Witness Statement Ref. No. 103/2

NAME OF CHILD: Adam Strain

Name: Kathryn Dowdie (nee Knaggs)

Title: Mrs

Present position and institution:

Previous position and institution:
[Since your Witness Statement of 8th April 2011]

Membership of Advisory Panels and Committees:
[Identify by date and title all of those since your Witness Statement of 8th April 2011]

Previous Statements, Depositions and Reports:
[Identify by date and title all those since your Witness Statement of 8th April 2011]

OFFICIAL USE:
List of previous statements, depositions and reports:

Ref:	Date:	
093-018	06.04.2006	PSNI Witness Statement
103/1	08.04.2011	Witness Statement to the Inquiry on Hyponatraemia

IMPORTANT INSTRUCTIONS FOR ANSWERING:
Please attach additional sheets if more space is required. Please identify clearly any document to which you refer or rely upon for your answer. If the document has an Inquiry reference number, e.g. Ref: 049-001-001 which is 'Chart No.1 Old Notes', then please provide it. If the document does not have such a number then please provide a copy of it

I QUERIES ARISING OUT OF YOUR INITIAL STATEMENT

With reference to your Witness Statement dated 8th April 2011, please provide clarification and/or further information in respect of the following:

(1) Answer to Question 1(c) at p. 2 and 3:

"I admitted Adam from theatre on the 27th November 1995 at 12.00hrs and cared for him until I handed over to S/N Cathy Hall at 14.00hrs and then went off duty at 14.30hrs ...My role and responsibilities would have been:-
The safe transfer of Adam from the theatre trolley unto the PICU bed...
I commenced hourly observations of heart rate, blood pressure, temperature, oxygen saturations and central venous pressure for early detection of any deterioration in Adams condition...
...Arterial blood gas analysis would have been carried out to ensure that the ventilation was adequate..."

(a) Describe in detail the process of how Adam was transferred from theatre to PICU. If you cannot recall specifically, describe how a paediatric renal transplant patient would likely/normally have been transferred from theatre to PICU in November 1995.

I would not have been involved with the transfer of Adam from theatre to PICU I would only have come in contact with him when he arrived into PICU. On admission from theatre Adam was already intubated and was being hand ventilated Ref: 058-038-155. I have not stated in the nursing notes who accompanied Adam from theatre, however Ref: 058-038-156 states accompanied by theatre staff but this is not my hand writing.

(b) Identify the consultant and any other nurse/s in PICU to whom the care of Adam was transferred on arrival on 27th November 1995. In particular state whether you were assisted with Adam's care by another nurse, and if so, identify that nurse.

I do not remember which consultant was in charge of PICU on the 27th November 1995.
I would have been assisted by another nurse but do not recall who this was.
Dr O'Connor made the first entry in Adams medical notes in PICU Ref: 058-035-135.

(c) State whether you were, or if you cannot recall specifically, would likely/normally have been assisted in the transfer of Adam from theatre to PICU by a PICU Medical Technical Officer (MTO), and if so, identify that MTO.

I cannot recall if a MTO accompanied Adam from theatre on the 27th November 1995.

(d) State whether you were present during the handover of Adam's care on 27th November 1995:

(i) from the theatre anaesthetist to the PICU consultant

I am not sure.

(ii) from the theatre nurse/s to the PICU nurse/s

I do not recall getting a handover from a theatre nurse.

and if so, identify the person/s who were present during each handover.

(e) Identify who carried out the handover to the PICU clinician and PICU nurses on Adam's arrival in PICU on 27th November 1995, and state what information was given, or if you do not recall specifically, what information was likely/normally given, during that handover to:

(i) The PICU consultant/clinicians

(ii) You or any other PICU nurse/s

About:

- Adam
- his renal transplant surgery
- the reasons for his failure to breathe spontaneously and his fixed dilated pupils post operatively
- Adam's serum sodium concentration
- Adam's fluids regime during the transplant procedure
- the position of the CVP line both during and on completion of the transplant procedure, the CVP readings during the transplant procedure and the explanation for those CVP readings, any concerns relating to the CVP line, whether the CVP line was functioning effectively and reliably

and state where that information is recorded.

I cannot recall who gave the handover to the PICU consultant or PICU nurses. The post operative instructions are written Ref: 058-003-006 by Dr Taylor.

(f) We refer you to the CVP print out during Adam's surgery (Ref:058-008-023). State whether you would have expected to have been informed of the CVP readings during surgery and the explanation for these readings on any handover to you in PICU in November 1995, and the reasons for your expectation or lack thereof.

I would not normally expect to be been informed of CVP readings during surgery. I do not recall being given any information about the CVP readings during Adams surgery.

(g) If you had been told during the handover of Adam's care that the CVP readings were not regarded by the theatre staff as reliable or accurate as an absolute number as the tip of the line was obstructed in the neck, but could be useful as a relative marker, state what you would likely have done in relation to the CVP line, and whether you would likely have reported this information to anyone, and if so, to whom, and whether you would likely have recorded this information, and if so, where.

I do not recall being told that the CVP reading was not accurate or that the tip of the line was

obstructed in the neck.
I would have made sure that the transducer was at the correct level and calibrated.
I would have reported this information to the medical staff and documented it in the nursing notes.

(h) Identify any guidance or protocols in November 1995 relating to the transfer from theatre to PICU of paediatric patients and the handover to PICU staff.

I am not aware of any such guidance or protocols.

(i) State whether the position of the CVP line had been adjusted between approximately 11.30 on 27th November 1995 and the transfer of the CVP line to the PICU monitors, and if so, when, how, by whom and identify where this is recorded. If you do not recall specifically, state whether it was likely/normal that the CVP line was adjusted during that period and if so, by whom.

Adam would have been in theatre at 11.30 hrs, so I would have no idea if the CVP line was adjusted at this time.

(j) State whether you were aware of any concerns relating to the CVP line and if so describe them and what, if any, action was taken.

I was not aware that there was a concern relating to the CVP line.

(k) We refer you to Adam's CVP records in PICU (Ref: 058-008-022, 057-009-010). State whether you regarded the CVP readings as accurately measuring Adam's CVP levels, and if so, state the reasons why. If not, state why not and what was done, if anything to remedy any inaccuracy.

Following transfer from theatre to PICU the transducer would have been repositioned and then recalibrated. The first reading recorded in PICU Ref: 057-009-010 was taken at 12.00hrs and the reading was 8cm H_2O which is within normal limits.
(Normal range 5 - 10 cm H_2O: reference Cole E 2007).

(l) State what would have been your normal practice for managing a CVP line when admitting a child to PICU from theatre and state how you would ensure that readings were accurate and reliable.

The transducer would have been repositioned and then recalibrated by the MTO. A wave form is then visible on the monitor.
If I was concerned that the reading was inaccurate I would first check that the transducer was at the correct level, then trace the line from the bag to the patient to make sure the 3 way tap was in the correct position, if this then was not the problem I would then aspirate the line to establish its patency and then flush with saline. If the reading then still appeared to be inaccurate I would report it to the medical staff.
Patency of the line is maintained with heparinised saline via a pressure bag.

(m) At the time of Adam's death and now, state whether there were/are any guidelines available to staff on the management of CVP lines.

I am unsure if there were written guidelines in 1995. I enclose BHSCT policy "Insertion and management of central venous catheter's"

(n) State whether on the 27th November 1995 you knew how to use a blood gas analyser to obtain blood gases and electrolytes, and whether you were trained and authorised to do so. If so, state how frequently you would normally have used the blood gas analyser whilst working in PICU to measure serum electrolyte concentrations.

In 1995 I was not authorised to obtain blood for blood gas analysis or use the blood gas analyser machine. My training in Blood Gas Analysis in Paediatrics did not take place until 2nd November 1998.

(o) State whether on 27th November 1995 heparin would have been added to the sample syringe when a blood sample was taken for blood gas analysis, and if so, state the type of heparin that was added to Adam's serum samples during his transplant surgery and whilst in PICU on 27th November 1995 together with the form of heparin used i.e. liquid or solid If you cannot recall specifically, state:

I would not have been adding heparin to a sample syringe as I was not trained at that time to take bloods from an arterial line.

(i) what type and form of heparin would likely have been used at that time

Heparin sodium.

(ii) whether the heparin used was sodium heparin, lithium heparin or lithium heparin balanced with calcium, potassium and sodium

Heparin sodium.

(p) State whether the type or form of heparin added to the serum sample changed after November 1995, and if so, state to what, when and the reasons why.

The blood gas syringe is now pre heparinised. The packaging states it contains "Ca_2 +LH 30 I.U. 1ml" I cannot remember when this changed or why.

(q) State whether in or prior to November 1995 you or PICU:

(i) Regarded or likely regarded

(ii) Were instructed or informed

that the addition of heparin to the serum sample altered the serum sodium reading on the blood gas analyser.

I was not aware that it altered the serum sodium reading.

- If so, state how that reading was or would have been altered, and specifically state whether the addition of heparin to the serum sample would have raised or

lowered the sodium concentration result.

- Identify who would have instructed/informed you/PICU of this, and whether this would have been done orally or in writing. If in writing, please identify the relevant document.

(r) State whether you or PICU had any concerns regarding the accuracy of blood gas analysers to measure serum sodium concentration in November 1995. In particular state whether you or PICU had any concerns relating to the alteration of the sodium content of the sample due to the addition of heparin to the sample syringe, and if so, describe those concerns and the reasons for them.

The blood gas analysis machine would only ever be used as a guide for a serum sodium level. For accurate serum sodium levels regular blood samples would be sent to the laboratory for analysis.

(s) Identify any guidance or instructions which would have been given to the anaesthetists/PICU/nurses prior to 27 November 1995:

(i) on the use of heparin with Blood Gas analysers so as to minimise its effects on the serum electrolyte readings

(ii) in relation to factoring that knowledge into the interpretation of the serum electrolyte readings produced by the Blood Gas analysers

I am not aware of any such guidance or instructions.

(2) Answer to Question 3(c) at p.4:

"I commenced work in RBHSC in 1998"

(a) Please clarify if this is a transposition error and you intended to state "1989" or state your actual start date at RBHSC.

Should read 1987

(3) Answer to Question 6 at p. 5:

"Fluid management of each patient was discussed in detail every morning on the ward round. The fluid balance chart would have been checked looking at how much fluid the patient received in the previous 24 hours and the patient output over the previous 24 hours, the fluid balance would show if the patient was either in a positive or negative balance. The medical staff would then prescribe now many ml/kg the patient would receive over the next 24 hours.
The fluid balance was continually reassessed during the day and intravenous fluids would change according to blood results."

(a) We refer you to the PICU fluid balance sheet and intravenous fluid prescription sheet at Ref: 057-018-026 and 057-018-027. State what was your assessment of Adam's fluid balance on his arrival in PICU on 27th November 1995 on transfer from theatre, and the basis and

reasons for this assessment.

I have recorded on the fluid balance chart the amount of fluid Adam received in theatre and the approximate losses. HPPF 1000ml, Hartman's 500ml, 1/5 Nacl 1500ml = 3000ml in total. Blood loss 1200ml approximately. I would have been recording this so at 08.00hrs on the 28th November there would be an accurate record of how much fluid was given in theatre and PICU and the total losses over the 24 hour period.

(4) Answer to Question 7 at p. 6:

"(Ref:058-038-160) 12.00-14.00 hrs 27.11.95 PICU Nursing Care Plan"

(a) State whether you completed the first column of that document and in particular made the entry *"unknown cause"* after *"Deteriorating level of consciousness due to"*. If so, state when you made that entry, identify the source of that information and when you were provided with that information.

This appears to be my writing. I would have written this sometime between 12.00 - 14.00hrs.
At the time I wrote the nursing care plan the cause was unknown.

II ADDITIONAL INFORMATION

(5) State when the post-operative chest X-ray was taken, identify who directed that this X-ray be taken and the reasons for the X-ray.

I cannot remember when Adam had a chest x-ray.

THIS STATEMENT IS TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF

Signed: Katie Dowdie **Dated:** 24.10.11

Measuring central venous pressure

Cole E (2007) Measuring central venous pressure. *Nursing Standard.* 22, 7, 40-42.
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Summary

Central venous pressure measurement is often associated with intensive and critical care settings. However, with increasing numbers of critically ill patients being cared for on medical and surgical wards, it is essential that nursing staff are able to record central venous pressure measurement accurately and recognise normal and abnormal parameters as highlighted in this article.

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Keywords

Central venous pressure; Manometer system; Transducer system

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BLOOD FROM systemic veins flows into the right atrium via the inferior and superior vena cava. The pressure in the right atrium is known as central venous pressure (CVP). The benefits of measuring CVP include the ability to:

- Monitor central intravascular blood volume and assess whether the patient is dehydrated, overhydrated or hypovolaemic.
- Measure the effectiveness of intravenous (IV) fluid therapy.
- Assess right-sided heart failure.

Many patients with such problems are nursed in general wards; it is essential therefore that CVP is measured and interpreted accurately. The condition of the patient and the treatment being administered determine how often CVP measurement should take place, for example, critically ill unstable patients may need hourly measurements.

Central venous pressure measurement

CVP is measured using an indwelling central venous catheter (CVC) and a pressure manometer or transducer (Figures 1 and 2). Available resources will dictate which method is used, for example, accident and emergency departments, high dependency units and intensive therapy units have transducers, whereas wards generally use manometers. Both methods are reliable when used correctly.

Nursing staff must be familiar with the equipment being used to ensure accurate readings and provide patients with appropriate care. There are a variety of sites where a CVC may be inserted, depending on the patient's condition, the procedure or treatment and the experience of the medical staff inserting the device. Ultrasound may be used to guide CVC insertion (National Institute for Clinical Excellence 2002, Wiklund *et al* 2005). Insertion sites include:

- Internal jugular veins – this site is chosen frequently as there is a high rate of successful insertion and a low incidence of complications such as pneumothorax (Woodrow 2002). Internal jugular veins are short, straight and relatively large allowing easy access, however, catheter occlusion may occur as a result of head movement and may cause irritation in conscious patients.
- Subclavian veins – this site is often chosen as there are more recognisable anatomical landmarks, making insertion of the device easier (Jevon and Ewens 2007). Because this site is positioned beneath the clavicle there is a risk of pneumothorax. A subclavian CVC is generally recommended as it is more comfortable for the patient (Woodrow 2002).
- Femoral veins – this site provides rapid central access during an emergency such as a cardiac arrest. As the CVC is placed in a vein near the groin there is an increased risk of associated infection. In addition, femoral CVCs are reported to be uncomfortable and may discourage the conscious patient from moving (Woodrow 2002).

CVP is usually recorded at the mid-axillary line where the manometer arm or transducer is level with the phlebostatic axis (Woodrow 2002). This is where the fourth intercostal space and mid-axillary line cross each other allowing the measurement to be as close to the right atrium as possible (Figure 3).

Using a manometer Many general wards and

units use a manometer to measure CVP. This system is easy to use once staff have been trained appropriately and it allows intermittent, hourly measurements to be recorded (Figure 1) (Jevon and Ewens 2007):

1. Explain the procedure to the patient to gain informed consent.
2. If IV fluid is not running, ensure that the CVC is patent by flushing the catheter.
3. Place the patient flat in a supine position if possible. Alternatively, measurements can be taken with the patient in an upright or semi-upright position. The position should remain the same for each measurement taken to ensure an accurate comparable result.
4. Line up the manometer arm with the phlebostatic axis ensuring that the bubble is between the two lines of the spirit level.
5. Move the manometer scale up and down to allow the bubble to be aligned with zero on the scale. This is referred to as 'zeroing the manometer'.
6. Turn the three-way tap off to the patient and open to the manometer. Open the IV catheter from the fluid bag and slowly fill the manometer to a level higher than the expected CVP.
7. Turn off the flow from the fluid bag and open the three-way tap from the manometer to the patient (Figure 1).
8. The fluid level inside the manometer should fall until gravity equals the pressure in the central veins.
9. When the fluid stops falling the CVP measurement can be read. If the fluid moves with the patient's breathing, read the measurement from the lower number.
10. Turn the tap off to the manometer, document the measurement and report any changes or abnormalities.

Using a transducer Critical care areas often measure CVP using a transducer. The transducer will be available as part of the unit monitoring equipment, to which the patient will be attached. The benefit of using a transducer system is that continuous readings are displayed on the monitor. Staff must receive education and training in use of monitoring equipment (Figure 2) (Jevon and Ewens 2007):

1-3. As per procedure for manometer.

4. Find the three-way tap that leads from the fluid bag to the CVC. Catheters differ between manufacturers, however, the white or proximal lumen is suitable for measuring CVP.
5. Turn the tap off to the patient and open to the air by removing the cap from the three-way port opening the system to the atmosphere.
6. Press the zero button on the monitor and wait while calibration occurs. When 'zeroed' is displayed on the monitor, replace the cap on the three-way tap and turn the tap on to the patient.
7. Observe the CVP trace on the monitor. The waveform undulates as the right atrium contracts and relaxes, emptying and filling with blood.
8. Document the measurement and report any changes or abnormalities.

Interpreting measurements

The normal range for CVP is 5-10cm H_2O (2-6mmHg) when taken from the mid-axillary line

FIGURE 1
Manometer system

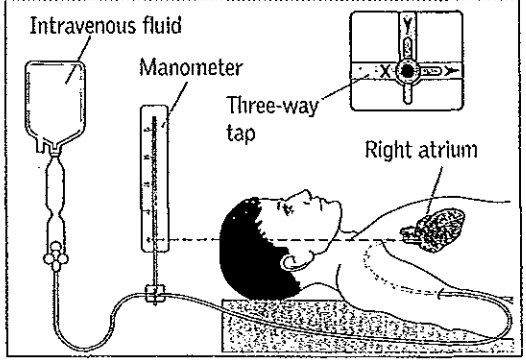


FIGURE 2
Transducer system

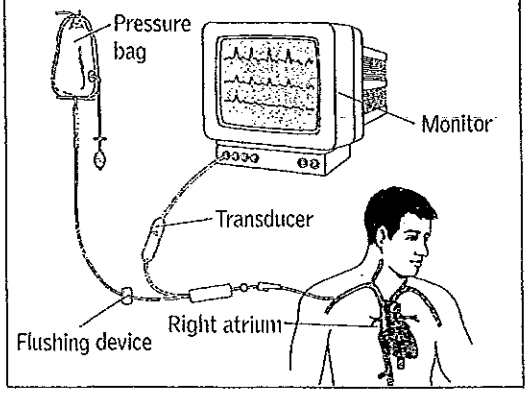
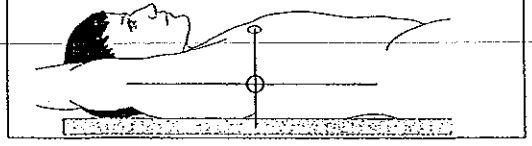


FIGURE 3
Phlebostatic axis



at the fourth intercostal space (Woodrow 2002, Gabriel *et al* 2005). However, many factors can affect CVP, including vessel tone, medications, heart disease and medical treatments (Box 1). Therefore, an isolated CVP measurement can be misleading and it is preferable to monitor trends over a period of time (Gabriel *et al* 2005, Jevon and Ewens 2007), in conjunction with other observations such as pulse, blood pressure and respiratory rate.

Potential complications As well as ongoing monitoring of the patient, it is essential that CVCs and associated equipment are checked carefully. Patients with a CVC *in situ* are exposed to a variety of potential complications (Hamilton 2006a). If any of the following are suspected urgent senior nursing or medical help should be sought:

- Local or systemic infection is one of the most serious complications associated with CVCs and preventive measures should include good handwashing and aseptic techniques (Hamilton 2006a). If a CVC site looks infected a swab should be taken for microscopy, culture and sensitivity (Woodrow 2002).
- The most common cause of CVC occlusion is a blood clot (Woodrow 2002). Other causes include kinking of the catheter and precipitate formation from medications (Hamilton 2006b). Pulling and pushing on the CVC with a syringe by an inexperienced operator is not recommended as it may liberate a clot in the patient's circulation. The inability to infuse or flush a CVC, indicating a potential occlusion, should be reported to an experienced practitioner.
- Catheter displacement into atria or ventricles may cause mechanical irritation in the myocardium or sinoatrial node. Sudden development of cardiac arrhythmias may indicate dislodgement and should be reported (Woodrow 2002).
- Extravasation from the site can occur as with peripheral cannulae, although rare. Redness, pain, swelling or difficulty infusing drugs or fluids should be reported (Hamilton 2006b).
- If the infusion giving set or manometer becomes disconnected and air enters the venous system, there is risk of a life-threatening air embolus (Morton *et al* 2005, Hamilton 2006a). All connections and taps should be checked at the start of each shift to avoid this risk, starting from the CVC in the patient working back up to the fluid bag. A clear occlusive dressing should cover the CVC so that the site is exposed to observe for disconnection.

Conclusion

Recording CVP is important to evaluate blood pressure within the right atrium and vena cava, and assists with fluid balance measurement. This article focused on methods of measurement, accuracy and interpretation of results, whether using a manometer or a transducer. Potential causes of an abnormal CVP measurement and potential complications associated with a CVC have been outlined NS

BOX 1

Common causes of raised and lowered central venous pressure (CVP) measurements

Raised CVP:

- Occluded central venous catheter, either as a result of a clot or a kink in the catheter.
- Heart failure.
- Pulmonary embolism.
- Fluid overload.
- Vasoconstriction resulting from medication use or arteriosclerosis causing narrowing of the vessel walls.
- Increased intra-thoracic pressure, for example, in the patient receiving continuous positive airway pressure (CPAP) ventilation.
- User error, for example, when the air filter in the manometer becomes wet, the fluid level does not fall easily (Woodrow 2002).

Lowered CVP:

- Fluid loss as a result of haemorrhage, vomiting, burns or ketoacidosis.
- Excessive use of diuretics.
- Vasodilation resulting from medication use, sepsis or neurogenic shock.

REFERENCES

Gabriel J, Bravery K, Dougherty L, Kayley J, Malster M, Scales K (2005) Vascular access: indications and implications for patient care. *Nursing Standard*. 19, 26, 45-52.

Hamilton H (2006a) Complications associated with venous access devices: part one. *Nursing Standard*. 20, 26, 43-50.

Hamilton H (2006b) Complications associated with venous access devices: part two. *Nursing Standard*. 20, 27, 59-65.

Jevon P, Ewens B (Eds) (2007) *Monitoring the Critically Ill Patient*. Second edition. Blackwell Science, Oxford.

Morton PG, Fontaine DK, Hudak CM, Gallo BM (2005) *Critical Care Nursing: a Holistic Approach*. Eighth edition. Lippincott Williams and Wilkins, Philadelphia PA.

National Institute for Clinical Excellence (2002) *Central Venous Catheters: Ultrasound Locating Devices*. Technology appraisal No. 49. NICE, London.

Wiklund CU, Romand JA, Suter PM, Bendjelid K (2005) Misplacement of central vein catheters in patients with hemothorax: a new approach to resolve the problem. *Journal of Trauma*. 59, 4, 1029-1031.

Woodrow P (2002) Central venous catheters and central venous pressure. *Nursing Standard*. 16, 26, 45-51.

Belfast Health and Social Care Trust

Standards and Guidelines Committee

Insertion and management of Central Venous Catheters

Summary	This policy outlines the processes to be followed for the management of CVCs in all clinical areas.
Purpose	To provide guidance to clinical employees ((medical, nursing and midwifery staff) in the management of CVCs ensuring evidence-based practice is applied in all clinical settings.
Operational date	September 2009
Review date	September 2010
Version Number	V1
Supersedes previous	Legacy Trust Policies
Director Responsible	Medical Director, Director of Nursing.
Lead Author	Joanna McCormick
Lead Author, Position	Critical Care Nurse Consultant
Additional Author(s)	Olive Macleod, Mary McElroy
Department / Service Group	Nursing
Contact details	*Joanna.mccoemick@belfasttrust .hscni.net*

Reference Number	SG 051/09
Supersedes	Legacy Trust Policy

Date	Version	Author	Comments
August 2008	V 0.1	Mary McElroy	First draft
November 2008	V0.2	Mary McElroy	Second Draft
December	V0.3	Mary McElroy	Third Draft

Belfast Health and Social Care Trust

Standards and Guidelines Committee

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Lead Author, Position	Critical Care Nurse Consultant
Additional Author(s)	Olive Macleod, Mary McElroy
Department / Service Group	Nursing
Contact details	*Joanna.mccoemick@belfasttrust .hscni.net*

Reference Number	SG 051/09
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Date	Version	Author	Comments
August 2008	V 0.1	Mary McElroy	First draft
November 2008	V0.2	Mary McElroy	Second Draft
December	V0.3	Mary McElroy	Third Draft

2008			
January 2009	V0.4	Mary McElroy	Fourth Draft
March 2009	V0.5	Olive Macleod	Fifth Draft
April 2009	V0.6	Mary McElroy	Sixth Draft
May 2009	V 0.7	JR Johnston	Amendments
May 2009	V0.8	Mary McElroy	Amendments sent to Joanna McCormick to finalise and merge with CCaNNI 001 – Guidelines for management and Maintenance of Central Venous Catheters
09/ 2009	V 0.9	JR Johnston	Amalgamation with CCaNNI 001

Policy Record

		Date	Version
Author (s)	Approval	May 2009	V0.8
Director Responsible	Approval	Sept 2009	V0.9

Approval Process – Trust Policies

Policy Committee	Approval		
Executive Team	Authorise		
Chief Executive	Sign Off		

Approval Process – Clinical Standards and Guidelines

Standards and Guidelines Committee	Approval	12/11/09	V1
Policy Committee	Approval	14/12/09	V1
Executive Team	Authorise	16/12/09	V1
Appropriate Director	Sign Off	16/12/09	V1

2008			
January 2009	V0.4	Mary McElroy	Fourth Draft
March 2009	V0.5	Olive Macleod	Fifth Draft
April 2009	V0.6	Mary McElroy	Sixth Draft
May 2009	V 0.7	JR Johnston	Amendments
May 2009	V0.8	Mary McElroy	Amendments sent to Joanna McCormick to finalise and merge with CCaNNI 001 – Guidelines for management and Maintenance of Central Venous Catheters
09/ 2009	V 0.9	JR Johnston	Amalgamation with CCaNNI 001

Policy Record

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Approval Process – Trust Policies

Policy Committee	Approval		
Executive Team	Authorise		
Chief Executive	Sign Off		

Approval Process – Clinical Standards and Guidelines

Standards and Guidelines Committee	Approval	12/11/09	V1
Policy Committee	Approval	14/12/09	V1
Executive Team	Authorise	16/12/09	V1
Appropriate Director	Sign Off	16/12/09	V1

Full Description

Reference No: *SG 051/09*

1 **Insertion and management of Central Venous Catheters**

2 **Introduction**

Central venous catheters (CVC's) are inserted for a number of reasons, in a wide range of clinical settings by a diverse group of clinicians including anaesthetists, radiologists, nephrologists, oncologists, surgeons, cardiologists, general physicians and paediatricians.

Health care associated infection (HCAI's) impact on the quality of care delivered to patients. Bloodstream infections associated with the insertion and maintenance of central venous catheters (CVC) are among the most dangerous complication that can occur, prolonging the period of hospitalisation, increasing cost of care and worsening the severity of the patient's underlying ill health. (EPIC 2007)

Catheter-related bloodstream infections are caused by:

- Skin micro-organisms at the insertion site that contaminate the catheter during insertion and migrate along the catheter track
- Hands of healthcare workers that contaminate and colonise the catheter hub during care interventions.
- Micro-organisms may also be introduced via the catheter hub or an injection port.

The site, method and clinical location of insertion may influence the likelihood of subsequent infection.

Effective prevention and control of HCAI's need to be embedded into everyday practice and applied consistently by everyone. The Department of Health publication, '**Saving Lives**: *reducing infection, delivering clean and safe care'* provides tools to achieve this through High Impact Interventions (HII's). The HII's are based on the 'care bundle' concept incorporating up to date evidence based guidelines.

This policy should be read in conjunction with *Guidelines for Insertion & Maintenance of Central Venous Catheters (CCaNNI 001)*[1] - Critical Care Network for Northern Ireland.
http://www.ccanni.org.uk/images/documents/cvc%20april%2008.pdf

3 **Purpose:**

To provide guidance to clinical employees in the management of CVCs and to minimise catheter related blood stream infection (CR-BSI) by suggesting evidence-based strategies for the insertion and management of CVC's.

4 **The scope:**

This policy applies to Trust clinical employees involved in the insertion and management of CVCs. It applies to all ward areas as well as critical care and high dependency units.

Full Description

Reference No: *SG 051/09*

1 **Insertion and management of Central Venous Catheters**

2 **Introduction**

Central venous catheters (CVC's) are inserted for a number of reasons, in a wide range of clinical settings by a diverse group of clinicians including anaesthetists, radiologists, nephrologists, oncologists, surgeons, cardiologists, general physicians and paediatricians.

Health care associated infection (HCAI's) impact on the quality of care delivered to patients. Bloodstream infections associated with the insertion and maintenance of central venous catheters (CVC) are among the most dangerous complication that can occur, prolonging the period of hospitalisation, increasing cost of care and worsening the severity of the patient's underlying ill health. (EPIC 2007)

Catheter-related bloodstream infections are caused by:

- Skin micro-organisms at the insertion site that contaminate the catheter during insertion and migrate along the catheter track
- Hands of healthcare workers that contaminate and colonise the catheter hub during care interventions.
- Micro-organisms may also be introduced via the catheter hub or an injection port.

The site, method and clinical location of insertion may influence the likelihood of subsequent infection.

Effective prevention and control of HCAI's need to be embedded into everyday practice and applied consistently by everyone. The Department of Health publication, '**Saving Lives**: *reducing infection, delivering clean and safe care'* provides tools to achieve this through High Impact Interventions (HII's). The HII's are based on the 'care bundle' concept incorporating up to date evidence based guidelines.

This policy should be read in conjunction with *Guidelines for Insertion & Maintenance of Central Venous Catheters (CCaNNI 001)*[1] - Critical Care Network for Northern Ireland.
http://www.ccanni.org.uk/images/documents/cvc%20april%2008.pdf

3 **Purpose:**

To provide guidance to clinical employees in the management of CVCs and to minimise catheter related blood stream infection (CR-BSI) by suggesting evidence-based strategies for the insertion and management of CVC's.

4 **The scope:**

This policy applies to Trust clinical employees involved in the insertion and management of CVCs. It applies to all ward areas as well as critical care and high dependency units.

5 Objectives:

- To ensure safe use of CVC's.
- To reduce the incidence of bloodstream infections related to the insertion and management of CVC's.
- To standardise the care of central venous catheters, ensuring use of evidence-based guidelines

6 Roles and Responsibilities:

All clinical Trust employees with responsibility for insertion and management of central venous catheters must adhere to this policy.

7 The definition and background of the policy:

The term CVC refers to any intravenous catheter whose tip lies within one of the large veins, e.g. superior vena cava, regardless of where the catheter is initially inserted. The following are considered great vessels for the purpose of reporting central-line infections and counting central-line days: Pulmonary artery, superior vena cava, inferior vena cava, brachiocephalic veins, internal jugular veins, subclavian veins, external iliac veins, and common femoral veins.

Central venous catheters are used for:

- haemodynamic monitoring,
- intravenous delivery of drugs (e.g. inotropes and chemotherapy)
- administration of blood products,
- haemodialysis,
- total parenteral nutrition,
- cardiac pacemaker placement
- management of perioperative fluids

This policy outlines the processes to be used for the insertion and management of CVC's

8 Policy statements:

8.1 Assessment

An assessment of the need for CVC insertion and which type of catheter is required must be undertaken and documented in the clinical notes.

8.1.1 CVCs should only be used for blood sampling in exceptional circumstances; it should not be routine practice. Requests for CVC insertion for the sole purpose of blood sampling should only be made by senior clinicians.

8.2 Consent

In the unconscious patient, CVCs are frequently inserted as part of a treatment plan and consent is presumed to be in the patient's best interests. In the conscious patient, the procedure should be explained, the reason(s) explained to the patient, informed consent obtained and this should be noted when documenting the procedure in the clinical notes.

8.3 Insertion

CVCs should be inserted in designated clean areas such as theatres, ICU/HDU by a suitably trained member of clinical staff using an aseptic technique.

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8.3 Insertion

CVCs should be inserted in designated clean areas such as theatres, ICU/HDU by a suitably trained member of clinical staff using an aseptic technique.

8.3.1 All practitioners who insert CVC lines should have had appropriate training on insertion of lines and recognition and appropriate management of the complications. (DHSSPSNI SQSD Learning Communication 09/09 - Cardiac Tamponade and the Use of Dilators)

The manipulation and removal of a central venous catheter should be undertaken by members of staff who have been trained and whose competence has been assessed in relation to this procedure.

8.3.2 A coagulation screen and platelet count should be performed prior to insertion of a CVC line. Any abnormality should be corrected.

8.3.3 In selecting an appropriate insertion site, assess the risks for infection against the risks of mechanical complications. Unless medically contraindicated, use the subclavian site in preference to the jugular or femoral sites.

Do not insert the catheter into an area of inflammation or infection

8.3.4 An aseptic procedure using Personal Protective Equipment (PPE) and a non-touch technique should be used for all catheter manipulation including insertion and ongoing care.

8.3.5 Do not routinely administer systemic antimicrobials before insertion or during the use of a central venous access device for the purpose of reducing catheter colonisation or blood stream infection.

8.3.6 The position of the CVC must ordinarily be verified on x-ray prior to commencement of the administration of fluids and/or drugs.

The only exceptions are when the CVC is inserted in the theatre environment by the anaesthetic service and in an emergency situation. Even in these scenarios, confirmation by X-ray should be obtained as soon as practically possible.

Confirmation of position should be documented in clinical note.

8.4. <u>Documentation</u>

The procedure should be documented in the multi-disciplinary clinical record stating the

- name of the person inserting the central venous catheter,
- the date of insertion,
- site,
- catheter type and size,
- reason for insertion,
- consent permission,
- procedure details including
  - method of vein location
  - method of obtaining site sterility
  - any complications or untoward events.
- confirmation of the correct position when that information is available. Repositioning (adjustment) of the CVC should also be documented if that becomes necessary.

8.4.1 The CVC should have the relevant insertion details written onto the CVC

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8.4.1 The CVC should have the relevant insertion details written onto the CVC

dressing and the line identification label attached, in keeping with the Policy for Identification and Labelling of Lines (SG014/08).

8.4.2 The date and time of CVC removal should be documented in the multi-disciplinary clinical record.

8.5 Management

Clinical employees must adhere to the 'Saving Lives' bundle of care for preventing catheter-related bloodstream infections. It provides the tools and resources for Trusts to reduce infection and deliver clean and safe care. See appendix 1.

8.5.1 The procedure for ongoing management (appendix 2) should be adhered to.

Before line manipulation, intravenous drug administration or dressing a central venous access device, hands must be decontaminated either by washing with an antimicrobial liquid, soap and water, or by using an alcohol hand rub.

2% chlorhexidine gluconate in 70% isopropyl alcohol should be used to clean the catheter insertion site during dressing changes, and allowed to air dry.

8.6 Catheter Dressing

A sterile, transparent, semi permeable polyurethane dressing should be used to cover the catheter insertion site.

If the patient has profuse perspiration or if the insertion site is bleeding or oozing, sterile gauze dressing may be preferable to a transparent semi-permeable dressing. A gauze dressing should be replaced with a transparent dressing as soon as possible

Transparent dressings should be changed every 7 days. Evidence of any breach of the dressing, loss of skin adhesion, significant soiling or collection of moisture should lead to earlier dressing change.

8.7 Infection control

The insertion site should be inspected at least daily for signs of infection (erythema, tenderness, warmth, thrombosis, pus or pyrexia) visually or by palpation through an intact dressing for evidence of catheter-related complications.

If the CVC is used for administration of medication, fluids, bloods/blood products or TPN, the site should be checked at each intervention.

Daily review of line necessity with prompt removal of unnecessary line should be carried out.

8.7.1 Consideration should be given to CVC removal at the earliest signs of systemic infection. Paired blood cultures i.e. both central and peripheral, are an important method in determining whether a bacteraemia is catheter related. Each clinical unit/area should have a local procedure for management of catheter related bacteraemias.

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Regarding signs of local infection or phlebitis, each clinical area should have a local procedure for determining the action to be taken.

In the event of a purulent discharge from the exit site, a swab should be taken for culture and sensitivity.

Catheter tips should also be sent for culture and sensitivity.

Blood cultures should be taken in accordance with the BHSCT policy on blood cultures.

