Guideline for the Care and Management of a Central Venous Access Device when used for a Child in the Community

Changing practice to support service delivery
Guideline for the Care and Management of a Central Venous Access Device (CVAD) when used for a Child in the Community

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This guideline should be read in conjunction with the following regulatory, professional and legislative documents and other key reference documents.

**Regulatory and Professional Documents:**

• Medicinal Products (Prescription and Control of Supply) (Amendment) Regulations 2007 (SI No. 201 of 2007).


Legislative Documents

• Nurses Act (1985).
• Health Act (2004).
• Pharmacy Act (2007).
• Medical Practitioners Act (2007).
• Irish Medical Practitioners Act (1978).
• The Misuse of Drugs Act (1984, 1997).

This guideline should be read in conjunction with local relevant policies/protocols/guidelines that include the administration of medications, reporting of adverse incidents in the community, infection control and any other relevant documents that incorporate best practice.
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1.0. Policy Statement

It is the policy of the Health Service Executive (HSE) that healthcare professionals involved in the care and management of a central venous access device (CVAD) when used for a child in the community utilise this document as guidance to their practice. This guideline provides direction for the:

- care and flushing of a CVAD when not in use
- changing of a needle free device and connecting line
- priming and connecting a syringe driver to a CVAD for the administration of medication via a syringe driver.

1.1. This guideline focuses on the use and management of a CVAD when utilised for a child being cared for in the community. It does not provide guidance on the psychological care which is integral to the holistic assessment at each community visit/assessment. Appendix I contains an overview of some psychological, pharmacological and non pharmacological pain relief and distraction techniques for the child (HSE, 2010a).

1.2. In order for healthcare staff in the community to be appropriately prepared and competent, this guideline assumes that an integrated planned transfer of care from the hospital to the community has taken place.
2.0. Background

2.1. Central Venous Access Device
This guideline has been developed as an outcome of recommendations outlined in the Report on the Use and Management of Central Venous Access Devices for Children in the Community (HSE, 2010b) (see Appendix II).

In this guideline CVADs refer to Skin Tunnelled Catheters (Hickman™/Broviac™) and Tunnelled Implanted Ports (Portacath™). However, from this point on in the document only Hickman™ Catheter and Portacath™ will be referred to in the text.

3.0. Purpose
The purpose of this guideline is to:

- provide guidance for all healthcare professionals who care for, manage and maintain CVADs in children in the community safely and in a manner that optimises effective and safe care
- encourage best practice and to support the standardisation of care by healthcare professionals who are caring for and managing children with CVADs in the community
- clarify for healthcare professionals their responsibilities in the care, maintenance and management of children with CVADs in the community
- support a needle free experience for the child insofar as is possible
- minimise the risk of infection associated with the care and management of long term use of CVADs in the community
- support standardised documentation practices

3.1. In line with the HSE Code of Practice for Integrated Discharge Planning (HSE, 2008), the transition of care from hospital to community must be proactively and collaboratively planned to ensure appropriate
services are in place (see Section 11.1). In anticipation of the child’s discharge, if required, education may be accessed by staff who will be providing care to the child.

3.2. Assuming that an integrated discharge plan has commenced healthcare professionals, where possible, require a minimum notice of three working days in advance of the discharge of a child with a CVAD to the community (see Section 11.1). Three working days is normally adequate to ensure that any required equipment is available. However it is acknowledged that a longer period of notice may be necessary if up-skilling/training is required (see Section 11.1 for criteria for discharge planning and Appendix III for an example of a discharge checklist). It is recognised that healthcare personnel in the community are required on an infrequent basis to provide care for a child with a CVAD and consequently will need to prepare themselves to a level of competence that supports optimum provision of care. However it is acknowledged that due to the rapid deteriorating condition of some children with palliative care needs this is not always possible.

4.0. Scope

4.1. This guideline applies to all HSE staff and healthcare professionals providing care on behalf of the HSE for a child with a CVAD in the community.

4.2. A registered nurse involved in the care and management of a child’s CVAD in the community must:
   - hold a current registration with ABA.
   - have successfully completed an ABA approved IV study day
   - have successfully completed education and training requirements for the administration of IV medication via a CVAD in children in the community.
## 5.0. Glossary of Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tr>
<td><strong>Accountability</strong></td>
<td>Accountability is the fulfilment of a formal obligation to disclose to referent others the purposes, principles, procedures, relationships, results, income and expenditures for which one has authority (Lewis and Batey, 1982 cited in ABA, 2000).</td>
</tr>
<tr>
<td><strong>Aseptic Non Touch Technique</strong></td>
<td>Aseptic non touch technique is the term used to describe a technique that maintains asepsis and is non touch in nature (Rowley and Clare, 2011, p.E90).</td>
</tr>
<tr>
<td><strong>Authority</strong></td>
<td>Authority is associated with role and linked to the responsibilities an employee is given. Authority is the power given to the employee to carry out his/her responsibilities (HSE, 2010c, p.6).</td>
</tr>
<tr>
<td><strong>Adverse Drug Reaction</strong></td>
<td>A response to a drug that is noxious and an unintended reaction and occurs at dose normally used in man for prophylaxis, diagnosis or therapy of disease or for the restoration, correction or modification of physiological function (Directive 2001/83/EC).</td>
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<td><strong>Child</strong></td>
<td>In this guideline “child” refers to individuals aged 18 years and under.</td>
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<td><strong>Community Nurse/Nursing Staff</strong></td>
<td>In this guideline community nurse/nursing staff refers to Public Health Nurses or registered nurses working in the community.</td>
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<td><strong>Competence</strong></td>
<td>The ability of the registered nurses or registered midwives to practice safely and</td>
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<tr>
<td>Term</td>
<td>Definition</td>
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<td>Continuous Infusion</td>
<td>May be defined as the intravenous delivery of a medication or fluid at a constant rate over a prescribed period of time. The length of time over which a continuous infusion is administered will range from several hours to several days (Whittington, 2008).</td>
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<tr>
<td>Direct Intermittent Injection (Intravenous Bolus)</td>
<td>Constitutes the administration of a medicine in a small volume of diluents directly into a venous access device or in the injection port of the administration set (Whittington, 2008, p. 127).</td>
</tr>
<tr>
<td>Guideline</td>
<td>A guideline is defined as a principle or criterion that guides or directs action (Concise Oxford Dictionary, 1995).</td>
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<tr>
<td>Healthcare Professional</td>
<td>In this guideline any medical practitioner or registered nurse employed by the HSE or who provide care on behalf of the HSE.</td>
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<td>Intermittent Infusion</td>
<td>Is the administration of a small-volume infusion i.e. 50-240 mls, over a period of between 20 minutes and 2 hours. This may be given as a specific dose at one time or at repeated intervals during a 24 hour period (Whittington, 2008, p. 126).</td>
</tr>
<tr>
<td>Medication Management</td>
<td>The facilitation of safe and effective use of prescription and over the counter medicinal products (Bulechek and McCloskey, 1999, p. 706).</td>
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| Medicinal Product                         | Any substance or combination of substances presented for treating or
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<th><strong>Responsibility</strong></th>
<th>Responsibility can be defined as a set of tasks or functions performed to a required standard that your employer can demand from you and which you are qualified and competent to exercise (HSE, 2010c, p.6).</th>
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<tr>
<td><strong>Subcutaneous Infusion (Hypodermoclysis)</strong></td>
<td>Injection of fluids into the subcutaneous tissues to supply the body with liquids quickly (RCN, 2010).</td>
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### Abbreviations

<table>
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<tr>
<th>Abbreviation</th>
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<tr>
<td>ABA</td>
<td>An Bord Altranais</td>
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<tr>
<td>ANTT</td>
<td>Aseptic Non Touch Technique</td>
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<tr>
<td>CNSPp</td>
<td>Clinical Nurse Specialist</td>
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<tr>
<td>CVAD</td>
<td>Central Venous Access Device</td>
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<tr>
<td>DoH</td>
<td>Department of Health</td>
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<tr>
<td>DPHN</td>
<td>Director of Public Health Nursing</td>
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<tr>
<td>GP</td>
<td>General Practitioner</td>
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<td>HSE</td>
<td>Health Service Executive</td>
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<td>IV</td>
<td>Intravenous</td>
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<tr>
<td>MDT</td>
<td>Multidisciplinary Team</td>
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<tr>
<td>mls</td>
<td>Millilitres</td>
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<tr>
<td>NCCP</td>
<td>National Cancer Control Programme</td>
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<tr>
<td>NHS</td>
<td>National Health Service</td>
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<tr>
<td>NMPDU</td>
<td>Nursing and Midwifery Planning and Development Unit</td>
</tr>
<tr>
<td>OLCHC</td>
<td>Our Lady’s Children’s Hospital Crumlin</td>
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<tr>
<td>PHN</td>
<td>Public Health Nurse</td>
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<tr>
<td>PCT</td>
<td>Primary Care Team</td>
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<tr>
<td>psi</td>
<td>Pounds per Square Inch</td>
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<tr>
<td>RCN</td>
<td>Royal College of Nursing</td>
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<tr>
<td>SARI</td>
<td>Strategy for the control of Antimicrobial Resistance in Ireland</td>
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<tr>
<td>TPN</td>
<td>Total Parental Nutrition</td>
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6.0. Roles and Responsibilities

Roles and Responsibilities

It is the responsibility of each healthcare professional using or managing a CVAD in a child cared for in the community to have read and to comply with this guideline. An integrated discharge planning process is essential to enable healthcare professionals in the community to provide optimum care (see Section 11.1). This section therefore also includes relevant aspects of the roles and responsibilities of healthcare professionals in the discharging facility and is structured sequentially, in order of transition of care from hospital to the community.

