). However, you should only offer a dummy if this is part of their normal care, in conjunction with the Lactation and Breastfeeding Guideline (Section 3.10). It is also recommended that the effect of sucrose could be further enhanced by utilising other comfort measures such as swaddling and kangaroo care.

Administer 1 to 2 minutes prior to procedure as there is a 2-minute peak effectiveness following administration which will provide short term pain management. The effect may be prolonged by administering two or three repeat doses at 2-minute intervals during the procedure. The duration of action is 5-10 minutes. Sucrose may be inadequate for painful procedures lasting longer than this and alternative analgesia should be considered.

Observe for gagging, choking, coughing and vomiting

6.5 Adverse Effects of Sucrose

Few studies have reported on adverse effects. Short-term side effects of oral sucrose were reported by two studies. Carbajal (2003) reported slight transient oxygen desaturations who received 0.3ml of 30% sucrose and Gibbons et al (2002) reported adverse effects as those which occurred after administration such as choking, coughing and vomiting. Adverse effects were most frequently noted in the immature infant but were not clinically significant and none of the infants who received sucrose with non-nutritive sucking had any adverse effects. Further concerns in relation to possible adverse effects have been alterations in glucose homeostasis and NEC. Sucrose however has not been proven to cause these adverse effects (Lefrack et al, 2006).

6.6 Sucrose Preparations

The sucrose solution available for use is ALGOPEDAL.

- Sucrose 24% is available in single patient twist-cap vials, each containing 2ml of Sucrose 24% Solution. Each single vial is graduated in 0.5ml increments so the sucrose can be accurately delivered
- For accuracy, if using a dose less than 2mls (the total dose provided in the vial), the correct dose should be drawn up into an enteral syringe using a drawing up straw
- Once open, so long as the infant does not take a dose directly from the vial, the cap can be replaced, the vial labelled with the name, hospital number, date and time opened
- Do not make use of an opened vial after 8 hours
- If patient is to take the dose directly from the vial, **ensure the cap is removed** before administration
- Any residual from a vial directly administered from should be discarded after the procedure
- Store at room temperature
- To be stored in a locked cupboard
- Do not use after the expiry date

6.7 Documentation

Oral sucrose administration **MUST** be documented in order to prevent exceeding the maximum recommended dose in 24 hours. The following information should be recorded for each dose given:

- Date and time
- Why the sucrose was given
- How much sucrose was given
- What the effect of the sucrose was
- Who gave it
- Any adverse effects

If more than one dose is given then these should each be documented as separate administrations to ensure that the maximum number of doses in 24 hours is not exceeded.

Infants should not be in pain prior to a procedure hence there is no need to document a pain score prior to a procedure. Also, they should not be in pain after the procedure so you do not need to routinely document a pain score. You should provide an evaluation of effectiveness of the dose should be documented in the infant's notes following administration and if any further interventions were needed or should be considered prior to the next procedure.

Any adverse events should be acted upon immediately and safely. Staff must report as per local policy soon after the event and in the patient's summary. Verbally hand over to the relevant staff.

For infants who are inpatients on the NNU, oral sucrose should be set up on MetaVision as a "Task" which can be created by the nurse looking after the infant. For infants who are not inpatients on the NNU, a sticker should be placed in their paper notes for each dose that is administered (See Appendix 1). If a baby attends NNU for a review that is documented on eQuest a sticker should be placed on the print out of their eDoc letter that is given to parents or added to paper notes on readmission.

6.8 Summary

- Staff administering sucrose should check contraindications first (Section 3.4)
- If mothers breast milk is available, then this should be used as an alternative to **Algopedol 24%**
- Check dosing regime, as per unit guideline (Executive Summary)
- Check previous dose and time
- Ascertain whether sucrose can be given with dummy
- Wash hands as per unit policy and apply gloves
- Two registered staff (or one registered staff and one Band 4 with medical competencies signed off) to check **Algopedol 24%** is within date and correct dose is drawn up into an enteral syringe if to be given to a pre-term infant
- Term infants can take dose directly from the vial
- Check patient's hospital number
- Ensure baby is awake to avoid aspiration
- Ensure cap is removed prior to administration if the vial is being sucked from directly
- Employ environmental and behavioural strategies to comfort baby (if appropriate and in conjunction with the traffic light system, of which can be found in the unit's **kangaroo Care Guideline (Section 3.2)**). For example, swaddling, containment holding, kangaroo care
- **Give the dose**
 - **EITHER: drop the dose onto the dummy and place into infant's mouth.**
 - **OR: give the dose directly onto the infant's tongue or buccal membrane**
- **WAIT** two minutes before commencing the painful procedure
- Continue with environmental and behavioural strategies during the procedure
- Observe infant's cues and vital signs and allow for "time out" to recover, if needed
- If infant is still displaying pain, discuss repeating a further dose in two-minute intervals (providing the dose is within the maximum number of times in 24 hours)
- Record of administration on MetaVision (or electronic note system) or using sticker
- Document in infant's handover summary how procedure was tolerated and any adverse events.
- After the procedure, ensure the infant is left calm, comfortable and stable
- Update parents

7 Roles and responsibilities

This guideline applies to all clinical staff employed or contracted by University Hospital Southampton (UHS) Foundation Trust who provide care to neonates within the Princess Anne Hospital. Staff have a responsibility to ensure that they are aware of this guideline and its contents. They should clearly document their rationale if they have not complied with the recommendations detailed in this guideline. It is the responsibility of department managers, consultants, teamleaders and education leaders to ensure staff are aware of this guideline.

8 Communication and training plans

The guideline will be displayed on the Staffnet, and sent to the relevant Care Group clinical teams. The team leaders will be expected to cascade to all relevant staff groups. All medical, nursing and midwifery staff caring for neonates should have support and training in implementing the contents of the guideline. In addition, the guidelines will be included in local induction programmes for all new staff members.

The author is responsible for ensuring the effective dissemination of this guideline.

To ensure dissemination takes place and to avoid duplication of work, do not assume others will do this based on their involvement in guideline consultation process.

Methods of dissemination may include:

- Email correspondence e.g.
 - midwiferystaff@uhs.nhs.uk
 - consultantobstetricians@uhs.nhs.uk
 - consultantneonatologists@uhs.nhs.uk; NeonatalJuniorDoctors@uhs.nhs.uk, NeonatalStaff@uhs.nhs.uk
- Theme of the Week (Midwifery Services)
- Communication board in birth environments and ward areas for discussion at handover
- Teaching sessions – involve Education team early in guideline consultation process
- Neonatal Dissemination: OMW, TOTW, NEST

9 Process for monitoring compliance

The purpose of monitoring is to provide assurance that the agreed approach is being followed. This ensures that we get things right for patients, use resources well and protect our reputation. Our monitoring will therefore be proportionate, achievable and deal with specifics that can be assessed or measured.

Key aspects of this policy will be monitored:

Element to be monitored	Compliance with guideline
Lead (name/job title)	Patient Safety Leads
Tool	Risk process
Frequency	As required
Reporting arrangements	Any non-compliance to be reported using incident form. Learning from risk process to be disseminated to staff

Where monitoring identifies deficiencies, actions plans will be developed to address them.

10 Document review

Guideline to be reviewed after three years or sooner as a result of audit findings or as any change to practice occurs.

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12 Appendices

Appendix 1: Sucrose Documentation Stickers

(see attached

document)Information

included:

ALGOPEDAL 24% (Sucrose) Administration Record

Patient Name:

Hosp No: Date: Time:

Why Given: Dose Given (mls):

Effect:

Adverse Effects:

Given By: