



Topic Expert Group: Care procedures

Taking blood samples

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Target group

Infants and parents

User group

Healthcare professionals, neonatal units, hospitals, and health services

Statement of standard

The process of taking blood samples is carried out using optimal comfort strategies to minimise stress and pain using an individualised supportive technique.

Rationale

Blood sampling is necessary to monitor neonatal care. The procedure of sampling carries certain risks (e.g. haematoma, infection, damage of nervous system, and pain). (1) Blood sampling should be performed exclusively by experienced and specially trained healthcare professionals. The need for and frequency of blood sampling should be individualised. Choosing the appropriate sampling method (venous, arterial, or heel puncture) depends on the type of investigation required. Venous puncture should be the preferred method, as it causes less pain than puncturing the heel. (2–4) As with all invasive procedures, both appropriate arrangements regarding the infant’s comfort and an effective pain relief therapy are necessary. It is also obligatory to comply with hygiene standards. There are no clear directives, guidelines or recommendations regulating which skin disinfectant should be chosen for preterm and term infants. (see TEG Patient safety & hygiene practice)

Benefits

Short-term benefits

- Reduced complications (2,3)
- Reduced painful interventions (2,3,5)
- Improved sleep (6)

Long-term benefits

- Improved cortisol levels (7)
- Improved brain structure/development (8,9)

Components of the standard

Component	Grading of evidence	Indicator of meeting the standard
For parents and family		
1. Parents are informed by healthcare professionals about the importance and	B (High quality)	Patient information sheet



procedure of taking blood samples, which strategies are followed by the clinic, signs of stress and pain in the infant, and how to react accordingly. (see TEG Care procedures)		
2. Parents are invited to be present at blood sampling and able to support (e.g. skin-to-skin care) their infant during the procedure. (10–12)	A (High quality) B (High quality)	Parent feedback
3. Parents are informed about non-pharmacological analgesic strategies (e.g. breastfeeding or pacifier). (10–15)	A (Moderate quality) B (High quality)	Patient information sheet
For healthcare professionals		
4. A unit guideline on the taking of blood samples is adhered to by all healthcare professionals.	B (High quality)	Guideline
5. Training on venous and capillary blood sampling and the behavioural identification of stress and pain in infants is attended by all responsible healthcare professionals. (see TEG Care procedures)	B (High quality)	Training documentation
6. Non-pharmacological analgesic strategies are used as a precaution, including skin-to-skin care and breastfeeding when parents are present. (10,12)	A (High quality) B (High quality)	Guideline
For neonatal unit		
7. A unit guideline on the taking of blood samples is available and regularly updated.	B (High quality)	Guideline
For hospital		
8. Training on venous and capillary blood sampling and the behavioural identification of stress and pain in infants is ensured.	B (High quality)	Training documentation
9. Appropriate equipment for blood sampling (e.g. needles matching the size of the infant) is available.	B (High quality)	Audit report
For health service		
N/A		



Where to go – further development of care

Further development	Grading of evidence
For parents and family	
<ul style="list-style-type: none">In all infants skin-to-skin care while taking elective blood samples is used. (15–17)	A (High quality)
For healthcare professionals	
N/A	
For neonatal unit	
N/A	
For hospital	
N/A	
For health service	
<ul style="list-style-type: none">Support and promote projects that develop non-invasive techniques to replace blood sampling. (10,12,15–17)	A (High quality)

Getting started

Initial steps

For parents and family

- Parents are verbally informed by healthcare professionals about the importance and procedure of taking blood samples, which strategies are followed by the clinic, signs of stress and pain in the infant, and how to react accordingly.
- Parents are invited to be present during their infant's blood sampling.

For healthcare professionals

- Attend training on venous and capillary blood sampling and the behavioural identification of stress and pain in infants.

For neonatal unit

- Develop and implement a unit guideline on blood sampling.
- Develop information material on the importance and procedure of taking blood samples, which strategies are followed by the clinic, signs of stress and pain in the infant and how to react accordingly for parents.
- Train all healthcare professionals with regard to individualised support of the infant, blood sampling, pain management and hygiene.

For hospital

- Support healthcare professionals to participate in training on venous and capillary blood sampling and the behavioural identification of stress and pain in infants

For health service

N/A

Source

- Buowari OY. Complications of venepuncture. Adv Biosci Biotechnol. 2013;04(01):126–8.



2. Dhingra N, Safe Injection Global Network, World Health Organization. WHO guidelines on drawing blood: best practices in phlebotomy [Internet]. 2010 [cited 2018 May 23]. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK138650/>
3. Ogawa S, Ogihara T, Fujiwara E, Ito K, Nakano M, Nakayama S, et al. Venepuncture is preferable to heel lance for blood sampling in term neonates. *Arch Dis Child Fetal Neonatal Ed*. 2005 Sep;90(5):F432-436.
4. Shah V, Ohlsson A. Venepuncture versus heel lance for blood sampling in term neonates. *Cochrane Database Syst Rev*. 2007 Oct 17;(4):CD001452.
5. Vinall J, Grunau RE. Impact of repeated procedural pain-related stress in infants born very preterm. *Pediatr Res*. 2014 May;75(5):584-7.
6. Graven S. Sleep and brain development. *Clin Perinatol*. 2006 Sep;33(3):693-706, vii.
7. Brummelte S, Chau CMY, Cepeda IL, Degenhardt A, Weinberg J, Synnes AR, et al. Cortisol levels in former preterm children at school age are predicted by neonatal procedural pain-related stress. *Psychoneuroendocrinology*. 2015 Jan;51:151-63.
8. Smith VC, Dukhovny D, Zupancic JAF, Gates HB, Pursley DM. Neonatal intensive care unit discharge preparedness: primary care implications. *Clin Pediatr (Phila)*. 2012 May;51(5):454-61.
9. Donia AE-S, Tolba OA. Effect of early procedural pain experience on subsequent pain responses among premature infants. *Egypt Pediatr Assoc Gaz*. 2016 Jun 1;64(2):74-80.
10. de Sousa Freire NB, Santos Garcia JB, Carvalho Lamy Z. Evaluation of analgesic effect of skin-to-skin contact compared to oral glucose in preterm neonates. *PAIN*. 2008 Sep 30;139(1):28-33.
11. Johnston CC, Filion F, Campbell-Yeo M, Goulet C, Bell L, McNaughton K, et al. Kangaroo mother care diminishes pain from heel lance in very preterm neonates: a crossover trial. *BMC Pediatr*. 2008 Apr 24;8:13.
12. Carbajal R, Veerapen S, Couderc S, Jugie M, Ville Y. Analgesic effect of breast feeding in term neonates: randomised controlled trial. *BMJ*. 2003 Jan 4;326(7379):13.
13. Cong X, Ludington-Hoe SM, McCain G, Fu P. Kangaroo Care modifies preterm infant heart rate variability in response to heel stick pain: pilot study. *Early Hum Dev*. 2009 Sep;85(9):561-7.
14. Akcan E, Yiğit R, Atici A. The effect of kangaroo care on pain in premature infants during invasive procedures. *Turk J Pediatr*. 2009 Feb;51(1):14-8.
15. Johnston C, Campbell-Yeo M, Fernandes A, Inglis D, Streiner D, Zee R. Skin-to-skin care for procedural pain in neonates. In: The Cochrane Collaboration, editor. *Cochrane Database of Systematic Reviews* [Internet]. Chichester, UK: John Wiley & Sons, Ltd; 2014 [cited 2016 Jul 27]. Available from: <http://doi.wiley.com/10.1002/14651858.CD008435.pub2>
16. Warren I, Hicks B, Kleberg A, Eliahoo J, Anand KJS, Hickson M. The validity and reliability of the Evaluation of Intervention Scale: preliminary report. *Acta Paediatr Oslo Nor* 1992. 2016 Jun;105(6):618-22.
17. Olsson E, Ahlsén G, Eriksson M. Skin-to-skin contact reduces near-infrared spectroscopy pain responses in premature infants during blood sampling. *Acta Paediatr Oslo Nor* 1992. 2016 Apr;105(4):376-80.

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Lifecycle

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