Consultant Paediatrician - is responsible for the decision to discharge the child. This needs to be a well planned integrated discharge to allow adequate time for healthcare professionals in the community to be up-skilled, if required, in order to provide optimum care. The Consultant Paediatrician will communicate, as required with members of the MDT within the hospital, the child’s GP, Paediatric Consultant in local hospital and Consultant in Palliative Medicine if relevant.

Specialist Nurse in Paediatric Unit - is responsible for contacting the DPHN or Area PHN as appropriate. (S)he will provide a discharge summary relating to all aspects of the child’s care. The Specialist Nurse if required will meet with healthcare professional(s) who will provide care for the child with a CVAD in the community and will supply a list of any required equipment to the Area PHN. The Specialist Nurse may be required to collaboratively provide education either at hospital or community level. This will be decided on a case by case basis.

Children’s Haematology/Oncology Clinical Nurse Specialist – is responsible for co-ordination of care between the hospital and community for children with a haematology/oncology condition in collaboration with local healthcare professionals, including their specific palliative care needs.
at hospital and community level. The CNSP has a responsibility to educate, in collaboration with existing education facilities and support the primary healthcare team, assisting in symptom management.

**General Practitioner** - The child’s GP receives notification regarding discharge which contains details regarding the child’s condition, medical history and requirements for care from the hospital. The GP is responsible for prescribing medication for the child in the community as required and in consultation, where necessary with the child’s Paediatrician and/or hospital team.

**Director of Public Health Nursing** - is responsible for the provision of the public health nursing service and is responsible for implementation of this guideline at community level. (S)he must ensure that nursing staff within their remit have access to this guideline and to ensure that staff are released for education to support the implementation of the guideline in the event that staff are required to provide care for a child with a CVAD.

**Area Public Health Nurse** - is responsible, given notification of planned discharge to have any required equipment/appliances in place as indicated by the discharging facility. (S)he will provide direct care and management of the CVAD as required when the child has been referred to his/her caseload and will work within their scope of practice.

**The Specialist Palliative Care Team** - is responsible for the provision of specialist palliative care for adults/children who have been referred and accepted for care by the Specialist Palliative Care Service. The Specialist Palliative Care Team is an interdisciplinary team made up of a Consultant in Palliative Medicine, Clinical Nurse Specialists, and may also include Allied Health Professionals. Following the referral and acceptance for care of a child with specialist palliative care needs the team works in
collaboration with the GP, PHN and other members of the primary care team and the Paediatric Units involved in the child’s care.

**Children’s Outreach Nurse for Life Limiting Conditions – Clinical Nurse Specialist** - is responsible for the co-ordination of care between the hospital and the community for children with a life limiting condition. In collaboration with local healthcare professionals this includes the provision of care for children with specific palliative care needs at hospital and community level. The CNSP has a responsibility to educate in collaboration with existing education facilities and support the primary healthcare team and voluntary services, assisting in symptom management and end of life care.
7.0. The Care and Management of CVADs (Hickman™ and Portacath™) in Children in the Community

Section 7.1 to 9.2 addresses the care and management of a Hickman™ Catheter (see Appendix IV for troubleshooting (Hickman™)). Section 10.0 to 10.3 addresses the care and management of an Implanted Port e.g. Portacath™ (see Appendix V for troubleshooting (Portacath™)).

7.1. Introduction to Hickman™ Catheter

The Hickman™ catheter is a central venous access device inserted under general anaesthetic in theatre. It is made of silicone and is approximately 90cms long and it is cut to the appropriate size for each individual child at the time of its insertion. It is tunnelled under the skin of the chest wall and inserted via the internal or external jugular vein with the tip sitting within the Superior Vena Cava (RCN, 2010, Dougherty and Lister, 2008). The external end exits from the chest wall usually lateral to the right breast (see Figure 1). The catheter has a short Dacron cuff on its outer surface, situated under the skin, above the point of exit from the chest. This is designed to act as a barrier to infection and to anchor the line in the subcutaneous tissue. These catheters may have single, double or triple lumens, which allows multiple, and concurrent venous access. These catheters are commonly used in children.
7.2. Guidelines for the Care of a Hickman™ Catheter

1. Strict hand hygiene is essential prior to handling the catheter at all times.

2. All procedures are carried out using an aseptic non touch technique (Rowley and Clare, 2011) (see Appendix VI, for information on aseptic non touch technique). Sterile gloves must also be worn when accessing the catheter for taking blood cultures, changing the needle free device and connecting or disconnecting Total Parental Nutrition (TPN) infusion lines.

3. The use of sterile gloves is unnecessary when administering bolus medication, attaching and detaching intravenous infusions (Rowley and Clare, 2011).

4. The Hickman™ catheter must remain clamped when not in use.
7.3. Care and Maintenance

7.3.1. Flushing and Maintaining Patency

It is essential to follow certain general principles prior to flushing and maintaining the patency of a Hickman™ catheter:

**Syringe Size:** It is recommended that a 10 ml syringe (or larger) be used for withdrawing blood samples or injecting into any Hickman™ catheter as infusion pressure must not exceed 25 psi (a catheter will rupture at pressures in excess of 25 psi). Small syringes generate very high internal pressures with very little force (Bard, 2010).

**Flush Volumes:** Sodium chloride (NaCl) 0.9% is used before and after drug administration. It is used after blood sampling and after disconnecting lines. Heparin sodium (10 units per ml IV flush solution) is then instilled to maintain patency (Dougherty and Lister, 2008). The volume varies depending on the age and weight of the child. Please refer to instructions from the discharging facility.

**Push-Pause Method:** It is important to use a push-pause method when flushing the Hickman™ catheter as this creates turbulence within the lumen and helps prevent the formation of fibrin clots. Administer 1ml of solution, pause for one second, and repeat until the appropriate volume has been administered. The procedure is completed using a positive pressure technique (Trigg and Mohammed, 2010; Dougherty and Lister, 2008).

**Positive Pressure Technique:** A positive pressure technique is accomplished by clamping the Hickman™ catheter as the last 0.5 ml of heparin sodium (10 units per ml IV flush solution) is being instilled. Maintaining positive pressure within the catheter prevents backflow of blood into the catheter (Trigg and Mohammed, 2010; Dougherty and Lister, 2008).
**Blood Return and Patency:** When not in use all lumens of the catheter must be clamped and heparinised weekly to maintain patency (Wynsma, 1998). Patency of the Hickman™ catheter is confirmed by obtaining a blood return. It must always be checked prior to instillation of any drug or infusion. If there is a suspicion that the line has dislodged i.e. cuff is visible, no blood return on aspiration, do not use it. Contact the discharging facility for advice if the line has dislodged.

**Blood Discard Volume Chart:** Prior to taking blood samples, the Hickman™ catheter must be aspirated using a 10ml syringe. The first sample may contain heparin sodium, a small amount of blood, bacteria or clots and must be discarded unless being used for blood cultures. The discard volume will vary according to the age of the child. Please note that this may vary depending on the discharging facility (see Appendix VII for an example of a blood discard volume chart as used in Our Lady's Children’s Hospital, Crumlin). The discarded sample must not be returned to the child.

7.4. Blood Sampling (see Appendix VIII)
When obtaining a blood sample from a multi-lumen catheter use the free lumen where possible. Ensure that the other lumens are clamped to avoid contamination of the blood sample.

7.5. Needle Free Devices/Clamps
There are many needle free device products currently in use. The hub of the catheter must always be protected with a needle free luer lock device and must be changed weekly (Bard, 2010) using an aseptic non touch technique. The clamp must be kept closed while disconnecting an IV line, changing a needle free device and when the catheter is not in use. The clamp must always be closed over the reinforced catheter sleeve to prevent damage to the catheter.
7.6. IV Administration Sets/Drug Administration

IV administration sets connected to the Hickman™ catheter must be changed every 48 hours unless the closed system is broken. However, children who are neutropenic or on TPN must have administration sets changed every 24 hours (Dougherty and Lister, 2008). Attach a label with the date and time of change. The use of three-way taps is not recommended.

Where possible use a free lumen to administer bolus medications and check for blood return. Flush with sodium chloride (NaCl) 0.9% before and after the administration of the bolus medication (Wynsma, 1998). Then flush with heparin sodium (10 units per ml IV flush solution) after the administration of sodium chloride (NaCl) 0.9%. The volume is dependent on the age and weight of the child (see Section 7.3.1). Please note that this may vary depending on the discharging facility.

7.7. External Catheter Dressings

Exit site dressings must be changed weekly (O’Grady et al., 2002). A semi-permeable polyurethane transparent dressing is preferred as it allows the site to be observed. If the child becomes sensitive to this dressing, a Mepore type dressing can be used. The frequency of dressing changes will be governed by the condition of the underlying exit site. Advice can be sought from the discharging facility if there are concerns about the condition of the exit site.

