

Use of Central Venous Access Devices in Neonatal Units Framework
Consultation Responses

Section	Name	Comment	Group Comment
Executive summary of recommendations and practice points	Mahmoud Montasser on behalf of NeoFOCUS-UK	Congratulations for completing this comprehensive much needed framework. I would like to add POCUS guided UVC insetion under insertion section in the executive summary of recommedations. This is becoming more widely used and the role of POCUS should start at the start of isertion process realtime so we can see where the UVC is going and navigate ints course rather than inserting the catheter then call for POCUS team. Obviously both can be used depending on the availabilty of trained personnels but I would add this in insertion. Thanks	Thank you We agree ultrasound guided insertion of UVCs is emerging as a method to improve UVC insertion although current literature has variable success rates, suggesting this is operator dependant. We have added a practice point to the executive summary
	Tim Smith	page 7: expertise in POCUS will be hard to achieve. how can we prove we are experts in a field without specific available accreditation, and any accreditation is unlikely to say someone is an expert. how will this be defined.	Amended expertise to competence to be more in line with current teaching/training nomenclature. The working group propose that standardised training courses for use of POCUS to insert and image CVAD's in neonates are developed by the relevant specialist group. Local governance procedures for service improvement/evaluation would be necessary for units implementing the use of US to ensure practitioners are competent.
	Sharon Murrell	Page 5 refers to the NRLS only and Page 19 refers to NRLS and LfPSE - should be both	Amended thank you

	Amarpal Bilkhu	Regarding the use of contrast in lower limb PICC confirmation, I could not see a clear explanation of why this is required routinely in lower limb lines and not used routinely for upper limb lines. Could this be expanded on later in the document for clarity?	Contrast in LL PICC is to ensure cannulation of paraspinal veins is identified promptly. Contrast may be used in upper limb PICC if the tip cannot otherwise be visualised. Comment added to imaging and complications section
	Judith Foster	Lower limb PICC should be imaged using contrast. It is not our usual practice always to use contrast. This was the case historically but the lines used are well seen without and so contrast is only used when we are having difficulty with visualisation. The word "should" implies we need to do this in all cases.	Working group recommendation is to use contrast at the time of first imaging (unless tip imaged in optimal position by POCUS) to promptly identify paraspinal vein cannulation and to avoid repeated imaging.
	Lawrence Miall	Good	
	Dr Kristin Tanney on behalf of St Mary's NICU consultant team	1. "All CVADs should be imaged in their final position after any adjustment of length and before use"" We feel this should say ""bar UVCs inserted in emergency situations." 2. "It is recommended that UVC tip position is confirmed with X-ray and an additional method depending on available local services. Suitable additional methods of imaging include a lateral X-ray or POCUS."" For widespread POCUS use, there is a need to establish a training package for POCUS directed at line tip imaging. Establishing training and expertise will take	1. Comment added 2. Agree, POCUS training and competency essential. The implementation of the framework will require working collaboratively with radiology colleagues in relation to lateral x-ray procedures and interpretation. 3. We acknowledge that avoiding parenteral nutrition in this situation is established practice in some neonatal units. We did not find evidence to support this specifically. Evidence suggests higher risk of extravasation and therefore short term use only is recommended.

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		time and is likely not yet achievable in all units. Lateral X-rays may prove challenging to interpret and are often contested by radiology staff. This practice point seems a aspirational at this current time. 3. "A low lying UVC with tip at T10 or below should be used for maximum of 24 hours due to the high risk of extravasation." In our unit we avoid using TPN when a UVC is low lying. We wonder if that is advisable and should be added to the document.	
	Dr Alan Fenton	The section regarding complications here might benefit from inclusion of the first bullet point on page 21: "The clinical deterioration of a baby in whom a CVAD is present should raise the question of device related complications, particularly infection, extravasation, thrombosis, cardiac tamponade and intra-abdominal extravasation". This highly important practice point is otherwise 'buried' in the middle of a long (very comprehensive) framework.	Thank you Included as first executive summary complication practice point
	Christian Chadwick on behalf of	Page 7: - 2nd point - it is not clear whether the line can be used 'properly' before the position is	2nd point in imaging section- amended 5th point- we recognise this will be a change in practice for some neonatal units.

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	NPPG Neonatology Special Interest Group	confirmed by the 2nd method in the 1st 24 hours - 5th point - is routine contrast for lower limb insertion current practice? This will require our NICU to keep stock, which we don't currently - I think that the use of a care bundle should be at the top of the insertion info in the exec summary, not 3rd to last point of complications (prevention is better than cure)	
	Graham King	Pg. 7 The statement that Lower Limb PICC lines should ALWAYS be imaged using contrast agent is TOO superlative (too restrictive). For example in my neonatal unit we use POCUS for lower limb PICC line insertion, and if using a 30cm length PICC (e.g. Nutriline), the PICC can easily reach the IVC/RA junction (i.e. optimal location just outside the heart) and in this position you can POCUS the line (using sub-xiphi/sub-costal POCUS view). All the examples of lower limb PICC lines (e.g. in the Appendix) all show lower limb PICC lines that have tips in the lower IVC (lumbo-sacral level) and these lower levels are not visible with POCUS (and as such contrast agent is useful).	Thank you. Practice point edited to reflect this If Lower limb PICC tip has not been identified in an optimal position by POCUS at the time of insertion, it should be imaged using contrast injection AXR according to local guidance developed with neonatal and radiology input
	Zuzana Kusnirikova	Terminology: PICC vs ECC Currently, in the nomenclature by GaVeCelt, PICC is the central catheter inserted in the deeper veins in green/ yellow zone of the arm with the use of ultrasound.	Our agreed nomenclature is described within the framework. Rational for use of PICC added.

