DOCUMENT CONTROL PAGE	
Title	Title: Guidelines for the Insertion, Management and Removal of Central Venous Catheters Version: 5 Reference Number: CVC Policy 2012
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Minor Amendment	Date Notified To Date Summary of amendments
Author	Originated / Modified By: Dr John Moore (Adults), Dr Mo Gnanalingham (Paediatrics) and Lead Nurse for Critical Care John Logan Designation: Dr Moore - Deputy Clinical Director Adult Critical Care, Clinical Lead CSS Division Infection Control Group. Dr Gnanalingham – Consultant in Paediatric Intensive Care Medicine
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1. Introduction/background

Introduction/Background

A Central Venous Catheter (CVC) is a vascular access device inserted into large central veins normally through direct access to the large veins (internal jugular, subclavian and femoral) or through large peripheral veins and then passed to reside in the large central veins.

Central Manchester Foundation Trust [CMFT] is a large University teaching hospital incorporating a wide variety of adult and paediatric services. Over 2,000 CVCs are inserted annually in the trust and over one hundred CVCs are in use on a daily basis throughout CMFT (Trust Audit Data 2010). The majority in use at any one time are longer term cuffed CVCs in use in both Adults and Paediatrics areas for the delivery of RRT, parenteral nutrition, chemotherapy and other medications. The other group are shorter term non-cuffed CVCs for the peri-operative care of patients having surgery, patients admitted to Critical care areas to allow for monitoring and giving of vasoactive agents, parenteral nutrition and renal replacement therapy [RRT].

These updated guidelines take advantage a number of Trust developments including Trust wide audits examining CVC practice in recent years. The National Matching Michigan Initiative in Critical Care areas began in 2009, the development of a CVC working group in 2011, a recent assessment of new technologies and an extensive review of the CVC related literature.

Matching Michigan was a National Patient Safety Agency led project started in 2009 which built upon existing Department of Health initiatives aimed at reducing CVC related blood stream infections [CVCBSI]. CVCBSIs are particularly costly Healthcare associated infections in terms of patient morbidity and healthcare cost [estimated £6,000 per CVCBSI].

The Keystone study performed in Michigan, USA had shown a significant reduction in CVCBSI's from a baseline rate of 7.7 per 1000 CVC patient days to 1.7 through the application of a strict patient safety culture and a number of CVC specific interventions

- Performing appropriate hand hygiene
- Use of 2% chlorhexidine in alcohol for skin disinfection
- Use of full barrier precautions during CVC insertion
- Avoiding the use of the femoral site when inserting a CVC
- Removing CVC's when no longer required

As participants in the National Matching Michigan project, CMFT Adult and Paediatric critical care units monitored their CVCBSI rates with concentrated application of the Michigan principles. For Adult Critical Care, the CVCBSI rate improved from 5.5 per 1000 at baseline to around 1.4.

Matching Michigan was launched on PICU in July 2010. In the 6 months prior to the launch (January - June 2010), there were 5 CVC infections, equating to 4.31 infections per 1000 CVC patient days. In the same 6 month period post launch (January - June 2011), there

were 5 CVC infections in 2098 CVC patient days which equates to 2.38 infections per 1000 CVC patient days.

Both units have thus seen an impressive reduction in rate of CVC infections of more than 50% in Critical Care areas.

The Matching Michigan process also enabled a unique opportunity for cross pollination and development of CVC practice between the adult and paediatric critical care areas. This process in ward areas is further supported by the vast experience in long-term CVCs in both adult (renal and haematology) and in children requiring long-term central venous access. CMFT had already developed a unique line monitoring tool, the MRVICTOR system, for long-term CVCs which has developed to become standard practice in the care of short term CVCs.

With audit work confirming that a large number of CVCs were being inserted and maintained in the trust on a daily basis it was decided to take advantage of acquired Trust knowledge and a CVC working group was established in 2011. The group comprised experts from across the Trust and clinicians with first-hand experience of introducing some of the changes brought through Matching Michigan. This CVC working group was tasked with helping define standards for best practice in the care of CVC in all areas of the trust incorporating a comprehensive literature review as well as local audit information. The group in combination with Infection Control leads also took on the evaluation of new technologies that were appearing following the last guidelines. Other experts around the Trust were also consulted for their advice.

All areas of CVC practice were reviewed and recommendations based around the themes of insertion, maintenance and removal [as previous guidelines had done].

2. Purpose

There updated guidelines take advantage a number of Trust developments including Trust wide audits examining CVC practice in recent years, the National Matching Michigan Initiative in Critical Care areas beginning in 2009, the development of a CVC working group in 2011, a recent assessment of new technologies and an extensive review of the CVC related literature.

As well as a specific CVC working group, the Guidelines are also drawn from a widespread clinical consensus within the Trust on the subject.

3. 0 Roles and Responsibilities

3.1 **Duties within the Organisation**

We hope to set-up leads in Paediatric, Neonates and Adults to help facilitate the introduction of this updated guidance. These guidelines will be implemented in every clinical area where CVCs are inserted and/or used.

- **Heads of Nursing –** to ensure that policy disseminated and corrective action taken as required.

- **Lead Nurses/Matrons-** to ensure that delivery of care to all patients within the Division adhere to the policy and all staff groups are educated to the level required, whilst keeping up to date with current practice.

- **Ward Managers-**to ensure that delivery of care to all patients within the ward adheres to the policy and all staff groups are educated to the required level, whilst keeping up to date with current practice.

- **Ward Staff-** to ensure that delivery of care to all patients within the ward adheres to the policy and keeps up to date with current practice.

- **Clinicians-** to ensure that in all patients under their care there is adherence to the policy and all staff groups are educated to the level required, whilst keeping up to date with current practice. To review and respond to issues highlighted by the policy.

4.0 Guidelines for the Insertion, Management and Removal of Central Venous Catheters

4.1 **Planning of Insertion of a Central Venous Catheter** - **Indication and type of line to be used**

4.1.1 The indication for a CVC must first be established and a decision made upon whether a short or long term catheter is required. If required for critical care/peri-operative monitoring and use of vasoactive agents, initial RRT support or short term central access for a single purpose such as IV access or parenteral nutrition then a non-cuffed CVC should be used.

Important Notice: Recent local and regional incidents of Chlorhexidine anaphylaxis including cardiac arrests. Please take care to check if a patient has history of suspected or known Chlorhexidine allergy. In this case a basic CVC containing no Chlorhexidine should be used and povidone-iodine solution used for skin cleaning. If a patient develops signs and symptoms of suspected allergy, consider Chlorhexdine as a source of possible allergy/anaphylaxis and remove the CVC and manage patient according to National and Trust guidelines for management of anaphylaxis.

4.1.2.1 Adult Critical Care has assessed the balance of risk of Chlorhexidine allergy versus the benefit from its antimicrobial properties [which tends to come after 4-5 days of insertion] and will continue to use non-cuffed antimicrobial impregnated Chlorhexidine-silver sulfadazine CVCs. Any incidents of possible Chlorhexidine will be monitored and reported to inform future guidance. Paediatric Critical Care use heparin bonded CVC's. In neonates the choice of lines are neither antimicrobial nor heparin bonded. In adult renal patients the standard dialysis line will vary with local policy.

4.1.2.2 CVCs placed in Elective Surgical cases in Adult General and Adult Cardiothoracic Theatres tend to remain in for less than 4 days post procedure [Audit data]. As such they have been assessed as being lower risk for CVCBSI and the risk of Chlorhexidine allergy is considered to outweigh the potential antimicriobial action. If a patient continues to require a

CVC after 4 days, then a plain CVC should be changed for one containing antimicrobial properties normally a Chlorhexidine CVC. Emergency Surgical Cases coming to Intensive Care with a longer expected CVC placement time will benefit from a Chlorhexidine CVC.

4.1.3 In adults and paediatric patients, if the line is being used for a planned single purpose such as prolonged intravenous antibiotics, parenteral nutrition, chemotherapy or longer-term RRT then a cuffed tunnelled line is preferable. For patients initially having a non-cuffed short term CVC placed and where the therapy is judged to be on-going requirement (more than 5-7 days) then it should be planned that the line is replaced with a tunnelled cuffed CVC. For Critical Care areas, this initial period will be longer but again if single purpose large vein access is going to be required it should be planned that a tunnelled cuffed CVC should be placed. These long-term lines are not normally antimicrobial impregnated. In neonatal patients the initial choice of line will be a 23 – 27G peripheral venous catheter or umbilical catheter.

4.1.4 The choice of vein to be used will depend both upon the indication for CVC and the ability to access the vein. Normally the Internal Jugular (IJV) and subclavian (SCV) central veins are preferred initially for short term CVCs because of their reduced risk of infection following placement as compared to the femoral route. However, if the line is being placed by the renal team for RRT, it is common practice that the femoral vein is generally preferred as the initial short term access point as the IJV and SCV will normally be utilised later for longer term access. Peripheral veins are preferred in neonatal patients,

4.1.5 For longer-term cuffed CVCs the SCV or IJV are the veins of choice. The lines should be inserted and tunnelled in the skin either by interventional radiology or in theatre by surgeons trained in the insertion of long-term CVCs. For neonatal patients, surgically inserted Broviac type lines are tunnelled but PICC and UVC lines are not.

4.2 Practice of Insertion of a CVC

Important Notice: Recent incidents of Chlorhexidine anaphylaxis including cardiac arrests. Please take care to check if a patient has history of suspected or known chlorhexidine allergy. In this case a basic CVC containing no chlorhexidine should be used and povidone-iodine solution used for skin cleaning. If a patient develops signs and symptoms of suspected allergy, consider Chlorhexidine as a source of possible allergy/anaphylaxis and remove the CVC and manage patient according to National and Trust guidelines for management of anaphylaxis.

Non-chlorhexidine CVCs and packs are available from Adult Critical Care.

4.2.1 It is the responsibility of individual clinicians who are required to be competent in CVC insertion as part of their professional duties to maintain their competency. Educational Supervisors or their delegated colleagues must assess the competency of doctors in training. This will normally take the form of DOPS and this should be documented where applicable in their portfolios. Training should be made available in all areas where CVCs may be inserted.

4.2.2 Maximum sterile precautions must be used during CVC placement as the morbidity from CVCBSI is considerable in terms of patient and financial cost [estimated at around £6,000 per CVCBSI]. Every health professional interacting with a central venous catheter

must have annually appraised ANTT. This should be part of their annual appraisal and PDP documentation.

4.2.3 The procedure of inserting a CVC should be always considered as a 2 person technique (operator and assistant) and requires the assistant to remain with the operator. This ensures the best approach to infection control; through minimising the risk of operator contamination during insertion and by incorporating the assistant as a prompt and monitor of optimal aseptic technique during insertion.

4.2.4 In areas where lines are inserted on a regular basis at the bedside (Critical Care areas) provision should be made for a specific intervention/line trolley which will both act as a source of CVC equipment and also to act as an area where equipment can be laid out to maintain a large sterile area. In areas where patients can be moved safely to a procedure room, CVCs should be placed in these areas which will help provide optimal environment for safe insertion with equipment and adequate room for the procedure.

4.2.5 The operator and assistant should both first wash their hands with liquid soap and water, dry with a paper towel and then apply alcohol hand rub.

4.2.6 The assistant/operator should then clean the line trolley surface or entire stainless steel trolley that is to be used. This is done by initially cleaning the surface with detergent wipes, then drying with paper towels and finally wiping the surface with a 70% isopropyl alcohol wipe (Sani-Cloth 70). If using a trolley all necessary equipment should be assembled on the bottom of the trolley otherwise equipment will be taken from within the line trolley.

4.2.7 The patient should if conscious have the procedure explained to them and then be placed in the appropriate position to ensure the venous pressure is adequate to avoid an air embolism [this is head down for IJV and SCV].

4.2.8 The site to be used should be identified by the operator. The most appropriate site should be selected based on the patient's age, size, clinical situation, anticipated duration of use, available sites, risk of subsequent infection and skill of the operator. The Internal Jugular site is the preferred option for adult resuscitation, general intensive care, cardiac and general theatre use. The subclavian site is however the preferred site for longer term adult non-tunnelled catheter placement unless medically contra-indicated. The subclavian route is almost never used in paediatric and neonatal patients. In addition, it is avoided in adult renal patients because of the high rate of subsequent subclavian stenosis which may compromise AV fistula creation at a later date.

4.2.9 After helping position the patient and checking equipment including the ultrasound machine [if being used], the operator should now remove their non-sterile gloves and undertake hand asepsis using liquid soap and water and a surgical scrub technique. A sterile gown and sterile gloves should be worn by the operator. If only sterile gloves are worn due to the life threatening nature of the clinical situation the catheter should be identified as high risk of infection on the CVC documentation and ideally be replaced within 24 hours.

4.2.10 The trust is working towards having universal CVC packs, but meanwhile a number of CVC packs are available throughout the trust. They generally contain the CVC and

equipment for its insertion and securing, and also large sterile drapes for creating an appropriately sized sterile field around the insertion site to maximise sterile precautions. The inclusion of the actual CVC within the pack will dependent upon local policy. **NB chlorhexidine allergy and identify whether the pack and line you are using is safe for the patient.**

4.2.11 Care must be taken to ensure that the drape does not exclude all visual clinical signs.

4.2.12 The pack should be checked to ensure it is intact, dry and in date. The sterile pack should then be opened by the assistant.

4.2.13 The operator then undertakes decontamination of the insertion site with a 2% alcoholic Chlorhexidine Gluconate sponge (ChloraPrep) in adult patients and 0.5-1% alcoholic chlorhexidine in children . Ideally the area should be cleaned in a horizontal and vertical manner for 30 seconds and then allowed to dry for a further 30 seconds to maximise sterility.

4.2.14 In patients with sensitive skins, 2% aqueous Chlorhexidine is advisable. In patients with a history of Chlorhexidine sensitivity/allergy 5% alcoholic povidone-iodine solution should be used. In neonatal patients 0.05% Chlorhexidine is used

4.2.15 The skin should then be allowed to dry for at least 30 seconds before commencing insertion of the catheter, this maximises sterile precaution for CVC insertion.

4.2.16 The vein should be identified in adults and children (not neonates) using either the landmark or ultrasound technique. Operators must be competent in the placement technique of choice (ultrasound or landmark). 2-D imaging ultrasound should always be available for all CVC placements in adults and children even if the landmark technique is used. If the IJV is selected 2-D ultrasound is recommended as the method of choice for adults and children (NICE Technology Appraisal Guidance No 49). However, the most appropriate method for CVC insertion must remain the choice of the healthcare professional based on what is in the best interest of the patient in his or her specific clinical situation, particularly in terms of minimizing the risk of adverse events such as failed catheter placement or catheter placement complications (Paragraph 7.6 in NICE Technology Appraisal Guidance no 49). A sterile sheath must be used over the ultrasound probe to maintain sterility of the probe during the procedure.

4.2.17 Catheters must be flushed with saline to remove all air prior to the line being inserted.

4.3 Securing and dressing a CVC once inserted

4.3.1 The CVC should be sutured in place excluding neonatal PICC. It is important to remember to suture both the CVC hub itself and the holding mechanism where used, this will avoid lines inadvertently being removed if only secure by holding mechanism. The tip of the CVC will normally be placed external to the heart although there may be specific circumstances where it is clinically appropriate to place the tip in the right atrium, such as patients with dialysis lines where both lumens will routinely be placed in the right atrium.

4.3.2 Once the catheter is sutured in place, the insertion site should be cleaned using Chloraprep (in the case of children or neonates refer to local guidelines) and allowed to dry for 30 seconds.

4.3.3 A sterile transparent semi-permeable polyurethane dressing should be used to cover the catheter site. The dressing should be labelled with the change date.

4.3.4 Lines should be dressed with transparent CVC dressing which allows MR VICTOR assessment. The dressing recommended is IV 3000, these are permeable to water, vapour and oxygen, but impermeable to micro-organisms. Dressing should be changed after 24 hours and then every 7 days, unless soiled and then they should be changed as soon as possible. To help guide staff the dressing should have the date of the next dressing change written on them. The dressing should be changed using ANTT procedures.

4.3.5 A sterile gauze dressing (for example Primapore) may be used if the insertion site is bleeding or oozing. The dressing must be changed if it becomes damp, loose or soiled. The dressing and insertion site should be assessed daily and documented in the care plan. Replacement with a transparent dressing should occur as soon as possible. The dressing should be labelled with the change date.

4.4Confirming placement of a CVC after insertion

4.4.1 In adults and children following insertion, line placement should be verified by transducing the line and aspirating venous blood from all lumens. In radiology confirmation of venous placement is through fluoroscopy. For IJV and SCV insertion, X-ray should then be used to exclude complications such as pneumothorax and to confirm position [ideally lines in the thorax should be level with the carina]. The results of the X-ray should be documented in the medical notes by a member of the medical staff and preferably the operator performing the procedure. In neonatal patients please follow local guidelines regarding injection of contrast prior to X-rays of the line to confirm position

4.4.2 In the clinically urgent situation or as part of an elective surgical procedure as long as venous blood has been aspirated and a central venous trace obtained radiological confirmation is not required prior to use of the line. A chest x-ray is required after the clinical urgency has been resolved or the surgery completed. In cardiac surgical patients it is routine to postpone the CXR till the chest drains are removed unless there is a clinical indication. Correct placement of the CVC in these cases is checked by TOE examination.

4.5 Documentation of Line Insertion

4.5.1 Following line insertion appropriate documentation and review dates should be included in the medical notes. Ideally, where possible the CVC pack ‘sticky label’ should be inserted into the notes, along with the forthcoming ‘CMFT CVC forms’.

4.5.2 As a minimum documentation of CVC lines includes;

Name and grade of operator performing CVC insertion

ANTT description of procedure [confirmation of 2 person technique]

Method used to insert CVC [Ultrasound/Landmark]

Any complications during procedure

Confirmation of venous insertion [transduction if applicable]

X-ray results for line check if applicable

4.5.3 Insertion CVC forms are included in most packs types in the Trust and should be used for documentation and inserted into the patients medical notes. They should always be available for and used by high-end users such as Critical Care, Radiology, Accident and Emergency and Theatres.

4.5.4 Where lines are inserted in ward areas which don't routinely place lines, insertion forms will be available in the high-end user areas and should be retrieved and used.

4.5.5 CVC forms will be available in the near future to download from the CMFT Intranet and should be used when lines are being placed.

4.6 Daily Review of CVC Documentation

4.6.1 Every CVC line should have daily nursing documentation of MR VICTOR scoring to determine the possible presence of infection. For temporary lines this should be performed on a twice daily basis and for longer term tunnelled lines once a day. For patients on outpatient dialysis, tunnelled catheters should be scored on alternate days.

4.6.2 The standard should be to remove lines as soon as they are no longer necessary so as to minimise risk of infection. The need for continued use of a temporary CVC line should be reviewed on a daily basis by the medical team responsible for that patient and documentation made in the medical notes regarding the indication for its continued placement. It should ideally be included in medical handover sheets in non-critical care areas.

4.6.3 The presence of a CVC in a ward area should also be included in nurse handovers / 'safety huddle' so that all staff are aware of their presence and the particular care they require. This should promote and encourage nursing staff to clarify with the medical team whether the line is still necessary or if it can be removed.

4.7 Assessing on-going need for a CVC

4.7.1 It is extremely important to be proactive in the removal of unnecessary lines as CVC related BSI is a leading source of hospital acquired infection. There will be two groups of patients in the hospital, one with CVC for short term often multiple purposes (critical care, post surgical) and the medium to long term tunnelled lines for single purpose use (parenteral nutrition, RRT and chemotherapy).

4.7.2 For short term CVCs, the on-going need for the presence of a CVC should be assessed on a daily basis by the patient's medical staff. The decision to continue with a

CVC should then be recorded in the patient's medical notes with the reasons why it is necessary. For longer term lines once the therapy has been completed the line should be removed as soon as possible to minimise the infection risk in each patient.

4.7.3 Where a short term non-cuffed CVC has been placed and if it is going to be necessary to continue with central venous access (needed > 7 days) plans should be made for a longer-term CVC to be inserted in Radiology or in Theatre. This does not apply initially to Critical Care areas where CVCs may be required for a number of weeks for multiple purposes. However, in Critical Care if CVC access is being maintained only for a single therapy (parenteral nutrition, RRT] and this therapy is going to be on-going, the CVC should be replaced with a longer term cuffed CVC as soon as possible.

4.7.4 In non-critical care areas CVCs should be included in the nurse hand-over. This should ensure that they are then assessed and the on-going need for their placement reviewed by the medical team.

Use and Maintenance of a Central Venous Catheter

Short term non cuffed CVCs will often be multi-purpose and maybe accessed for the giving of medications, infusion of vasopressor and inotropic medications, RRT, parenteral nutrition and the taking of blood samples.

Longer term tunnelled CVCs are generally single purpose [RRT, chemotherapy and parenteral nutrition] and to maintain their longevity and reduce opportunity for infection should not generally be used for other purposes except in an emergency or when other IV access is not achievable

4.8 Using a CVC

4.8.1 Remember to first consider the on-going need for the CVC before using it. If the indication is no longer valid or necessary it should be removed.

4.8.2 For access to a CVC, prior to the cleaning of the catheter site the operator should wash their hands with soap and water, dry hands and apply alcohol hand rub. An apron and non sterile gloves should be put on and the dressing trolley cleaned as previously described (see Insertion section).

4.8.3 Following cleaning of the dressing trolley, where gloves have been used, these should be removed; alcohol gel applied and allowed to dry. Clean non-sterile gloves should then be used to undo the dressing.

4.8.4 The operator must then remove their gloves, wash their hands again, apply alcohol rub, allow to dry and apply sterile gloves.

4.8.5 After inspection of the site for evidence of infection, a Sani-Cloth CHG 2% must be used to decontaminate the injection port or catheter hub before and after it has been used to access the system. The site should be allowed to dry for 30 seconds prior its use.

4.8.6 If there is evidence of infection at the catheter site, the CVC should be removed. If central venous access is still required a new site should be used. Where the CVC cannot be removed for clinical reasons, the decision should be recorded in the medical notes.

4.8.7 In the absence of evidence of infection a malfunctioning catheter can be replaced using a guide wire assisted catheter exchange (excluding neonatal PICC and umbilical lines).

4.8.8 If a catheter related infection is suspected but there is no evidence of infection at the catheter site, the existing catheter can be removed and exchanged for a new one using a guide wire, particularly if IV access is difficult. If microbiology confirms a catheter related infection the catheter should be removed. Ideally, an alternative site should be used in suspected CVCBSI.

4.9 Maintenance of CVC

4.9.1 Administration sets for blood and blood components should be changed if used continuously every 12 hours or according to the manufacturer's recommendations. Intermittently used sets must be discarded after every use.

4.9.2 Administration sets/manometer lines which are in continuous use should to be changed every 72 hours unless they become disconnected when the sets should be immediately discarded.

4.9.3 Administration sets used for parenteral nutrition must be changed every 24 hours.

4.9.4 All sets must be dated with the change date and time.

4.10 Removal of a Central Venous Catheter

4.10.1 Non-cuffed and cuffed CVC need to be removed in different ways, this section deals with the removal of short term non-cuffed CVCs. For cuffed CVCs these lines are normally removed in theatre by the surgical team or by the haematology/renal teams. For further guidance on removing cuffed CVCs please refer to the Standard Operating Procedures for removal of cuffed CVCs.

4.10.2 Prior to removal of a CVC an assessment needs to be undertaken of the patient's risk of bleeding (coagulation profile and platelet count). Ideally aim for INR <1.5, APTT ratio <1.5 and platelets > 50 [this may not always be possible in haematology patients with resistant thrombocytopenia].

4.10.3 Assemble all necessary equipment on the bottom of a trolley that has been cleaned as previously described (see Insertion section).

4.10.4 The operator should then wash their hands with liquid soap and water, dry hands and apply alcohol hand rub, put on a plastic apron and non-sterile gloves.

4.10.5 The patient should if conscious have the procedure explained to them and then be placed in the appropriate position to ensure the venous pressure is adequate to avoid an air embolism. **This requires the patient to be lying flat.**

4.10.6 The dressing should be loosened. The healthcare professional must then remove their gloves, wash their hands again, apply alcohol rub, allow to dry and then apply sterile gloves.

4.10.7 2% Chlorhexidine Gluconate in 70% isopropyl alcohol (Chloraprep) should be used to clean the catheter site [1-0.5% chlorhexidine in paediatrics and 0.05% chlorhexidine in neonates]. In patients with sensitive skins 2% aqueous Chlorhexidine is advisable and for patients with a history of Chlorhexidine allergy/sensitivity 5% alcoholic povidone-iodine solution is appropriate. The site should be allowed to dry.

4.10.8 The sutures should be cut with a stitch cutter. The catheter should then be removed aseptically being careful not to place a sterile swab on the tip of the line as it is removed.

4.10.9 The catheter should be examined for completeness and this should be documented in the care plan.

4.10.10 Direct pressure using a sterile swab should then be applied to the site until the bleeding has stopped. The precise time required will depend on the site of the line, size of the catheter removed and relevant patient factors.

4.10.11 The minimum time for which pressure should be applied in adults is 5 minutes for a single, triple or quad lumen line, 10 minutes for an arterial line and 20 minutes for a large bore dialysis line (for paediatrics and neonates refer to local guidelines). The precise timing for applying pressure will be individual to each patient but must take account of the degree of bleeding at the time of removal of the CVC, site of CVC and presence of a coagulopathy or thrombocytopenia. The time pressure is applied for should be recorded in the care plan.

4.11.12 A sterile gauze dressing should then be applied to the site for example primapore. The wound dressing should be observed and documented at regular intervals in the patients care plan according to local practice. Initial observation should take place 15 minutes after the dressing has been applied.

4.11.13 If the CVC tip is to be sent for culture the tip should be cut off using sterile scissors. DO NOT USE A STITCH CUTTER OR BLADE. In critical care arenas, all CVC lines should be sent for culture.

4.12 **Patients with a CVC *in situ* on admission to the Trust**

4.12.1There will be a small number of patients admitted either from home or another in-patient facility with a central venous catheter in situ. The majority of these catheters will be long-term devices and will be being used for:

- Haemodialysis

- Chemotherapy

- Parenteral nutrition

In these clinical circumstances such catheters will exclusively be tunnelled and monitoring of these lines will be along standard Trust policy with MRVICTOR daily monitoring.

4.12.2 The other group of patients with a CVC in situ on admission will be those who have had a non-tunnelled central venous catheter inserted in the hours or days prior to transfer. The catheter in these circumstances is an integral part of the patient's clinical management.

4.12.3 All CVCs present on admission must have their entry site and catheter assessed for evidence of infection and the ongoing need for the catheter reviewed. A risk assessment should be performed and ideally all non-tunnelled CVCs should be removed or replaced/rewired within 24 hours following transfer. Where a line has been inserted in a resuscitation situation when asepsis may have been suboptimal it should ideally where possible always be replaced within 24 hours.

4.12.4 The reinsertion or rewiring of CVC for replacement must be in accordance with the Trust policy.

5. Equality Impact Assessment.

5.1 This Policy has been equality impact assessed by the author using the Trust's Equality Impact Assessment (EqIA) framework.