7.7.1. Securing a Hickman™ Catheter

The Hickman™ catheter must be looped under the dressing for additional security to reduce the effect of pulling on the catheter. Care is needed to prevent the lumens of the catheter being caught or pulled particularly in the case of babies and young children.
8.0. Procedures to Guide the Care and Management of a Hickman™ Catheter

8.1. Catheter Dressing, Flushing, Needle Free Device Changes

**Equipment for single lumen:**
- Tray (plastic)
- Sterile gloves x 1
- 10ml syringe x 1
- Transparent semi-permeable polyurethane dressing x 1
- Filter needle straw x 1
- Needle free device x 1
- Heparin sodium (10 units per ml IV flush solution) 5ml vial x 1 as per valid prescription
- Large disposable disinfection wipes X 8 – 70% v/v isopropyl alcohol and 2% chlorhexidine gluconate (as recommended by discharging facility). Please note that the SARI guidelines (2010) recommend the use of sterile chlorhexidine solution 0.5% in children less than two months old corrected gestational age.
- Sharps bin

**For each additional lumen you will need:**
- 10 ml syringe x1
- Filter needle/straw x 1
- Needle free device x 1
- Heparin sodium (10 units per ml IV flush solution) 5ml vial x1
- Large disposable disinfection wipes x 4

**Procedure:**
1. Explain the procedure to the child and parents.
2. Perform hand hygiene prior to starting the procedure (SARI, 2010).
3. Wash the tray and dry it with a paper towel.
4. Wipe the top surface of the tray with a disinfection wipe and allow it to dry for 30 seconds (Pratt et al., 2008).
5. Open the sterile glove packet onto the tray. The inside of this packet is now your ‘sterile area’.
6. Carefully open filter needle/straw(s), syringes, needle free device and dressing onto the glove packet using an aseptic non touch technique.
7. Open the disinfection wipes onto the packet using an aseptic non touch technique.
8. Check the expiry date on the bottle of heparin sodium (10 units per ml IV flush solution), open and leave it beside the tray.
9. Remove the child’s old dressing and discard outside the tray. Take care not to dislodge the line (the second person or the child can remove the old dressing, having first washed their hands, and taking care not to pull on the line).
10. Wash hands again and put on the sterile gloves.
11. Attach filter needle/straw onto the syringe and draw up 2.5ml (10 units per ml IV flush solution) of heparin sodium (Dougherty and Lister, 2008).
12. Remove the filter needle/straw and discard outside of the tray. Expel the air by slowly pushing up the plunger. Place the syringe on the tray.
13. Unfold two disinfection wipes leaving remainder unfolded.
14. With one hand pick up the Hickman™ catheter. This hand now becomes the non sterile hand and must not touch the sterile field. Pick up an unfolded disinfection wipe in the other hand (sterile hand) and remove the needle free device by rotating it to the left.
15. Discard both the disinfection wipe and the needle free device outside of the tray. Pick up another disinfection wipe (sterile hand) and clean the open end of the Hickman™ line. Discard the disinfection wipe outside of the tray. Allow it to dry for 30 seconds (Pratt et al., 2008).
16. Attach (sterile hand) the new needle free device to the Hickman™ catheter by rotating it to the right for a secure fit.
17. Attach (sterile hand) the 10ml syringe containing heparin sodium solution by pushing it firmly into the centre of the needle free device and rotating it to the right for a secure fit. Open (non-sterile hand) the clamp and slowly withdraw blood to check for the patency of the line, then slowly inject the heparin sodium (10 units per ml IV flush solution) into the line using push – pause method. Close (non-sterile hand) the clamp as the last 0.5ml is being injected (Dougherty and Lister, 2008). Remove (sterile hand) the syringe and discard it outside of the tray.

18. Clean (sterile hand) the top of the needle free device with a disinfection wipe and allow it to dry for 30 seconds (Pratt et al., 2008). Discard the disinfection wipe outside of the tray.

19. Repeat the same procedure for change of needle free devices in double and triple lumen catheters.

20. Pick up (non-sterile hand) the Hickman™ catheter, taking care not to pull on it. Pick up (sterile hand) a disinfection wipe and carefully clean the skin around the exit site in a circular movement. Start at the catheter exit site. Discard the disinfection wipe outside of the tray.

21. Repeat the cleaning procedure with two other disinfection wipes moving a little further out from the exit site each time.

22. Now with the remaining unfolded disinfection wipe (sterile hand) gently clean the catheter from the exit site to the end of the catheter, taking care not to pull on it, and then discard outside of the tray.

23. For a double or triple lumen Hickman™ catheter, use a separate disinfection wipe for each lumen, to clean from the triangle area down to the end of the catheter.

24. Loop the Hickman™ catheter on to the chest wall as illustrated in Figure 2. The child or a second person (having washed their hands) may hold the loop in place. Place the transparent semi-permeable polyurethane dressing over the exit site securely and press out any air under the dressing. Secure the Hickman™ catheter (Dougherty and Lister, 2008).

25. Dispose of needles and syringes into the sharps bin, and other equipment appropriately as per local guidelines.
26. Wash hands.


**Figure 2: Flushing the Hickman™ Line**
8.2. Disconnecting an Infusion Set from a Hickman™ Catheter:

**Equipment:**
- Clean tray and sterile preparation towel
- 10ml syringe x 2
- Filter needle/straw x 2
- Non-injectable bung x 2
- Sodium chloride (NaCl) 0.9% 10ml x 1
- Heparin sodium (10 units per ml IV flush solution) 5ml x 1 as per valid prescription
- Disposable disinfection wipes x 3– 70% v/v isopropyl alcohol and 2% Chlorhexidine gluconate (as recommended by discharging facility)
- Sharps bin

**Procedure:**
1. Explain the procedure to the child and parents.
2. Perform hand hygiene (Rowley and Clare, 2011; SARI, 2010).
3. Open the preparation towel and cover the tray (Pratt et al., 2008). Check expiry date of sodium chloride (NaCl) 0.9% and heparin sodium (10 units per ml IV flush solution). Using a filter needle/straw draw up sodium chloride (NaCl) 0.9% and heparin sodium (10 units per ml IV flush solution) into two separate syringes as recommended by the discharging facility. Remove the filter needle/straw and discard outside of the tray, expel air bubbles and attach a non-injectable bung to each syringe tip. Place the syringes on the tray.
4. Turn off the pump, close line clamp and clamp the Hickman™ catheter.
5. Wash hands.
6. Holding the catheter in one hand, pick up a disinfection wipe and clean the connection between the IV giving set and the needle free device, allow it to dry for 30 seconds (Pratt et al., 2008).

7. Rotate the giving set connection to the left, and detach it from the needle free device.

8. Carefully clean the centre of the needle free device with a disinfection wipe. Allow it to dry for 30 seconds (Pratt et al., 2008).

9. Remove non-injectable bung from the syringe containing sodium chloride (NaCl) 0.9%. Push the syringe firmly into the centre of the needle free device and rotate to the right for a secure fit. Open the clamp and slowly inject the sodium chloride (NaCl) as per instructions from discharging facility using a push-pause method (Dougherty and Lister, 2008). Close clamp and remove syringe by rotating to the left and discard.

10. Remove non-injectable bung from the syringe containing heparin sodium (10 units per ml IV flush solution) as per instructions from discharging facility, attach the syringe to the needle free device and inject the solution as above. Close the clamp as the last 0.5ml is being injected. Remove the syringe by rotating to the left and discard.

11. Carefully clean the centre of the needle free device with a disinfection wipe and allow it to dry for 30 seconds. Ensure the catheter is secured safely.

9.0. Procedure for Connecting a Syringe Driver to a Hickman™ Catheter

Hickman™ catheters may have one or more lumens, any of which can be used with the syringe driver. The priming volume (or dead space within the line) depends on the final length of the catheter when inserted in theatre; each lumen being the same length, although different diameter. It is the responsibility of the discharging facility to notify the relevant health care professionals of the child’s individual priming volumes. In the event of families not having the required supplies, they can be organised by the Area PHN.

9.1. Principles of Safe Practice when Connecting a Syringe Driver to a Hickman™ Catheter

1. The syringe driver infusion pump must comply with safety criteria outlined in Appendix IX.

2. It is recommended that when connecting an infusion for the first time to the Hickman™ that a 2nd 10ml/20ml leur-lock syringe containing the same medication to be administered, is drawn up. The syringe used to prime the line is then replaced with the second syringe so that the infusion will not need to be changed several hours later or early the next day. The first syringe is then discarded.

3. There is a time delay as medication travels the length of the Hickman™ catheter before reaching the child. The duration of this delay depends on the actual length of the catheter (lumen) and it’s (the child’s) priming volume. Some children will have their individual priming volumes calculated and documented on discharge to the community. In the case of children whose priming volume is not calculated and documented, the clinician must contact the discharging hospital. This is important as there can be significant
variation in priming volumes. Please note that this may vary depending on the discharging facility.

4. Once the priming volume is calculated, the length of time it will take for the medication to reach the child will depend on the type of syringe driver used. A stat dose of medication may be given via another route, e.g. orally, rectally, or subcutaneously to achieve symptom control quickly while waiting for the medication to reach the child.

5. When connecting a syringe driver to a Hickman™ catheter for the first time check the selected lumen for blood return to confirm the position of the catheter. The lumen can be flushed with sodium chloride (NaCl) 0.9% and the infusion line attached in the usual way.

6. The needle free device and the infusion line from the syringe driver needs to be changed once a week. However, if changes in a dosage of drug are made or new drugs added the infusion line from the syringe driver must be changed. The length of the Hickman™ line must be taken into account, as a delay will occur before the new dose reaches the child.

In the event that the medication in the catheter needs to be withdrawn, aspirate and withdraw blood equivalent to its priming volume. It is then safe to flush the lumen with sodium chloride (NaCl) 0.9%. If reconnecting the line to that lumen please remember that the medication will take some time to reach therapeutic levels as what will infuse initially is the sodium chloride (NaCl) 0.9% within the lumen (see Section 10.3.). A stat dose of medication may need to be given for symptom control in the intervening period. The other lumen can still be used. It must be checked for blood return and flushed prior to initial use as per procedure (see Section 10.3, Procedure points 17-22).
7. The lumen in use does not need to be flushed routinely when in continuous use. Care must be taken at all times not to inject any drugs remaining within the catheter if the infusion is discontinued.

8. If during a syringe driver infusion the catheter (lumen) appears to have blocked it must not be flushed with sodium chloride (NaCl) 0.9% as the medication within that lumen will be flushed into the circulation and could represent several hours worth of dosage. In this instance the line must be clearly labelled “Do not use, lumen blocked” and the parent/carer made aware not to flush it during routine Hickman™ care. This must be documented and the child’s GP and discharging facility notified. However, if an alternative lumen is available, set up infusion as per Section 9.0.

9. A syringe and infusion line that was previously connected to a blocked lumen cannot be re-used. It must be discarded and a new syringe driver and infusion line commenced on an alternate lumen to prevent cross infection.

**Equipment and Requirements:**

- Valid prescription
- Written instruction/medical order issued by a registered medical practitioner
- Tray (plastic)
- Disposable disinfection wipes x 1 – 70% v/v Isopropyl alcohol and 2% Chlorhexidine gluconate. Please note that the SARI guidelines (2010) recommend the use of sterile chlorhexidine solution 0.5% in children less than two months old corrected gestational age.
- Filter needle/straws x 2
- Luer-lock syringe 10ml/20ml for infusion
- Non-injectable bung X 1
- Prescribed medications
- Prescribed diluent
- Prescribed sodium chloride (NaCl) 0.9% for flush
- Infusion line for use with syringe driver
- 1ml, 2ml, 5ml, 10ml syringes to draw up prescribed medication
- Syringe driver infusion pump (The syringe driver infusion pump must comply with safety criteria outlined in Appendix IX)
- New syringe driver battery
- Medication label
- Sharps bin

**Procedure:**

1. The issues highlighted in Section 7.3.1 must be considered at all times when carrying out this procedure.
2. Explain the procedure to the child and parents.
3. Check with the parents for known allergies.
4. Check expiry date of all preparations.
5. Perform hand hygiene (Rowley and Clare, 2011; SARI, 2010).
6. Draw up a flush of sodium chloride (NaCl) 0.9% as recommended by the discharging facility in a 10ml syringe using non-touch technique.
7. Attach a non-injectable bung to the tip of the syringe to maintain sterility.
8. Label the syringe and place on the tray.
9. Select syringe type for syringe driver and size 10 ml/20 ml appropriate to dispensed medication. Use syringe with luer-lock nozzle.
10. Fill the syringe with the prescribed medication and diluents. Connect the infusion line to the luer-lock of the syringe and prime the line with the prescribed medication leaving the cover on the end. Note: infusion time will be lost due to priming, as some of the prescribed medication is used. This needs to be taken into account when calculating time for subsequent reloading of syringe driver.
11. The syringe must be labelled with the following as a minimum: child’s name, date of birth, amount of medication strength being delivered, date and time infusion commenced, signature of clinician. Attach label to the blank side of the syringe.
12. Set the rate on the syringe driver.
13. Wash hands adhering to aseptic non-touch technique (SARI, 2010).
14. Support the Hickman™ line with one hand and, clean the centre of the needle free device with disinfection wipe and discard outside of the tray. Allow to dry for 30 seconds (Pratt et al., 2008).
15. Remove the non-injectable bung from the flush syringe containing the sodium chloride (NaCl) 0.9% syringe.
16. Support the needle free device. Attach the flush of sodium chloride (NaCl) 0.9% by pushing the syringe firmly into the centre of the needle free device rotating to the right to secure the fit (Vygon, 2003).
17. Open the clamp of the Hickman™ line and draw back gently to assess for blood return to confirm correct position. Inject sodium chloride (NaCl) 0.9% flush using a push-pause method (Dougherty and Lister, 2008).
18. Close the clamp, remove syringe from the needle free device by gently turning it to the left (Vygon, 2003).
19. Remove the cover on the end of the primed infusion line.
20. Attach the infusion line to the end of the Hickman™ catheter by pushing it firmly into the centre of the needle free device, rotating it to the right (Vygon, 2003).
21. Secure the attachment of the primed infusion line to the Hickman™. Load the syringe into the syringe driver as per manufacturers’ instructions, local guidelines/policies/protocols.
22. Open the clamp on the Hickman™ catheter, open the clamp on the connecting infusion line and commence the infusion.
23. Dispose of waste as per local guidelines.
9.2. Procedure for Daily or Alternate Day Change of Syringe

1. Wash hands.
2. Draw up prescribed medications for infusion into appropriate (selected) luer lock syringe using aseptic non touch technique and attach non-injectable bung.
3. Close Hickman™ catheter clamp and the infusion line clamp.
4. Clean the area where the infusion line and syringe meet with the disinfection wipe and allow it to dry.
5. Remove previously used syringe.
6. Remove non-injectable bung and attach new syringe. Load syringe onto driver (continue as per points 22 to 24 in Section 9.1).
10.0. Introduction to Tunnelled Implanted Port (Portacath™)

A Portacath™ is an implanted venous access device which is implanted subcutaneously in a convenient but inconspicuous location on the body, usually on the chest wall or forearm.

There are two basic parts to the system:

- The reservoir – A small plastic chamber sealed at the top by a rubber disc (septum) designed to withstand multiple punctures.
- A thin catheter – one end is placed into a vein inside the body and the other end is firmly attached to the reservoir.

A Portacath™ is normally inserted under general anaesthetic. A subcutaneous pocket is surgically created to hold the reservoir and a separate incision usually in the neck is made to locate the vein into which the catheter will be placed. The catheter is tunnelled under the skin from the reservoir and inserted via the internal or external jugular vein with the tip sitting within the Superior Vena Cava. The Portacath™ may be used immediately following insertion once the position is confirmed on an x-ray and the system is flushed to ensure it is working properly.

Implanted ports require minimal site care as there is an intact skin layer over the Portacath™. Portacaths™ are easy to access for fluids, administration of medications and blood sampling.

10.1. General Principles for the Care of Tunnelled Implantable Ports

1. An aseptic non touch technique must be observed when accessing the Portacath™.
2. Skin over the Portacath™ site must be cleaned with a disinfection wipe prior to accessing the Portacath™ (2%w/v chlorexidine gluconate/70% v/v isopropyl alcohol) as recommended by the
discharging facility (Pratt et al., 2008). Please note that the SARI guidelines (2010) recommend the use of sterile chlorhexidine solution 0.5% in children less than two months old corrected gestational age.

3. To access the Portacath™ use a non-coring needle i.e. a needle that does not damage the port by coring the silicone on insertion (Dougherty, 2006). Non-coring needles are available in various gauges and lengths. Choose the appropriate size for the individual child as advised by the discharging facility.

4. A non-coring needle may stay in place for up to 2 weeks depending on the child’s condition. In the neutropenic child a non-coring needle may remain in place for 7 days (Dougherty, 2006; Springhouse, 2002).

5. Use only 10ml syringes or larger when accessing or flushing the Portacath™ (Weinstein, 2007; Springhouse, 2002; Perucca, 2001).

6. Correct needle placement must be confirmed with blood return (Dougherty, 2006). In the event of no blood return, contact the discharging facility for advice.

10.2. Flushing and Maintaining Patency

Prior to accessing the Portacath™ for flushing and blood sampling, the documented Portacath™ volume and needle volume must be noted as per discharging facility (see Appendix X for an example of Volume of Flush Solutions as used in Our Lady’s Children’s Hospital, Crumlin). Please note that this may vary depending on the discharging facility.

10.3. Procedure for Insertion of a Non-coring Needle and Flushing of Implantable Port

Equipment and Requirements:

- Tray (plastic)
- Local anaesthetic cream
- A semi-permeable polyurethane transparent (waterproof) dressing
- Sterile gloves
• Heparin sodium (10 units per ml IV flush solution) 5ml x 1 as per valid prescription
• 10 ml syringe x 3
• Sodium chloride (NaCl) 0.9% 10ml x 1
• Filter needle/straw x 2
• Sharps bin
• Needle free device x 1
• Non-coring needle x 1
• Disposable disinfection wipes x 6– 70% v/v isopropyl alcohol and 2% w/v chlorhexidine gluconate as recommended by discharging facility. Please note that the SARI guidelines (2010) recommend the use of sterile chlorhexidine solution 0.5% in children less than two months old corrected gestational age.

Procedure:
1. Explain the procedure to the child and parents.
2. Wash the skin with soap and water to remove the ointment based anaesthetic cream and dry.
3. Perform hand hygiene prior to starting the procedure (SARI, 2010).
4. Assist the patient into a comfortable position.
5. Wash the tray and dry with a paper towel (Dougherty and Lister, 2008).
6. Wipe the entire top surface of the tray with a disinfection wipe. Discard outside the tray and allow the tray to dry (Pratt et al., 2008).
7. Open the glove packet onto the tray. The inside of this packet is now your “sterile area” (Mallett and Dougherty, 2000).
8. Carefully open syringes, filter needle/straws, needle free device, non-coring needle and dressing onto the glove packet using an aseptic non touch technique.
9. Open the disinfection wipes onto the packet in the same way.
10. Open the bottle of heparin sodium (10 units per ml IV flush solution) and sodium chloride (NaCl) 0.9% and place them beside the tray (outside the sterile field).

11. Wash hands and put on sterile gloves (SARI, 2010).

12. Attach filter needle/straw to the syringe and draw up heparin sodium as recommended by the discharging facility. Remove the filter needle/straw and discard outside the tray. Expel the air by slowly pushing up the plunger. Place the syringe on the tray (Dougherty and Lister, 2008).

13. Attach second filter needle/straw to the second syringe and draw up sodium chloride (NaCl) 0.9% as recommended by the discharging facility. Remove the filter needle/straw and discard outside the tray. Expel the air by slowly pushing up the plunger. Attach the needle free device to the end of the non-coring needle and extension set. Prime the line with the sodium chloride (NaCl) 0.9% until fluid exits. Clamp the line. Do not remove the syringe (Dougherty, 2006).

14. Clean the raised access site of the Portacath™ and surrounding skin using disinfection wipe, working in a clockwise direction from the raised centre outwards. Repeat three times, using each wipe once only and allow the site to dry (Trigg and Mohammed, 2006; Dolan and Dougherty, 2000).

15. Pick up both the non-coring needle with the attached sodium chloride (NaCl) 0.9% syringe in one hand.

16. Hold the syringe of sodium chloride (NaCl) 0.9% in the palm of the dominant hand and the non-coring needle with two fingers.

17. Remove the protective cover from the non-coring needle with the other hand.

18. Palpate the edges of the Portacath™, holding the outer edges through the skin with two fingers of the non-dominant hand, to stabilise the port (ensure the Portacath™ is secure and non-mobile) (Dougherty and Lister, 2008).
19. Insert the non-coring needle firmly through the skin and port at a 90 degree angle until it hits the bottom of the Portacath™ chamber.

20. Check for blood return. If there is no blood return, stop the procedure and contact the discharging facility. If there is blood return, flush the line with 0.9% sodium chloride (NaCl) as prescribed (Dougherty and Lister, 2008).

21. Attach the syringe containing heparin sodium to the needle free device. Open clamp and inject the heparin solution, closing the clamp as the last 0.5ml is being injected (Krzywda, 1999).

22. If removing the non-coring needle, press down on the Portacath™ with two fingers to stabilise the port. Withdraw the non-coring needle. It may be necessary to apply a plaster if site is oozing.

23. If on-going care dictates the non-coring needle can remain in situ. It may be necessary to place a small piece of gauze under the non-coring needle to secure its position. Cover with a transparent dressing (Pratt et al., 2008).

24. Ensure that the child is comfortable and that the line is well secured.

25. Dispose of all equipment appropriately. Wash hands.


27. A non-coring needle and a 10ml syringe (or larger) must always be used to access the Portacath™. The non-coring needle is inserted through the skin and the silicone rubber septum into the portal chamber for repeated venous access e.g. for antibiotic therapy.

28. The non-coring needle may remain in place for up to two weeks unless the child is neutropenic. Use a transparent waterproof dressing to secure the needle and avoid dislodgement.
Figure 3: Inserting the Non-Coring Needle into the Portacath™ Chamber
11.0. Documentation

Integrated discharge planning must commence as soon as possible following the child’s admission to hospital. Health care professionals, where possible, require a minimum notice of three working days in advance of the discharge of a child with a CVAD to the community (see Section 3.1 and 3.2). In order to facilitate preparation of staff, it is recommended that hospital staff contact the Area PHN once a CVAD has been inserted. In this way, the Area PHN is aware from an early stage that a client from her area is in hospital who will be coming home in the foreseeable future with a CVAD, giving the Area PHN maximum time to access any support/education required to up-skill.

11.1. Criteria for Discharge Planning

The following needs to be considered:

- A child being discharged with a CVAD requires documented home care arrangements to be made prior to discharge or a continuum of care treatment plan documented.
- Notification to be sent to the child’s General Practitioner (GP) prior to discharge and the GP will receive details of the child’s condition, medical history and requirements for care from the discharging facility.
- Notification will be sent to the DPHN/Area PHN prior to the child’s discharge to include a discharge summary related to all aspects of the child’s care. If required, notification will be sent to the Specialist Palliative Care Team.
- The DPHN/Area PHN will assist with the discharge plan for care at home. A care plan developed collaboratively between the tertiary nursing unit and the Area PHN will also assist in the delivery of care to the child.
- A list of required equipment/appliances will be sent by the discharging facility to the Area PHN prior to discharge. Sufficient
notice must be provided to allow required equipment/appliances to be ordered.

- The Specialist Nurse from the discharging facility will educate whomever is responsible for the care of the child’s CVAD. The Area PHN may be required to review and reinforce the education at home if necessary. In situations where the community nurse is required to administer medication via the CVAD, the Specialist Nurse will provide education (if required).
- Written parent information for the care and maintenance of a child with a CVAD in the community will be provided.
- The parent will have received a prescription from the discharging facility for medicines the child will need on discharge.
- The parent will be aware of who to contact if they have any concerns after discharge or for further information or advice.
- The parent/guardian will have received the child’s discharge letter.
- Requirements for care and maintenance of the CVAD will be given as part of the discharge prescription.

An example of a discharge checklist is contained in Appendix III.
12.0. Implementation Plan

12.1. Dissemination
This guideline applies to all HSE staff and healthcare professionals providing care on behalf of the HSE for a child with a CVAD in the community. The guideline will be disseminated by the Office of the Nursing and Midwifery Director to Directors of Public Health Nursing, Directors of Nursing of Children’s Hospital and Directors of Nursing in acute hospitals with a Children’s Unit. It is the responsibility of Directors of Public Health Nursing to ensure that this guideline has been disseminated to all community nurses. The guideline is also available to download from:


It is the responsibility of each healthcare professional required to care for a child with a CVAD to read and comply with this guideline.

12.2. Education
An education programme to support the implementation of this guideline will contain the following elements:

- A programme/workshop on use, management and care of a child with a CVAD in the community using a train the trainer model. This will also include criteria for up-skilling. It is envisaged that this will build on the knowledge and skills of nurses who have completed the Community Oncology Programme (for adults in the community) provided under the auspices of the National Cancer Control Programme (NCCP).
• Criteria for education/training provided on an individual basis by the discharging facility as required. In many cases this will be a training update.

• An implementation plan for a national rollout of education to all relevant stakeholders.

12.3. Resource Implications

Resource implications are considered from a national perspective:

• Development and delivery of an educational programme.
• Release of community staff to attend education sessions.
13.0. Review and Audit

The content and structure of this guideline will be reviewed after two years.
References


Health Service Executive (2010a) *Psychological, pharmacological and non pharmacological methods of pain relief for IV Cannulation and Venepuncture in children*. Dublin: Health Service Executive.


Medicines and Healthcare products Regulatory Agency (MHRA) *DB 2003 (2) Infusion systems* (2003). Available at: 


Our Lady’s Children’s Hospital Crumlin (2007) Intravenous Guidelines for Nursing Staff. OLCHC.

Our Lady’s Children’s Hospital Crumlin (2008) Supportive Care Guidelines, Paediatric, Haematology and Oncology. OLCHC.


Appendix I: Psychological, pharmacological and non pharmacological methods of pain relief for procedural pain in children

- Please refer to local guidelines and policies on pain scales and distraction techniques, pharmacological and non pharmacological methods of pain relief.
- Pain scales used when appropriate should be developmental, physically, emotionally and cognitively suitable for the child.

<table>
<thead>
<tr>
<th>Stage – Age</th>
<th>Understanding of pain and responses to pain and Fears and concerns</th>
<th>Measuring pain Suggested Pain scales: (used where appropriate)</th>
<th>Family Involvement</th>
<th>Distraction techniques and pharmacological and non pharmacological methods of pain relief</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants 0-1 year</td>
<td>Exhibit facial expressions of pain – brows lowered and drawn together, eyes tightly closed, mouth opened and squarish. Cry intensely, loudly, inconsolable Poor oral intake Changes in sleep/awake cycles, activity level. Exhibit hypersensitivity or irritability. Becomes withdrawn unresponsive</td>
<td>FLACC (Face, legs, arms, cry and consolability Scale) Behavioural assessment scale that uses body movements and sounds to assess: the pain of infant and toddlers (Hockenberry and Wong 2003)</td>
<td>- Explain procedure to parents and reason for same - Encourage parental tactile contact and encourage parent to hold and comfort but not to restrain the child (RCN 2003). - Explain to the child regarding that the ethyl chloride spray can feel cold. - Also explain that Ametop or Emla can be called 'magic cream or gel' as it 'disappears' absorbs when used.</td>
<td>- Sucrose and Glucose as prescribed. - Application of topical Anaesthetic (e.g. Tetracaine 4% Gel Ametop as Emla is not recommended for children under 1 year) (Please refer to manufacturer’s guidelines and local organisational guidelines) Infants should be supervised when applied in case of ingestion. - Use of ethyl chloride spray (if appropriate). (Davies and Molloy 2006, Scales 2008 and Dougherty 2008). (Please refer to local guidelines, policies and manufactures’ instructions) - Oral pacifiers (soothers) or if mum is breastfeeding encourage same. - May cry for discomfort on being held rather than being in pain.</td>
</tr>
</tbody>
</table>
| Toddler (1-3 year) | Changed behaviour:  
Irritability, crying, screaming, unusual posture, unusual quietness  
Increased clinging, loss of appetite  
Restlessness, disturbed sleep pattern  
**Fears and concerns:**  
Little fear of danger.  
Fear of separation from parents.  
Limited language and understanding of procedure.  
Threat of immediate pain is overwhelming. | **FLACC**  
Pain scale: same as above | - Same as infant.  
- Ascertain from parent common word and for pain (hurt) and ways of alleviating pain.  
- Parents should be encouraged to hold and comfort the child prior, during and after procedure.  
- Encourage parents to decorate cot of child with pictures and toys.  
- Parents may read a story book to child with clinical procedure explained in a child friendly manner (Broome 2000 and Willock et al 2004).  
- Application of topical anaesthetic agents or ‘magic cream’ (e.g Tetracaine 4% Gel (Ametop Gel) and Lidocaine and Prilocaine 5% (Emla Cream). Refer to manufacture’s instructions and local organisational guidelines.  
- Toddlers should be supervised when applied in case of ingestion. (Tak and van Bon 2006 and Franuirk et al 2000).  
- Be honest with child and let them know that they will feel a pinch and let them know when they will feel it.  
- Listen to cassettes with music/family voices or child’s favourite story/song.  
- Distract child with favourite toy or game.  
- Oral pacifiers (soothers) or if mum is breastfeeding encourage same.  
- Reassure the child that you are only taking a small amount of blood and that they will have sufficient blood left.  
- Ascertain the advice/support of play therapist and psychologist if indicated.  
- Distraction techniques 10 minutes prior to the procedure to minimise fear. |
<table>
<thead>
<tr>
<th><strong>Preschool age children (4-6yr)</strong></th>
<th>Able to use more descriptive adjectives and attachments of associated emotions (e.g. sad, painful, mad)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fears and concerns:</strong></td>
<td>Greater body awareness. Fear injury to body. Difficult to realise that the pain from the needle will be over quickly. Reassure child that crying is ok.</td>
</tr>
<tr>
<td><strong>Wong-Baker Face Rating Scale</strong></td>
<td>Suggested age group 4 years and over and older children with different languages. (Hockenberry and Wong 2003)</td>
</tr>
<tr>
<td></td>
<td>- Advised to have parent present to assist with comforting the child and gaining child’s cooperation. (if the parents and/or child does not speak English arrangements must be made according to organisational policy to organise an interpreter)</td>
</tr>
<tr>
<td></td>
<td>- Reassure the child that they have done nothing wrong and are not being punished.</td>
</tr>
<tr>
<td></td>
<td>- Parent may read a story book to child with the clinical procedure explained in a child friendly manner.</td>
</tr>
<tr>
<td></td>
<td>- Same as with toddler</td>
</tr>
<tr>
<td></td>
<td>- Ascertain what the child likes to play with as this could be used as a distraction technique.</td>
</tr>
<tr>
<td></td>
<td>- Child will have developed magical thinking which can be used for fantasy scenes in guided imagery.</td>
</tr>
<tr>
<td></td>
<td>- Allow child to be involved in the decision making process for procedure.</td>
</tr>
</tbody>
</table>
### School age children (6-12yr)


**Fears and concerns:**
- Fear loss of self control.
- More willing to participate and less dependent on parent.
- Concerns of pain or procedure limiting current activities rather than future abilities.

| Numerical scale rating | - Child may not want parent present.  
- Parents and practitioner can use diagrams, models to explain procedure.  
- Encourage parents to bring in child’s favourite music and books.  
- Important to allow child to be involved in the decision making process.  
- Child will want more explanations of need for procedure.  
- Child will have developed magical thinking which can be used for fantasy scenes in guided imagery.  
- Child can be distracted by reading books, listening to music or T.V. (Doverty 1992). |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Child rates pain intensity from 1-10.</td>
<td></td>
</tr>
<tr>
<td><strong>Wong-Baker Face Rating Scale</strong></td>
<td></td>
</tr>
<tr>
<td>Can be used for child with different languages. (Hockenberry and Wong 2003 and Trigg and Mohammed 2006)</td>
<td></td>
</tr>
<tr>
<td><strong>FLACC</strong></td>
<td></td>
</tr>
<tr>
<td>Pain scales have been proven to be beneficial in this age group. (Nillson et al., 2008)</td>
<td></td>
</tr>
</tbody>
</table>

- Parents and practitioner can use diagrams, models to explain procedure.
- Encourage parents to bring in child’s favourite music and books.
### Adolescences 13 yrs +

**Pain acknowledged as a ‘feeling’**
May be hyper responsive to pain, minor procedures magnified.

**Fears and concerns:**
- Want to be consulted with decisions regarding procedure.
- Sense of identity.
- Maybe embarrassed to show fear.
- May act hostile to hide fear.
- Separation from peers.  
  (Duff 2008, Melhuish and Payne 2006 and Willock et al., 2004).

As above

- Child may not want parent present.
- Child may be resistant to parental and authority figures.
- Explanation should be given in adult terms.

- Consulted in the decision making process.
- Give as much time as possible for advanced warning of procedure.
- Reality conversation
- Guided imagery
- Listening to music, reading books.
- Explanation of equipment and function, allow time for questions.

### Children with special needs/Intellectually challenged

**Indications of pain:**
- Increased flexion or extension
- Crying or alteration in type of sounds made
- Quieter/withdrawn
- Hypersensitivity
- Breath holding
- Colour changes
- Changes of facial expression
- Protective posture

**Fears and concerns:**
- Similar in age appropriate behaviours that are based on their developmental level  
  (Duff 2008).

**FLACC**
- Behavioural assessment scale that uses body movements and sounds to assess: older children that are cognitively and verbally impaired.

- Parent/Family member or carer should stay with the child and assist if necessary.
- Ascertain from parent/family member or carer how the child normally reacts to pain or discomfort and the comforting measures that they use.
- Explain procedure to parent/family member or carer and reason for same. 
  (Hockenberry and Wong 2003 and Trigg and Mohammed 2006).

- Similar to age appropriate behaviours that are based on their developmental level

Adapted from Psychological, pharmacological and non pharmacological methods of pain relief for IV Cannulation and Venepuncture in children (HSE 2010a).
Appendix II: Summary of Recommendations from Report on the Use and Management of CVADs for Children in the Community (HSE, 2010b)

**Recommendation 1**
It is recommended that a national guideline be developed on the use and management of CVADs for children in the community. This will support the standardisation of care and encourage best practice (HSE, 2009).

**Recommendation 2**
It is recommended that a guiding framework be developed for the education of healthcare professionals in the use and management of CVADs for children in the community.

**Recommendation 3**
It is recommended that the parameters of clinical responsibility for the care of the child with a CVAD in the community are clearly defined.

**Recommendation 4**
It is recommended that the relevant principles of integrated discharge planning are applied in the care and management of children with life-limiting conditions in community settings as per the HSE Code of Practice for Integrated Discharge Planning (HSE, 2008).

**Recommendation 5**
It is recommended that enhanced pathways of communication within an integrated model of care and current shared care model be extended. This will enable staff at secondary and tertiary level to provide support and advice to other healthcare professionals at community level.

**Recommendation 6**
It is recommended that a steering group is established to commence implementation of recommendations.
## Appendix III: Discharge Checklist

<table>
<thead>
<tr>
<th><strong>GP</strong></th>
<th>Date</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phoned</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referral sent</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>DPHN/Area PHN</strong></th>
<th>Date</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phoned</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hickman™/Portacath™ requirements and referral faxed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>The Community Specialist Palliative Care Team</strong></th>
<th>Date</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phoned</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referral sent</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Equipment/Appliances</strong></th>
<th>Date</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required supplies given to family – i.e. respirator masks, etc.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Education</strong></th>
<th>Date</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent or Child (if appropriate) educated on the dressing/flushing of the devise</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Advice and Information</strong></th>
<th>Date</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written information provided to Parent or Child (if appropriate)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advised on who to contact if they have any concerns after discharge</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Medication Management</strong></th>
<th>Date</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescription for required medications provided</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advised on how and when to take the medicines at home</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advised on the safe storage of medicines at home</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Local Hospital</strong></th>
<th>Date</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure the parent/guardian is informed of follow up appointments in local hospital (if necessary)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local hospital: Phoned on</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referral faxed:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Community Pharmacist (if required)</strong></th>
<th>Date</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phoned</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescription faxed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Guideline for the Care and Management of a Central Venous Access Device (CVAD) when used for a Child in the Community
Approval Date:
Appendix IV: Troubleshooting (Hickman™)

**Hickman™ Catheter Exit Site Infections**

1. If the exit site appears red, inflamed or a discharge is evident, a swab for culture and sensitivity from the site should be taken. If the exit site has a discharge a Mepore type dressing should be used, to allow the exudate to be absorbed. The dressing should be changed daily (Supportive Care Guidelines Paediatric Haematology and Oncology, OLCHC 2008).
2. Ensure that the catheter is firmly secured to prevent accidental dislodgement whilst the exit site is infected.
3. Depending on the sensitivity of the exit site infection appropriate topical and / or antibiotic treatment is applied.
4. If the infection spreads to include the skin tunnel and tracks upwards refer to the discharging facility supervising the child’s treatment for specific guidelines.