		The neonatal lines commonly called PICCs in neonatal settings are recommended to be labelled as ECC (epicutaneo - caval catheter). FICC - currently, especially for the tunnelled lines, the approach to puncture is a bit more distal than a common femoral line; in the femoral vein (incorrectly often labelled superficial femoral vein).	FICC- intended vein referenced rather than insertion point
	Dr Sarah Oh on behalf of Newborn Care Services, John Radcliffe Hospital, Oxford University Hospital Trust, Oxford	1. Recommendation that all Lower limb PICCs should be X-rayed with contrast (p7) does not seem appropriate, especially if there has been POCUS at insertion identifying the tip in hepatic IVC. We agree that contrast for 1Fr lines can assist in visibility but we do not use with larger lines. Likewise, is it necessary to expose an infant to a second lateral Xray (and handling) if the course of a left lower limb line crosses to the right of the spine smoothly and reaches the upper abdomen in the first Xray?	LL PICC and contrast practice point has been updated 2nd x-ray (lateral) only required if there is uncertainly after contrast injection AXR
	Fiammetta Piersigilli on behalf of NEVAT Neonatal European Vascular Access Team	Regarding nomenclature, when using the term PICC in neonates nPICC/epicutaneocava catheter should be used, to differentiate this kind of devices from adult PICC lines, as these are two different devices (Navigate Study).	Our agreed nomenclature is described within the framework and rational provided.

		Page 7: It is recommended that UVC tip position is confirmed with X-ray and an additional method depending on available local services. Suitable additional methods of imaging include a lateral X-ray or POCUS. It is recommended that additional imaging is performed within 24 hours of insertion There is no mention of ultrasound: the gold standard for the correct position of a CVAD is ultrasound; in case this is not feasible, then an Xray should be performed (Xray gives only a projection, US shows the correct position of the line inside the hearth) Lower limb PICC should be imaged using contrast”: there is no rationale why you should use contrast for lower limbs. It could be useful to use contrast for 1 Fr nPICCs as the tip can be hard to see with conventional Xray. When a UVC tip lies at or below T10 it should only be used if essential and for a maximum of 24 hours”: if the UVC is not central it should be use only for emergencies or be considered as a peripheral access (no hyperosmolar fluids, no catecholamines..)	Point of care ultrasound is included Rational provided in text of the framework We did not find evidence to support a recommendation to use a low lying UVC for certain medications only but recommend using for less than 24 hours.
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Introduction	Don Sharkey	The wording about consent is far too restrictive. Arguably, insertion of a UAC/UVC on admission to the NICU isn't strictly 'an emergency' as many of the initial drugs given can be given peripherally. Obtaining verbal consent would not always be possible and what do you do if parent/carer refuses when this is an critical part of intensive care? Do we need to obtain consent for semi-elective intubation for LISA or similar? The use of the term 'as a minimum' is likely to result in colleagues defending themselves either through litigation processes or coroner inquests. Please revise this, or better define 'emergency' as this is too ambiguous. The statement "The use of cyanoacrylate glue at the insertion site of PICC and CICC has been found to reduce complication rates including central line associated bacterial infection (CLABSI) and dislodgement (Piersigilli 2023)" should also mention these glues shouldn't be used on silicon based catheters as they can affect stiffness/compliance of these.	Wording amended SecurePort IV - Cutaneous Glue Vygon current manufacture statement confirms compatible with all catheter materials which we have confirmed following your comment. Ongoing evaluation and reporting of complications essential by the clinical community.
Central venous access device insertion	Dr Anay Kulkarni on behalf of NEOFOCUS-	1. Technical Considerations – Umbilical Venous Catheter (Page 10) We recommend that the Framework uses ultrasound-guided UVC insertion rather than	1. Not recommending liver mobilisation- we say “evidence is limited”. See paragraph added related to US guided insertion.

	Guideline Group for POCUS for Longlines and UVC	liver mobilisation to align the umbilical vein and ductus venosus. 2. Sterile Field Requirements A dedicated paragraph outlining sterile procedural requirements for CVAD insertion would strengthen the Framework. This should include full sterile barrier precautions, appropriate skin preparation, and sterile handling of catheter and equipment. 3. CVAD Size Selection It would be helpful for the Framework to provide a summary table aligning catheter size with infant weight, to support appropriate device selection and standardise practice.	2. We have made the following edit; All neonatal units should have CVAD guidelines with agreed local policies on method of determining CVAD insertion distance, skin cleaning and the required sterile precautions, insertion technique, fixation method, imaging and maintenance protocols. 3. Weight is one factor in device selection. We state; “The appropriate device is dependent on patient size, intended function and intended dwell time.” Manufacturer recommendations are included in appendix 2 where available.
	Don Sharkey	In the documentation section there doesn't appear to be any record of 'flashback', it is mentioned in Practice Points.	This has been added to the text within “CVAD Insertion”
	Christian Chadwick on behalf of NPPG Neonatology Special Interest Group	Page 10: - UVC - wording needs correcting, currently says "None have been proven to be superior to the other" could be "to the others" or "to any other" to make better sense - Paragraph 3 - perhaps strengthen the chlorhexidine application technique recommendation (dabbing technique)	Thank you- edited Thank you- Added “A dabbing technique is recommended rather than scrubbing to minimise skin trauma”

	Graham King	Pg 11. The use of IC-ECG etc. IC-ECG is intra-"cavitary" ECG, not intra-cardiac. A CVAD should never be inside the heart.	Amended
	Dr Sarah Oh on behalf of Newborn Care Services, John Radcliffe Hospital, Oxford University Hospital Trust, Oxford	1. Documentation of the serial number of the catheter used (p12). This is important in the instances when there have been issues with fractured/leaking lines. 2. Documentation of PICC tip position should include limb position in all image modalities (Xray and POCUS). When using POCUS, documentation should record the range of movement of tip with limb manipulation, not just a final tip position.	1. Added to catheter details 2. Added to imaging general principles "If imaging using POCUS movement of the catheter with changing limb position can be assessed"
	Fiammetta Piersigilli on behalf of NEVAT Neonatal European Vascular Access Team	Page 10: When considering the use of umbilical venous catheters (UVCs), it is essential to emphasize that their insertion should be performed under ultrasound guidance, as this approach reduces complications and improves success rates. Therefore, adequate and standardized training in ultrasound-guided UVC placement is crucial, and all neonatologists involved in neonatal care should be appropriately trained to ensure optimal and safe management of newborns.	We have included discussion on this in the Technical considerations: UVC section
	Dr Claire Keaney	Do the working group members recommend that contrast for the routine confirmation of	We recommend follow manufacturer advice re storage.

Central Venous Access Device imaging		lower limb PICC tip position is kept warmed before injection? Is there a particular or minimum concentration of IV contrast that the group recommends? Eg Omnipaque 300 vs Omnipaque 360? I am presuming, as in other areas of Clinical Imaging, once a bottle of contrast is opened for lower limb PICC position, the bottle must be discarded for infection control purposes - so for environmental purposes, we should be trying to source the smallest product volume as possible to reduce contrast waste (although that does mean more plastic and probably smaller volume product will be more expensive per ml than larger volumes).	Lowest concentration to achieve adequate visualisation. We did not find literature to support specific practice related to this.
	Dr Anay Kulkarni on behalf of NEOFOCUS-Guideline Group for POCUS for Longlines and UVC	2. Practice Points – CVAD Insertion 2.1 Interpretation of Resistance and Blood Aspiration The current recommendation that any CVAD that does not aspirate blood “should be removed” requires refinement: There is limited evidence supporting mandatory removal of non-aspirating PICC lines. Certain PICC types (e.g., Premicath) with an in-situ guidewire cannot be aspirated during insertion.	2.This practice point has been edited

		Once the guidewire is removed, adjustment is limited, and inability to aspirate alone does not reliably indicate malposition. We recommend revising the statement to: If blood cannot be aspirated, do not use for PN/hyperosmolar infusions until position/patency is confirmed. Assess for malposition (imaging/POCUS/contrast as appropriate) and consider withdrawal/reposition/removal based on findings and clinical need' 3. CVAD Imaging 3.1 Limitations of AP Radiography The Framework should state that AP X-ray alone cannot reliably determine PICC tip position in the presence of vertical or lateral mediastinal shift. Point-of-care ultrasound (POCUS) offers superior accuracy and should be encouraged where available especially in context of mediastinal shift (https://doi.org/10.1136/archdischild-2020-319293?urlappend=%3Futm_source%3Dresearchgate.net%26utm_medium%3Darticle) 4. Evidence Base for Limb Position Recommendations	4. Thank you for highlighting this recent work. We have included this in our references.
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		The studies underpinning limb-position guidance during X-ray to define CVAD (Shalygin 2018, Saha 2013, Nadroo 2002, Connolly 2006) provide limited and indirect evidence, due to retrospective design, small sample sizes, X-ray-based methodology, or non-neonatal populations. A recent prospective neonatal study using real-time POCUS to observe catheter movement during limb manipulation was published (BMJ F&N 2025). These findings offer a more robust basis for recommendations on limb positioning during PICC imaging https://fn.bmj.com/content/early/2025/10/15/archdischild-2025-328992. 5. Frequency of Imaging PICCs The recommendation to obtain imaging at 48 hours post-insertion and weekly thereafter may substantially increase radiation exposure in units without POCUS. In our service (approx. 150 lines/year, ~2000 line-days), this approach would generate approximately 350 additional X-rays annually. We recommend emphasising that POCUS is the preferred modality for follow-up imaging, reducing radiation exposure to infants, nearby patients, and staff.	5. This is discussed within the framework. 6.1 We have made pragmatic recommendations in relation to limb
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		6. Limb Positioning – Practical Guidance 6.1 Upper Limb PICC Cephalic vein cannulation: arm should be abducted above the head Basilic vein cannulation: arm should be adducted These recommendations reflect dynamic line movement observed through POCUS (evidence highlighted above) 6.2 Lower Limb PICC and FICC The hip should be flexed during imaging, as catheter tips advance with flexion. The document gives some “hard” rules that aren’t consistently supported by its own examples/appendices. For example, lower-limb PICC “avoid renal vein level (~L2)” statement, which clashes with the Appendix 4 traffic-light figure that says peri-renal levels (L1–L3) are “safe to use” for PICC unless there are clinical/radiological concerns (while saying UVC should not lie there).	position. The working group are of the view that arms in a neutral, position with elbow flexion is optimal Avoid renal vein L2 has been removed
	Amarpal Bilkhu	With regards to imaging, I feel it would be helpful for the Working Group to consider looking into any advice regarding imaging recommendations for neonates who have been	We did not find evidence to develop specific recommendations in this area. We have highlighted transport as a potential risk to CVAD migration.

		transferred by a neonatal transport service from one centre to another (e.g. is routine repeat x-ray/imaging of a UVC or PICC recommended when a neonate has arrived at a receiving unit, and if so, within what timeframe should this be done?). Practice for this appears to vary significantly between units.	
	Judith Foster	The first X-ray should include the entire course from umbilical cord to the tip of the UVC (thoraco-abdominal radiograph). This is not our usual practice as the "babygram" gives poor quality information on the chest and abdomen for other pathologies. Separate CXR and abdomen is done in all cases with appropriately centred radiographs to optimise the quality for each radiograph. Baby grams are centred so that the chest and abdomen are not good at looking at either the chest or abdomen for pathologies and often necessitate repeats. These are not done in our department. Lower limb PICC should be imaged using contrast according to local guidance which should be developed with neonatal and radiology input. Please see my comments in section 5 Have not been explicit in the danger of a left lower limb PICC going in the lumbar vein. Although a correctly positioned left lower limb	Thank you. We have further highlighted the risks with left LL PICC

		PICC will cross the midline it would be good to explain why.	
	Lawrence Miall	It is good to see a clear recommendation that all CVADs should lie outside the heart (unless in much older children)- this is a point of contention with surgeons and radiologist who insert them in older children and leads to confusion on P30 the xrays of the lines would benefit from arrows on p31 it is unclear what the red ovals refer to as they are not at the line tip (?remove if possible or explain- I think they might be referring to calcification?)	Images have been edited
	Dr Kristin Tanney on behalf of St Mary's NICU consultant team	"When imaging in the neonatal unit a 10 millilitre(ml) syringe should be used to prime the PICC with the volume of contrast stated by the manufacturer. A further 0.2-0.3ml contrast should then be injected and AXR image should be taken as the final volume of contrast is injected." We think it would be very challenging to give 0.2-0.3ml using a 10ml syringe and wonder if a smaller syringe should be used.	Agree challenging to do with precision however smaller syringe will generate higher pressure and risk catheter fracture.
	Don Sharkey	The statement "All CVADs should be imaged in their final position after any adjustment of length and before use." is too restrictive. It makes no mention of emergency use or where other infusions/drugs are to be given. For	Edited to comment on UVC in resuscitation

		example, placing a UVC, obtaining flash back and giving antibiotics (within 1st hour of life) before any imaging is possible is likely to be a safe practice and avoids need to insert peripheral cannula. Giving inotropes or other potent infusions it is sensible to ensure it is in the right place. The statement "A low lying UVC with tip at T10 or below should be used for maximum of 24 hours due to the high risk of extravasation" is ok for stable infants. However, some mention of critically ill infants where this line is a lifeline needs to be included so that the balance of risk is considered. For example, a 22 week infant may only be able to get a low UVC in and yet need multiple infusions down it as long line/other access not possible due to skin integrity/vessel size etc. In this instance, a balance is struck, documented and d/w parents. There is no mention of scalp vein lines in this section and their placement.	We have added a comment to this affect Thank you for highlighting. This has been included.
	Christian Chadwick on behalf of NPPG Neonatology	Page 16: - Using contrast for lower limb PICC is not our current practice. Is a particular contrast recommended?	We have not recommended a specific contrast agent and would depend on local policy/availability.

	Special Interest Group	- 3rd point - "saline" should be 0.9% sodium chloride	Thank you. Edited
	Graham King	Pg 16. 'Practise Points for Imaging Lower Limb PICC and FICC': I suggest you add POCUS for lower limb PICC tip identification. (i.e a 30cm long PICC will reach the IVC/RA junction i.e. approx T9 and level of diaphragm and can be visualised using POCUS - sub-xiphisternal/sub-costal view).	Thank you. Comment added
	Dr Sarah Oh on behalf of Newborn Care Services, John Radcliffe Hospital, Oxford University Hospital Trust, Oxford	1. PICC tip movement with limb movement (p14). Perhaps inadequate published data at present though consideration of other movements should be recognised as potentially having effect on tip position. Positions proposed may be appropriate for term infant in an open cot but does not represent normal positions for preterm infants. The prone or swaddled infant's limb position is not considered by positions currently mentioned. – Position of upper limbs only refers to abduction/adduction of shoulder. Flexion/extension of shoulder should also be considered as can have as much effect as the abduction/adduction.	The recommended limb position for imaging is felt to be applicable for term and preterm infants.

		– Position of lower limbs only refers to flexion and extension of hip but should also consider the adduction/abduction of hip as also has effect on tip position. 2. Timing of monitoring imaging for UVCs should be considered separately to PICCs. Currently states all CVADs should be imaged at time of insertion (including a second modality within 24 hours), within first 48 hours, then weekly (p15). UVCs are prone to migration particularly around day 3 so would be preferable to recommend imaging/review at 48-72 hour intervals until removed. 3. Use of POCUS at insertion to optimise tip position before securing is preferable. If an experienced clinician is doing POCUS and tip is clearly seen in SVC/IVC does an additional Xray have to be done. Perhaps some more scope to recognise the advanced abilities of some clinicians, and that this is adequate to confirm position.	Our recommendation aims to be pragmatic and balance repeated imaging with early identification of migration. Should POCUS be available additional imaging without increasing x-ray burden would be valid. The current opinion of the working group is POCUS is a complimentary imaging modality for CVADs recognising that there is a wide range of competency among neonatologists. The working group recommend x-ray imaging of the entire path of a CVAD by on at least one occasion.
	Fiammetta Piersigilli on behalf of	Page 14: Additional methods of confirmation of tip position such as use of contrast, additional X-ray views and POCUS should always be	Use of ultrasound has been discussed throughout the framework and the benefits highlighted.

	NEVAT Neonatal European Vascular Access Team	performed if there is uncertainty about CVAD tip position- Page 15: POCUS is an emerging method of CVAD tip imaging and is considered complimentary to conventional radiography: As this document represents a clinical guideline, it should be specified that ultrasound is the preferred method for visualizing central venous catheters when performed by adequately trained and competent operators. The placement of centrally inserted central catheters (CICCs) may also be guided by intracavitary electrocardiography (IC-ECG). However, when ultrasound visualization of the catheter is not feasible or when appropriately trained personnel are not available, chest radiography should be used to confirm catheter position. The aim should be to increase clinicians' awareness that alternative and superior methods to chest radiography are available for catheter visualization and tip confirmation. Accordingly, adequate training in these techniques should be undertaken by all neonatologists involved in the care of newborns, in order to promote safer and more effective neonatal management	
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		Page 17: Once again there is no rationale why you should use contrast for lower limb nPICCs. Evenmore, US visualization of lower limb placed nPICCs is feasible and very easy!	
Central Venous Access Device care and maintenance	Mahmoud Montasser on behalf of NeoFOCUS-UK	I would add a recommendation of checking tip position of cantral lines whenever echocardiogram is performed to make sure no line migartion happened.	Edited to include
	Don Sharkey	This statement "CVAD flushes to ensure patency or after administering medication should be with 0.9% sodium chloride. Prefilled syringes are recommended." could remove the 'or after administering medication' as in preterm infants <25weeks it is not uncommon to use 0.45% saline to reduce chloride burden.	Edited thank you
	Christian Chadwick on behalf of NPPG Neonatology Special Interest Group	Page 18: - Cochrane review (in adults) found no benefit for using heparin over saline, although not enough evidence of the harms either. Maybe the text should be more ambiguous about whether to lock with heparin or saline? Could also be added to the further research section, maybe as a wider line about finding out the best way to care for CVADs.	Thank you we have edited these practice points with reference to the Cochrane and WHO publications.

		- CVAD flushes: suggest also including sodium chloride 0.45% as an appropriate flush	
	Fiammetta Piersigilli on behalf of NEVAT Neonatal European Vascular Access Team	Regarding UVC, there is no mention about dressing methods; a lot of units still use old dressing methods (bridge, no coveing of the line). There is evidence that correct dressing reduces CLABSi related to UVC: - Towards targeting zero CLABSi in umbilical catheterization: insights from a retrospective study. Di Chiara M, Iacona G, Yazami S, Auriti C, Giambra V, Terrin G, Piersigilli F. Eur J Pediatr. 2025 Aug 18;184(9):558. - A novel neonatal protocol for Safe Insertion of Umbilical Venous Catheters (SIUVeC): Minimizing complications in placement and management. Barone G, Pittiruti M, Prontera G, Ancora G, D'Andrea V. J Vasc Access. 2025 Mar;26(2):681-686 Page 18: Tunnelled CICC/larger PICC can be locked when not in use using heparin solutions labelled “for maintenance of patency of intravenous devices” It is recommended to use saline solution to flush every CVAD in neonates, as heparin has no benefit over saline solution. It can be recommended to lock tunneled or not tunneled CICCs with taurolidine when not in use	We recommend all neonatal units have a standard fixation method and avoiding fixation to the abdominal wall to preserve skin integrity. We have amended this practice point

		(Savarese et al Use of 2% taurolidine lock solution for treatment and prevention of catheter-related bloodstream infections in neonates: a feasibility study. J Hosp Infect. 2024 Jan;143:76-81.)	
	Anne Ho	"Routine dressing change is not required but should be performed when the benefit of changing the dressing outweigh the risk of dislodging the CVAD or introducing infection." For the CICC or longer term CVADs, dressings need to be done to reduce infection, maintain integrity of the CVAD so could the wording be re-considered. Dressing section talks about aseptic technique. But not discussed with use of CVAD. Is aseptic technique required? ANTT® is the best practice & used at our paediatric hospital for the CVAD dressings	We did not find strong evidence to support the practice of routine dressing changes.
Central Venous Access Device complications	Dr Anay Kulkarni on behalf of NEOFOCUS-Guideline Group for POCUS for Longlines and UVC	CVAD-Related Complications 1. CLABSI Reporting The denominator for CLABSI should be expressed as episodes per 1000 line-days, not percentages. A correction is recommended. 2. Accidental Arterial Cannulation During PICC Insertion	1. The reference included in the framework reports % CLABSI 2. Additional text added

		We recommend the inclusion of a paragraph addressing this safety issue. Abstract in BAPM 2025: An audit over 3-year period in a tertiary surgical centre, identified 9 arterial cannulations during PICC insertion (presented at BAPM 2025; manuscript in preparation). Key findings: Contrast X-ray failed to identify arterial placement in all cases. Dynamic POCUS should be advised for confirming line location where arterial cannulation is suspected. Common sites involved: axilla, behind the medial malleolus, cubital fossa (median cubital vein). Gas analysis and excess bleeding were not reliable indicators. Two infants experienced harm; importantly, the harm occurred away from the limb of insertion, indicating the need to image lines when any embolic phenomenon is observed. This represents a significant clinical risk that warrants explicit recognition within the Framework.	
	Christian Chadwick on behalf of	Page 19: - First sentence could be re-worded to read/flow better. ""Malposition is a common	Thanks you- edited

	NPPG Neonatology Special Interest Group	CVAD complication, with up to 60% of incidents reported at the time of insertion for certain types of CVAD"" Page 20: - Glyceryl trinitrate - some centres use ointment. Perhaps this could be changed to say topical Glyceryl trinitrate?	
	Dr Sarah Oh on behalf of Newborn Care Services, John Radcliffe Hospital, Oxford University Hospital Trust, Oxford	1. Thrombosis is mentioned briefly (p20). With regular monitoring of CVADs using POCUS on our unit we have identified clots associated with PICCs and would not consider it to be rare, but under diagnosed. Published data is limited in this setting but can you expand on advice for management strategies to consider as they will become more frequently diagnosed as POCUS is used more widely. 2. Application of cyanoacrylate glue is mentioned (p11 & 21) to reduce infection, migration and dislodgement. For neonates, only 1–2 drops should be applied to protect delicate skin, and the framework should specify this recommended amount to strengthen safety guidance.	1. With the limited published data we are not able to make specific recommendations on the management of CVAD associated thrombosis. 2. Added thank you
	Fiammetta Piersigilli on	Page 20: A Glyceryl Trinitrate patch placed over the affected artery should be considered and	This is not in remit of framework

	behalf of NEVAT Neonatal European Vascular Access Team	early referral to plastic surgery teams is recommended: a useful practice in case of arterial vascular spasm is caudal blockade (Neonatal limb ischemia: caudal blockade and NIRS monitoring. Eur J Pediatr. 2014 Dec;173(12):1599-601.)	
Education and Training	Mahmoud Montasser on behalf of NeoFOCUS-UK	I think NeoFOCUS-UK have led the way of disseminating the knowledge and training across the UK in the past few years as we run regular courses every year and many of our colleagues run parallel courses in their networks as well so I wouldn't say there is lack of training courses but rather I would recommend to add this training to training curriculum for neonatal and paediatric trainees with the help of RCPCH & neonatal CSAC and we are working on this.	This comment references the paper.
	Amarpal Bilkhu	With regards to 'Neonatal units should have a standard CVAD education package', although I agree with this in principle, I believe the 'responsibility' of this is not solely on units, but shared via RCPCH curricula and ANNP training routes. Having different education packages between units will continue the variation in practices that this document is highlighting already.	

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Key Horizons and research	Dr Anay Kulkarni on behalf of NEOFOCUS-Guideline Group for POCUS for Longlines and UVC	We support the inclusion of a section advocating for: Development of governance frameworks and training pathways for POCUS use in CVAD insertion and verification. Recommend including POCUS training as part of the training curriculum for trainees to be supported by the royal college and CSAC Standardisation of POCUS for UVC, UAC, and PICC placement and troubleshooting. Further research into catheter migration, optimal limb positioning, and radiation-free monitoring techniques.	Edited to include in paediatric training curriculum.
	Don Sharkey	Research - clinical studies/trials should be developed to reduce the complications of CVADs in neonatal setting.	Added
Imaging Examples	Tim Smith	good examples and diagrams on pages 37-40 are helpful, especially for education. As POCUS is being recommended, it may be helpful to have some example images of USS here.	We have not included in this framework. With the expectation that future education and training resources will include and elaborate further
	Dr Claire Keaney	These are excellent examples - thank you. Louise - if these are yours - they are superb & so useful for all the team (imaging & NNU) to have as resources :)	Yes the images can be shared

		I am presuming that it is ok to print some of these for immediate resources/help/examples for Drs/ANNP office room walls?	
	Dr Anay Kulkarni on behalf of NEOFOCUS-Guideline Group for POCUS for Longlines and UVC	Some of the images may be subject to copywrite issues	No copy write issues. All images provided by working group members with approval for use and permission from relevant health board.
	Lawrence Miall	Good examples, but this takes up a lot of room	
	Dr Kristin Tanney on behalf of St Mary's NICU consultant team	Excellent images, very useful for teaching and training.	
	Graham King	All the examples of lower limb PICC lines (e.g. in the Appendix) all show lower limb PICC lines that have tips in the lower IVC (lumbo-sacral level) and these lower levels are not visible with POCUS (and as such contrast agent is useful). However, lower limb PICC lines that do reach closer to diaphragmatic level (T9 level) are visible POCUS for EchoTip.	

Appendix 2: Neonatal Central Venous Access Devices	Graham King	The 'Epicutaneo' (Vygon) catheters are included in this table. This hereby introduces the ongoing issue with the disagreement between nomenclature for "PICC" in the neonatal and paediatric specialities!!! Please see Other Comments, below.	
	Zuzana Kusnirikova	I would like to add the following catheter: Medcomp 1.9 Fr Vasco-PICC single lumen catheter (polyurethane) Insertion devices: At our institution we have good experience with inserting 1.9 and 2Fr lines with 2Fr Galt peelaway. Galt Medical Tearaway Introducer Sets & Kits	Included thank you
	Anne Ho	P35 Bard Access Groshong, please check for correct size, the single is a 4Fr, not 4.5 for the NXT version. The Groshong is also a 3 way valve. The 5Fr double lumen is not trimmable & according to the senior managers at Bard will not be manufactured soon Medcomp: also do a 1.9Fr single Vasco-PICC, the 2.6Fr is a double lumen	Edited thank you

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		Medcomp also do a 3Fr single lumen/4Fr double cuffed VascuLine, like the Broviac/Hickman if you wanted to add this in?	
Appendix 3: Anatomy	Tim Smith	good examples and diagrams on pages 37-40 are helpful, especially for education.	
	Dr Claire Keaney	As per Imaging examples - excellent resource. Again - question - can they be printed out for office walls as resources? Thanks	Yes the images can be printed
	Dr Sarah Oh on behalf of Newborn Care Services, John Radcliffe Hospital, Oxford University Hospital Trust, Oxford	Figure 3 - Distracting showing misplaced PICC in this image. Good to illustrate the anatomy on CXR image. Arrow for Aorta is also pointing at NGT.	Image not editable as provided by Yorkshire and Humber Network
Appendix 4: Neonatal CVC QI Project example	Sabina Checketts	I like the traffic light image but could you also have examples after it of xrays with expected position range for each type of line (UVC, lower limb picc, upper limb picc etc) rather than just the combined image? i.e. marked X-rays with key anatomical landmarks like vertebrae marked.	Traffic light image removed as some contradictions within framework text. Reference remains for information.

		Plus annotation below the reference images of how the baby's limb should be positioned during the Xray rather than this being in a separate page. This means the correct positions are clear at a glance and you can compare them to your real life images. And trainees often don't have time to read the entire guideline in emergencies so I like the quick visual reference guide but I currently feel the traffic light one is a bit too confusing esp if the vertebrae are not labelled. So could you also have a comment about how to count vertebrae/ribs on an xray so you can be sure which vertebrae the lines are next to? This guideline will be most useful for trainees who have less line insertion experience. Thus these images of the right placements are especially useful for trainees who often have inserted lines without a consultant present (as often overnight in level 1&2 NICUs). Trainees may not know how to check line position from the words (esp when starting out) so having pictorial reinforcement would be very helpful.	
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		Also can appendix 4 be above the incorrect images? Currently it is not clear from the contents page name that this appendix has the correct placement images. And trainees on busy shifts don't have time to scroll through the entire guideline. Maybe appendix 4 should be renamed on the contents page? Maybe called "neonatal cvc correct placement images QI project"? Then you can follow this with all the other incorrectly placed line images.	
	Tim Smith	good examples and diagrams on pages 37-40 are helpful, especially for education.	
	Don Sharkey	this is an unacceptable example with red/green/amber colours for those readers who are colour blind. It is impossible to see the colours and differentiate. The wording the main body suggests this approach could be developed. Why not leave it as an example only rather than saying it could be developed as again if a complication arises some may ask why it wasn't used or developed.	Traffic light image removed as some contradictions within framework text. Reference remains for information.
	Zuzana Kusnirikova	In the traffic light system for the PICC line: I think the green ovals should be only in the area of SVC and IVC. The current green oval over the area of Left BCv for the line coming from the left is not a 'true' central position, could this be orange to	- Traffic light image removed as some contradictions within framework text. Reference remains for information.