5.2 The completed Equality Impact Assessment has been completed and submitted to the Equality and Diversity Department for "Service Equality Team Sign Off"

5.3 The EqIA score will then be generated.

6. Consultation, Approval and Ratification Process

6.1 Consultation and Communication with Stakeholders: Refer to appendix 1.

6.2 Policy Approval Process. The Critical Care Delivery Group will approve these clinical guidelines

6.3 Ratification Process. The Clinical Practice Committee will ratify these clinical guidelines

7 Dissemination and Implementation

7.1 Dissemination

These clinical guidelines will be disseminated through the following:
7.1.1 Divisional Directors and Directorate Managers
7.1.2 Clinical Heads of Divisions and Directorates
7.1.3 Professional Nurse Forum
7.1.4 Associate Director of Clinical Governance
7.1.5 Head of Clinical Audit
7.1.6 Deputy Chief Nurse
7.1.7 Duty Managers

These clinical guidelines will be available on the Trust's Intranet.

They will be supported by upcoming E-learning package and also a planned update to current nurse CVC documentation to highlight advancements in best practice.

7.2 Implementation of Procedural Documents

Training for insertion of CVCs and the use of thereafter including technique for removal and timing of removal will be delivered at Divisional level.

8.0 Monitoring Compliance

Outline the process to monitor compliance of these clinical guidelines. As a minimum include the review and monitoring arrangements:-
8.1 An annual audit to assess compliance to the guidelines will be held.
8.2 The audit will be led by the Adult Critical Care Directorate but supported by Divisional representatives and Infection control staff.
8.3 A standard proforma will be used for the audit and compliance to the standards for insertion, use and removal will be assessed. In addition the rate of CVCBSI will be recorded per 1000 catheter days. The National standard is <1.4 per 1000 catheter days.
8.4 Annual Audit.
8.5 The results will be fed back to the Critical Care Delivery Group, Clinical Effectiveness committee and Divisional Governance groups.

9.0 Standards and Key Performance Indicators 'KPIs'

9.1. The National standard is <1.4 per 1000 catheter days.

9.2. The policy will be reviewed annually. Next review: August 2013

10.0 References

(Up to date review of the literature, this is a selection of the most relevant)

International Standards

http://www.cdc.gov/hicpac/pdf/guidelines/bsi-guidelines-2011.pdf

UK Standards

National Patient Safety Agency Matching Michigan

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11. Appendices

Appendix 1 Consensus Group

Critical Care

John Moore	Deputy Clinical Director Adult Critical Care
Mo Gnanalingham	Consultant in Paediatric Critical Care
John Logan	Lead Nurse Adult Critical Care
Jane Eddleston	Clinical Head CSS Division, Clinical Director Adult Critical Care
Peter-Marc Fortune	Clinical Director Paediatric Critical Care
Niall O'Keefe	Consultant Anaesthetist (Manchester Heart Centre)
Anne Tighe	Clinical Nurse Lead Manchester Heart Centre
Ngozi Edi-Osagie	Clinical Director Neonatal Critical Care
Katie McCall	Clinical Nurse Lead Paediatrics

Renal

Dee Waterhouse	Consultant Nurse, Renal Medicine
Mike Picton	Clinical Director Renal Services

Infection Control

Andrew Dodgson	Consultant in Microbiology
Michelle Worsley	CSS Division Infection Control Nurse
Julie Cawthorne	Consultant Nurse, Infection Control Team

Anaesthetics

Akbar Vohra	Clinical Director Adult Anaesthetics
Martin Bewsher	Consultant in Cardiac Anaesthesia
Stephen Greenhough	Clinical Director Paediatrics Anaesthetics
Kamran Abbas	Deputy Clinical Director Anaesthetics

Mandy Griffiths	Consultant Paediatric Anaesthetist
Swati Karmarkar	Consultant in Anaesthetics

Acute Medicine

John Bright	Consultant in Acute Medicine

Surgery

Jim Hill	Head of Surgical Division

Paediatrics

Tina Twigg	IV Specialist Nurse in Paediatrics

Executive Committee

Gill Heaton	Director of Patient Services/Lead Nurse