**Hickman™ Catheter Intra Lumen Infection**

A Hickman™ catheter line infection is suspected if a child experiences rigors during or after flushing of the catheter. This warrants immediate medical attention. Please refer to the hospital supervising the child’s treatment as it is necessary to obtain blood cultures from each lumen to determine the cause of infection and treat with appropriate antibiotics.

**Occlusion**

Obstruction secondary to thrombus formation is one of the complications associated with CVAD (Trigg and Mohammed, 2010; Dougherty and Lister, 2008). If the line is blocked it will not flush or yield blood on aspiration. Do not attempt to force totally occluded catheters as it may cause rupture of the catheter or dislodge a catheter embolus. Always check the following - cuff position, the line is not kinked and clamp is open. Consider asking the child to change position and cough, as this may improve blood flow. Contact the discharging facility re advice/treatment of occlusion.
**Catheter Dislodgement**

Hickman™ catheters may accidentally become dislodged and the dacron cuff of the catheter may become visible. Secure the catheter with tape to the chest. Contact the discharging facility for further advice. Do not use the line until it is medically confirmed as safe to use once again (Supportive Care Guidelines Paediatric Haematology and Oncology, OLCHC, 2008).

If the catheter falls out, apply a sterile dressing over the exit site and apply direct pressure over the entrance site (neck site) and the exit site to stop any bleeding. A chest x-ray should be performed to ensure that there is no residual tubing in situ. Contact the discharging facility for further advice (Supportive Care Guidelines Paediatric Haematology and Oncology, OLCHC, 2008).

**Extravasation**

CVADs have decreased the incidence of extravasation. Whilst the incidence of extravasation is lower, the severity of the injuries is far greater as detection tends to occur later and is therefore more serious requiring immediate management. Extravasation can occur as a result of a leaking or damaged catheter or fibrin sheath formation. It may present clinically as leakage of fluid around the catheter exit site, dull aching pain in the shoulder area, tingling, burning or a warm sensation of the chest wall or fever of unknown origin.

**Hickman™ Catheter Damage**

Catheter damage may occur in the form of a weakness/split of the catheter wall resulting in leakage from the catheter. If this happens -

- Clamp the catheter between the child and above the damaged area with a smooth-edged, atraumatic clamp, to prevent air entering the catheter via the damaged area and to prevent any blood loss.
• Seal damaged area with a sterile occlusive dressing to prevent infection and air entry.

• Contact the discharging facility to arrange catheter repair (Supportive Care Guidelines Paediatric Haematology and Oncology, OLCHC, 2008).
Appendix V: Troubleshooting (Portacath™)

Portacath™ Infection
A documented rise in temperature in a clinically well child following flushing of the Portacath™. It is associated with a chill/rigor, fatigue or decreased activity. It is necessary to contact the discharging facility immediately as this may warrant admission.

Port Occlusion
Obstruction secondary to thrombus formation is one of the complications associated with implantable Portacaths™. Do not force flushing solution into the Portacath™ as it may dislodge a catheter embolus or result in the device bursting. Contact the discharging facility, as Urokinase may need to be prescribed to unblock the line occlusion.

Port Erosion
If skin breaks down over the port reservoir cover with a sterile dressing and contact the discharging facility supervising the child’s care. Once port erosion occurs the device usually requires removal.

Splitting of the Portacath™
If there is a suspected break on the internal part of the catheter the child may experience pain or swelling along the catheter track, while flushing the Portacath™. Stop using the Portacath™ immediately and seek advice from the discharging facility. The child may need a lineogram to confirm the breakage.

Portacath™ not yielding Blood
If there is no blood return from the Portacath™, check that the non-coring needle is reaching the bottom of the reservoir. Check the catheter is unclamped and there are no obvious kinks. Following these measures, if the Portacath™ is still not yielding blood, insert a new non-coring needle and contact the discharging facility.
**Port Pocket Infection**

Swelling, tenderness and redness at the port site or along the catheter tract suggests port pocket infection. Do not access device and contact the discharging facility immediately.
Appendix VI: Aseptic (Non touch) Technique (SARI, 2010)

1. Hand hygiene -Wash with an antimicrobial liquid soap and water, or if hands are physically clean, applying an alcohol based hand rub. Hands that are visibly soiled or contaminated with dirt or organic material must be washed with liquid soap and water before using an alcohol hand rub.
2. Prepare an aseptic surface. Procedure trolleys/trays must be cleaned using a detergent and disinfectant.
3. Gather equipment for procedure
4. Hand hygiene and put on gloves
   a. Clean, non-sterile gloves: if the procedure can be completed without touching key parts (intravenous drug administration, blood sampling or connecting or disconnecting intravenous fluids except TPN).
   b. Sterile gloves if the procedure cannot be completed without touching key parts (e.g., line manipulation, insertion site dressing changes, connecting TPN and connecting or disconnecting catheters used for haemodialysis).
5. Identify ‘key parts’ e.g., cannula hub, port, infusion line, lumen
6. Prepare equipment and patient ensuring that all key parts are protected
   Protect key part at all time using a non-touch technique. Non key parts can be touched with confidence.
7. Carry out procedure taking care to avoid contamination of sterile areas/items/key parts
8. Dispose of waste and sharps appropriately
9. Remove gloves
10. Hand hygiene
Appendix VII: Blood Discard Volume Chart as used in Our Lady’s Children’s Hospital, Crumlin

<table>
<thead>
<tr>
<th>Age</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 year</td>
<td>1.5 ml</td>
</tr>
<tr>
<td>1 – 3 years</td>
<td>2.5 ml</td>
</tr>
<tr>
<td>&gt;3 years</td>
<td>5 ml</td>
</tr>
</tbody>
</table>

(Supportive Care Guidelines Paediatric Haematology and Oncology, OLCHC, 2008)
Appendix VIII: Procedure for Blood Sampling

Procedure for Taking Blood Sample from a Hickman™ Catheter (CVAD)

Perform hand hygiene and collect the following:

Requirements:
Clean tray and sterile preparation towel
Gloves (non sterile)
Large disinfection wipes x 3
10ml syringe x 4
Blood bottles and forms
Non – injectable bung x 4
Filter needle/straw x 2
Sodium chloride (NaCl) 0.9% solution 10ml x 1
Heparin sodium (10 units per ml IV flush solution) 5ml x 1
Sharps bin

Procedure:
• Perform of hand hygiene.
• Wash tray and dry with paper towel.
• Open the preparation towel and cover the tray. Check expiry date of sodium chloride (NaCl) 0.9% solution, using a filter needle/straw and 10ml syringe draw up sodium chloride (NaCl) (amount to be advised by referring hospital). Remove the filter needle/straw, expel all air and attach a non-injectable bung to the syringe tip. Place the syringe on the tray.
• Draw up heparin sodium solution into a separate 10ml syringe using a filter needle/straw. Remove the filter needle/straw, expel air bubbles and attach a non-injectable bung to the syringe tip. Place the syringe on the tray.
• Open the other two 10ml syringes and attach non-injectable bungs to maintain the sterility of the syringe tips and place them on the tray.
• Take the tray, disinfection wipes and blood bottles to the patient’s bedside and explain the procedure to the child/parents.
• Open the disinfection wipes and place them on the tray.
• Wash hands again before putting on the gloves.
• Carefully clean the centre of the needle free device with a disinfection wipe (discard same) and allow it to dry for 30 seconds. Place an opened out disinfection wipe under the needle free device.
• Remove the non-injectable bung from a 10ml syringe, attach the syringe by pushing firmly into the centre of the needle free device rotating to the right for a secure fit. Open the clamp and slowly withdraw appropriate discard volume of blood (as advised by referring hospital). Close clamp, remove the syringe by rotating it to the left and discard the blood and the syringe with the blood in it.
• If there is any difficulty in withdrawing blood from the catheter, change the position of the patient. Asking the patient to cough may improve the flow or instil 2-3 ml of sodium chloride (NaCl) 0.9% and try again.
• Remove the non-injectable bung and attach 2nd 10ml syringe (as before), open the clamp and withdraw the required amount of blood. Close clamp, remove syringe by rotating to the left, and place it on a clean tray.
• Attach the syringe with sodium chloride (NaCl) 0.9% solution (as before), open the clamp and slowly inject same using push – pause method. Close the clamp, remove the syringe by rotating to the left and discard the syringe.
• Attach the syringe with heparin sodium solution (10 units per ml IV flush solution), inject slowly using push-pause method. Close the clamp as last 0.5ml being injected and remove the syringe as above.
and discard. Discard the disinfection wipe from underneath the needle free device.

- Carefully clean the centre of the needle free device with a disinfection wipe and allow it to dry for 30 seconds. Ensure the Hickman™ Catheter CVAD is secured safely.
- Place blood in appropriate bottles and label correctly at the patient’s bed side (fill U+E bottle before FBC bottle to prevent EDTA contamination of U+E sample).
- Dispose of needles and syringes immediately into a sharps bin and dispose of all other equipment appropriately. Ensure bloods are transported to the laboratory with the appropriate forms.
- Wash hands.
Appendix IX: Important safety features for a syringe driver infusion pump as stipulated by the MHRA in descending order of importance

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>1.</td>
<td>Pump model</td>
</tr>
<tr>
<td>2.</td>
<td>Safety features</td>
</tr>
<tr>
<td>3.</td>
<td>Anti-free flow device in administration set</td>
</tr>
<tr>
<td>4.</td>
<td>Free-flow clamp in pump when door opened</td>
</tr>
<tr>
<td>3.</td>
<td>Provision against accidental modification of settings</td>
</tr>
<tr>
<td>4.</td>
<td>Two distinct actions to change rate</td>
</tr>
<tr>
<td>5.</td>
<td>Two distinct and/or simultaneous actions to initiate bolus</td>
</tr>
<tr>
<td>6.</td>
<td>Syringe barrel clamp alarm, door open alarm or equivalent</td>
</tr>
<tr>
<td>7.</td>
<td>Syringe plunger disengagement alarm or equivalent</td>
</tr>
<tr>
<td>8.</td>
<td>Patient history log</td>
</tr>
<tr>
<td>9.</td>
<td>Volume infused display</td>
</tr>
<tr>
<td>10.</td>
<td>Technical history back-up</td>
</tr>
<tr>
<td>11.</td>
<td>Battery back-up</td>
</tr>
</tbody>
</table>

Appendix X: Volume of Flush Solution for use in Portacaths™ as used in Our Lady’s Children’s Hospital, Crumlin

<table>
<thead>
<tr>
<th>Implantable port with open ended Catheter (Paediatric)*</th>
<th>Volume</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-weekly flush</td>
<td>3ml</td>
<td>Heparin sodium 100 units per ml</td>
</tr>
<tr>
<td>Before and after drug administration</td>
<td>4-5 ml</td>
<td>Sodium chloride 0.9% or 5% Glucose then Heparin sodium 10 units per ml</td>
</tr>
<tr>
<td></td>
<td>3-5 ml</td>
<td>Sodium chloride 0.9% then Heparin sodium 10 units per ml</td>
</tr>
<tr>
<td>After Blood withdrawal</td>
<td>10 ml</td>
<td>Sodium chloride 0.9% then Heparin sodium 10 units per ml</td>
</tr>
<tr>
<td></td>
<td>3-5 ml</td>
<td>Sodium chloride 0.9% then Heparin sodium 10 units per ml</td>
</tr>
<tr>
<td>Prior to blood sampling when TPN infusing and after each infusion of TPN</td>
<td>20 ml</td>
<td>Sodium chloride 0.9% then Heparin sodium 10 units per ml</td>
</tr>
<tr>
<td></td>
<td>3-5 ml</td>
<td>Sodium chloride 0.9% then Heparin sodium 10 units per ml</td>
</tr>
</tbody>
</table>

**Principles of safe practice**

Please note the difference in Heparin sodium dose.

10 units per ml of Heparin sodium can be used after intermittent drug administration or infusion if the needle remains in situ and the device is used at least 8 hourly.

If the device will not be in use for 4 weeks, to maintain patency, 100 units* per ml of Heparin sodium is recommended to flush the Port- A-Cath®.

(Supportive Care Guidelines Paediatric Haematology and Oncology, OLCHC, 2008; Intravenous Guidelines for Nursing Staff, OLCHC, 2007)
Appendix XI: Development Group for Guideline for the Care and Management of a CVAD when used for a Child in the Community

Ms. Mary Godfrey, Director of Centre for Children’s Nurse Education, Our Lady’s Children’s Hospital, Crumlin (until August 2010) replaced by Ms. Carmel O’Donnell, Acting Director of Centre for Children’s Nurse Education, Our Lady’s Children’s Hospital, Crumlin

Ms. Imelda Hurley, Paediatric Haematology/Oncology Clinical Nurse Specialist, Our Lady’s Children’s Hospital, Crumlin

Ms. Kaye Kealy, CNM3, Home Care Team, Our Lady’s Hospice and Care Services, Harolds Cross

Ms. Maura McDonnell, Director of Nursing, Specialist Palliative Care Services, HSE, DNE, Louth/Meath and Cavan/Monaghan Service Areas, Dóchas Centre, Our Lady of Lourdes Hospital, Drogheda, Co Louth

Ms. Lorraine Murphy, NMPD Officer, NMPDU Kilkenny, HSE South (until December 2010) replaced by Ms. Jennifer Cunningham, Professional Learning Facilitator, NMPD, HSE South

Dr. Marie Murphy, Consultant Physician in Palliative Medicine, Marymount Hospice, St. Patrick’s Hospital, Cork

Ms. Liz O’Donoghue, Clinical Nurse Specialist, Palliative Care, Our Lady’s Children’s Hospital, Crumlin

Ms. Eileen O’Leary, Regional Support (Palliative Care), HSE South (until 8th November 2010)
Dr. Maeve O’Reilly, Consultant in Palliative Medicine, St. Luke’s Hospital, Rathgar, and Our Lady’s Children’s Hospital, Crumlin

Ms. Joan Phelan, Area Director, NMPD, HSE South (Chair)

Ms. Virginia Pye, Director of Public Health Nursing, HSE Dublin Mid-Leinster

Dr. Marie Twomey, Consultant in Palliative Medicine, St. Luke’s Hospital, Rathgar, and Our Lady’s Children’s Hospital, Crumlin
Appendix XII: Consultation Trail

The National Advisory Group for the Development of a Guideline for the Care and Management of a Central Venous Access Device when used for a Child in the Community wish to thank the following individuals who were consulted during the development of this guideline.

Consultation Trail:

- Community Paediatrics Committee, Royal College of Physicians of Ireland
- Directors of Nursing, Specialist Palliative Care Services
- Directors of Public Health Nursing
- Dr. Mary Devins, Consultant in Children’s Palliative Medicine, Our Lady’s Children’s Hospital, Crumlin
- Ms. Sheila Donlon, Infection Control Manager, Health Protection Surveillance Centre
- Ms. Maura McDonnell, Director of Nursing/Chairperson Directors of Nursing, Specialist Palliative Care Network Group
- Ms. Caroline O’Connor, Nurse Practice Development Co-ordinator, Children’s University Hospital, Temple Street
- Ms. Siobhán O’Connor, Nurse Practice Development Co-ordinator, The Adelaide and Meath Hospital, Dublin Incorporating the National Children's Hospital
- Dr. Margaret O’Riordan, Head of Quality and Standards, Irish College of General Practitioners
- Ms. Fionnuala O’Neill, Nurse Practice Development Co-ordinator, Our Lady’s Children’s Hospital, Crumlin
- Mr. Bevan Richie, Children’s Outreach Nurse for Life Limiting Conditions, Clinical Nurse Manager II, Temple Street
- Ms. Alice Ward, Clinical Nurse Facilitator, Haematology/Oncology, Our Lady’s Children’s Hospital, Crumlin
- Dr. Joe Clarke, HSE Primary Care Clinical Lead
• Dr. Barry Cosgrove, ICGP, Representative to the Palliative Care Clinical Care Programme

• Irish Association for Palliative Care

• Dr. Karen Ryan, Consultant in Palliative Care Medicine/Chairperson of Palliative Care Consultants

• Ms. Imelda Kelly, Clinical Nurse Specialist, Haemophilia, Our Lady’s Children’s Hospital, Crumlin

• Ms. Olga Buckley, Paediatric Oncology/Haematology Clinical Nurse Specialist, Mercy Hospital, Cork

• Ms. Margaret Naughton, Clinical Nurse Specialist, Cystic Fibrosis, Our Lady’s Children’s Hospital, Crumlin

• Ms. Mary Hamzawi, Clinical Nurse Specialist, Gastroenterological, Our Lady’s Children’s Hospital, Crumlin

• Ms. Kathleen Crumlish, Clinical Nurse Specialist, Cardiac, Our Lady’s Children’s Hospital, Crumlin

• Ms. Elaine O’Brien Doyle, Acute Paediatric Link Nurse, Midland Regional Hospital Portlaoise

• Dr. Philip Larkin, Associate Professor of Clinical Nursing (Palliative Care) School of Nursing, Midwifery and Health Sciences, University College Dublin

• Ms. Maura O’Connor, Senior Pharmacist, Our Lady’s Children’s Hospital, Crumlin

• Ms. Mary Connor, CNSP Paediatric Liaison, Sligo General Hospital

• Ms. Anthea Bryce-Smith, Clinical Nurse Specialist, Gastroenterology, Our Lady’s Children’s Hospital, Crumlin

• Ms. Mary Kavanagh, Clinical Nurse Specialist, Haemophilia, Our Lady’s Children’s Hospital, Crumlin

• Ms. Kay O’Mahony, CNM2, Training and Development Department, Nurse Practice Development Unit, Mercy University Hospital