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		highlight the need for more vigilance due to risk of migration/ thrombosis?	
	Fiammetta Piersigilli on behalf of NEVAT Neonatal European Vascular Access Team	The image shows a region highlighted in green that is too broad. The correct position of the CVAD should be in the inferior vena cava, specifically between the renal veins and the entrance to the right atrium	Traffic light image removed as some contradictions within framework text. Reference remains for information.
Any other comments	Sabina Checketts	This is a fabulous project and very necessary. Clearly a lot of hard work has gone into it. So thank you to everyone who contributed!	Thank you
	Tim Smith	This is a very comprehensive guideline. I feel that the summary is the most useful part for day-to-day use, as long guidelines can become prohibitively long to . the summary pages and photos/diagrams can be useful aide-memoires	Thank you
	Dr Claire Keaney	Thank you for these - excellent guidelines & for all the work that has gone into writing them up.	Thank you
	Dr Anay Kulkarni on behalf of NEOFOCUS-Guideline	Summary of Key Recommendations To use USS-guided UVC insertion as terminology.	Thank you for you input. Your comments have been considered

	Group for POCUS for Longlines and UVC	• Add detail on sterile field requirements. • Include CVAD size guidance by infant weight. • Modify aspiration-based removal recommendations. • Remove avoid L2 position for PICC • Highlight X-ray limitations and the role of POCUS. • Reassess evidence for limb-based catheter movement. • Reduce reliance on scheduled radiographs; prioritise non-ionising imaging. • Add guidance on arterial cannulation risk and detection. • Clarify CLABSI denominator. • Emphasise POCUS governance, training, and research needs.	
	Amarpal Bilkhu	As mentioned previously, I think it would be beneficial to have a set of recommendations with regards to neonatal transport.	

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	Lawrence Miall	Very useful document, well done. Once agreed need to make sure everybody uses as a standard of care , and if deviates need to document why in the notes	
	Dr Alan Fenton	This is a very comprehensive document and for this reason is understandably long. This is the reason for my comment regarding highlighting tamponade, etc earlier in the document.	
	Don Sharkey	I am concerned that the approach of the guideline is very defensive/low risk. Whilst this is extremely important we need recognition that at times these lines may not be in optimal position but are lifelines without which managing the baby may not be possible and they may die/suffer significant morbidity. There also needs to be an 'emergency' use section which recognises the critical role these lines play in emergency.	
	Christian Chadwick on behalf of NPPG Neonatology Special Interest Group	1. In the glossary (Page 4), there is a typo: "CLASBI" should be "CLABSI" 2. Noted that there were no nurses included in the working group, would be keen to ensure there were nursing voices included, especially in the care and maintenance section. 3. UAC/UVC - should there be a recommended maximum duration of use in general. It is only mentioned in relation to a low-lying UVC	Edited thank you. Your comments have been addressed within the text.

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		4. Should there be a mention of heparin infusions for maintaining patency of arterial lines? 5. Pleased to see the NPPG position statement on chlorhexidine is referenced 6. Contrast is mentioned at various points - suggest adding somewhere a reminder that contrast media are prescription-only medicines, and that if a decision to use contrast is made, it is prescribed and documented as administered on the infant's prescription chart 7. The framework is missing any information on minimum flow rates through CVADs 8. It would be useful to include information on suitable fluids to run through a CVAD following insertion while waiting for the position to be confirmed	
	Sarah Chan	Would you consider adding a statement on duration of use of a well positioned UVC. There seems to be national variation in what is deemed acceptable duration of use. The link to the NPPG statement on chlorhexidine goes to 'page not found.' It would	Recommendation added

		be useful to have a clear statement on skin preparation within the document itself.	
	Graham King	Section - 'Nomenclature'. Perhaps in this section there should be a statement acknowledging the confusion of the use of the term 'PICC' in neonatology. Traditionally in paediatrics the term 'PICC' relates to lines >3Fr placed in the larger limb vessels (i.e. proximal arm, proximal leg) and these lines are able to take higher pressure infusions and can be line-locked, and used for aspirating blood, etc. Nowadays, neonatologists use the term 'PICC' to mean lines placed in the smaller limb vessels (i.e. mid/distal limbs) and these lines (1 Fr or 2Fr) are made of softer polyurethane and cannot take high pressure infusions, cannot be locked, and cannot be used for phlebotomy/aspiration. However in mainland Europe (Italy, Spain, Belgium, etc) these (1Fr, 2 Fr) polyurethane lines are given the nomenclature 'Epicutaneo-caval catheters'. So you might want to acknowledge that the term 'PICC' in this document is referring to these smaller/softer more distal lines.	Thank you. This difference in terminology has been highlighted.

	Zuzana Kusnirikova	would it be helpful to have appendix for fixation devices to complete the references for suitable products. The cyanoacrylate glue is useful in infection protection as well as securing the line. I would propose it is recommended as a standard practice. The sutureless devices could be mentioned as well such as FlexiGrip, Griplcok etc. Subcutaneous anchoring device Securacath. This comes in a size 3fr and 4 fr and can be used for securing most of uncuffed tunelled CICC's in neonates. I would recommend introducing this device for securing appropriately sized lines, based on current literature and also experience.	Thank you. Fixation devices included in appendix.
	Dr Sarah Oh on behalf of Newborn Care Services, John Radcliffe Hospital, Oxford University Hospital Trust, Oxford	Overall a really great update to the national framework. Thank you	

	Fiammetta Piersigilli on behalf of NEVAT Neonatal European Vascular Access Team	I am writing on behalf of NEVAT, the Neonatal Vascular Access Team, an international network of clinicians, researchers, and educators dedicated to improving vascular access practices in newborns. The group's mission is to promote evidence-based standards, share knowledge and expertise, and foster training initiatives to optimize the use of central and peripheral vascular access devices. By supporting research, education, and collaboration, NEVAT aims to enhance procedural success, reduce complications, and ultimately improve the safety and quality of care for neonates worldwide. We greatly appreciate the effort put into developing an international guideline that comprehensively addresses all aspects of neonatal vascular access, with the goal of standardizing practice and enhancing patient safety. We would like to take the opportunity to share a few comments on your guidelines, in the spirit of fostering international collaboration and dialogue. Our hope is that these observations may provide constructive insights and contribute to the ongoing effort to optimize neonatal vascular access practices in Europe and worldwide.	
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	Petya Drencheva on behalf of Great Ormond Street Hospital for Children	Dear Members of the Framework for Practice Development Group, We would like to thank British Association of Perinatal Medicine (BAPM) for the opportunity to comment on the draft framework for neonatal central venous access devices (CVADs). We welcome the work undertaken to standardise and improve best practice in this important area of neonatal care. We would like to highlight an area that is not currently addressed within the document: the use of interventional radiology (IR) – inserted central lines in neonates. In some tertiary and quaternary neonatal units, very complex neonatal patients, particularly those with extremely difficult venous access gain significant benefit from IR-inserted central lines. These devices are often used when conventional bedside insertion techniques are not feasible or have been unsuccessful. The insertion techniques and recommended final tip positions for IR-inserted lines may, by necessity, differ from those described in the draft framework as best practice. As these devices and approaches are not discussed, there is a risk that their omission could lead to	Thank you for your comment and sharing of your experience in this area. Evidence based recommendations for the use of interventional radiology inserted central venous access in neonates is out with the scope of this framework. BAPM would recommend that guidance in this area is developed by those with the expertise in this area including representatives from the British Society of Interventional Radiology.
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		uncertainty or misinterpretation when managing this specific subgroup of neonatal patients. We therefore suggest that an additional section should be included within the framework for practice that acknowledges the role of IR-inserted CVADs in neonatal care. Such a section could outline the clinical contexts in which they are appropriate, describe relevant insertion techniques, and clarify acceptable tip positions, particularly where these differ from standard recommendations. At GOSH, IR-inserted central lines have been used safely and successfully in neonatal patients for many years, with established multidisciplinary pathways and robust governance. Should the framework development group find it helpful, we would be pleased to share local data relating to safety, complications, and outcomes to support inclusion of this practice within the framework. We hope these comments are helpful and would be happy to contribute further to the development of this framework if required. Yours sincerely,	
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		Dr Petya Drencheva Consultant Neonatologist Neonatal Intensive Care Unit (Dolphin Ward) Great Ormond Street Hospital for Children NHS Foundation Trust London WC1N 3JH	
	Stephen Rowley on behalf of The Association for Safe Aseptic Practice	Dear Colleagues at the British Association of Perinatal Medicine, The Association for Safe Aseptic Practice (The- ASAP) welcomes the opportunity to comment on your guidance and to offer recommendations intended to strengthen patient safety through clearer and more consistent application of aseptic technique. Aseptic technique is a fundamental first principle underpinning all invasive clinical procedures and the management of invasive medical devices. However, within this document it is referenced only once, and without definition, rationale, or supporting evidence. This limited treatment near ignores the importance of aseptic technique and will contribute to variability in practice, despite the document's otherwise strong emphasis on standardisation and evidence-based care.	Thank you for your comments. As recommended we have revised these areas and included further discussion and recommendations referencing ANTT®

		Internationally, there is now clear consensus on the need to standardise aseptic practice. Many leading professional bodies and national health organisations have adopted the Aseptic Non Touch Technique (ANTT®) Clinical Practice Framework as the standard approach to aseptic technique. These include organisations in the USA, Canada, Australia, Europe, Africa, and the UK. ANTT is the most widely adopted aseptic technique framework in the UK, used as a single standard in >85% of English NHS Trusts and is mandated by NHS Wales. It is recommended and monitored by the Care Quality Commission (CQC). In addition, since the Health and Social Care Act (2008), healthcare organisations in England have been legally required to use a single standard aseptic technique and to evidence compliance through training, competency assessment, and audit. Clear reference to a recognised standard within national guidance therefore provides essential leadership and practical clarity for clinicians, and quality assurance for health care organisations.	
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		In light of the above, The Association for Safe Aseptic Practice makes the following recommendations: - That BAPM guidance explicitly states that all invasive clinical procedures should be performed using a standard aseptic technique, with clear reference to ANTT as the internationally established and evidence-based standard framework. - That the statement “Redressing a CVAD is a minimum two-person, aseptic procedure” is revised to: - Reference a risk-assessment-based rationale (Such as ANTT Risk Assessment) and include a brief explanation and supporting evidence - Avoid unqualified assertions regarding staffing numbers without an objective methodology ANTT provides a structured framework to determine procedural complexity and staffing requirements based on factors that directly affect the ability to achieve and maintain asepsis. That aseptic technique is embedded consistently throughout the document, with explicit application to all invasive procedures discussed and inclusion of clear, standardised definitions within the glossary, aligned with internationally recognised ANTT terminology	
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		The Association for Safe Aseptic Practice would be pleased to support BAPM by providing evidence summaries, standardised definitions, and guidance resources to assist in strengthening this critical area of clinical practice. We commend BAPM's commitment to reducing variation in care and improving outcomes, and we believe that clearer leadership on aseptic technique—anchored in the ANTT framework—would strongly support those aims.	
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