8.7.2 There is no requirement to routinely replace catheters as a method to prevent catheter related infection.

8.8 Administration sets
Administration sets used to administer blood/blood products must be replaced after every second unit, after transfusion episode or at 12 hours, whichever is sooner. (EPIC 2 2007)

Administration sets used for TPN must be changed after 24 hours (72 hours if no lipid).

Administration sets used for fluids should be changed every 72 hours, unless otherwise indicated.

8.9 Flushing and anticoagulation
The BHSCT Policy concerning flushing of catheter lumens should be adhered to.

8.10 TPN should be administered via a dedicated lumen. This should not be used for drug or fluid administration, blood or blood product administration or blood sampling.

9 Implementation/Resource requirements:
Training

10 Source(s) / Evidence Base
5 million lives: Getting Started Kit: Prevent Central Line Infection, How-to guide. www.ihi.org

Saving Lives: reducing infection, delivering clean and safe care: High Impact Intervention No 1 - Central venous catheter care bundle.

Royal Marsden Hospital Manual of Clinical Nursing Procedures 6th Ed

Centre for Disease Control Guidelines. Healthcare Infection Control Practices Advisory Committee. Guidelines for the prevention of intravascular catheter-related infections. American Journal of Infection Control 2002; 30:476–489.

11 References, including relevant external guidelines:

1. Guidelines for Insertion & Maintenance of Central Venous Catheters (CCaNNI 001) http://www.ccanni.org.uk/images/documents/cvc%20april%2008.pdf
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4. Managing bloodstream infection associated with intravascular catheters. Drug Therapy Bulletin 2001, 39:75–80 Smyth ETM. Healthcare acquired infection prevalence survey 2006. Presented at 6th International Conference of the Hospital Infection Society, Amsterdam 2006. Preliminary data available in Hospital Infection Society: The third prevalence survey of healthcare associated infections in acute hospitals, 2006, www.his.org.uk.
5. Department of Health. Winning ways: working together to reduce associated healthcare infection in England. London: Department of Health. 2003. www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/Browsable/DH_4095070
6. Department of Health (UK) commissioned 'EPIC 2: National Evidence Based Guidelines for preventing Healthcare Associated Infections in NHS Hospitals in England'.
7. http://www.epic.tvu.ac.uk/PDF%20Files/epic2/epic2-final.pdf
8. National Audit Office. Improving patient care by reducing the risk of hospital acquired infection: A progress report. London: The Stationery Office. 2004. www.nao.org.uk/publications/nao_reports/03-04/0304876es.pdf

12 Consultation process:

IPC Team
BHSCT, 'Central Lines Group'
Standards & Guidelines Committee
Associate Directors of Nursing
Belfast City Hospital Site Infusional Devices Team.

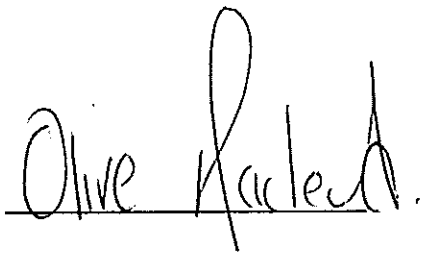
13 Equality and Human Rights screening carried out:

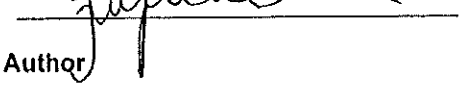
In line with duties under the equality legislation (Section 75 of the Northern Ireland Act 1998), Targeting Social Need Initiative, Disability discrimination and the Human Rights Act 1998, the Belfast Trust has carried out an initial screening exercise to ascertain if this policy should be subject to a full impact assessment.

√ Screening completed
No action required.

14 Procedures

Appendix 1 - 'Saving Lives' bundle of care (amended)





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Chief Executive / Director

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7. http://www.epic.tvu.ac.uk/PDF%20Files/epic2/epic2-final.pdf
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Author

Olive MacLeod **Joanna McCormick**

Chief Executive / Director

(delete as appropriate)

(delete as appropriate)

Appendix 1

The 'Saving Lives' bundle of care for preventing catheter-related bloodstream infections.

Elements of the Care Process

There are two sets of actions outlined below as good practice; these are concerned with:
a) Insertion
b) Ongoing care.

Bundle of Care for Insertion Actions for Central Lines
Catheter type • Single lumen unless indicated otherwise. • Consider antimicrobial impregnated catheter if duration 1 to 3 weeks and risk of CR-BSI high.
Insertion site • Subclavian or internal jugular.
Coagulation screen and platelet count should be performed and, if abnormal, corrected.
Skin preparation • Preferably use 2% chlorhexidine gluconate in 70% isopropyl alcohol and allow to dry. • If patient has a sensitivity use a single patient use povidone-iodine application.
Personal protective equipment • Gloves are single-use items and should be removed and discarded immediately after the care activity. • Eye/face protection is indicated if there is a risk of splashing with blood or body fluids.
Hand hygiene • Decontaminate hands before and after each patient contact. • Use correct hand hygiene procedure.
Aseptic technique • Gown, gloves and drapes as indicated should be used for the insertion of invasive cannulae.
Dressing • Use a sterile, transparent, semi-permeable dressing to allow observation of insertion site.
Safe disposal of sharps • Sharps container should be available at point of use and should not be overfilled; do not disassemble.
Documentation • Date of insertion should be recorded in notes.

Appendix 1

The 'Saving Lives' bundle of care for preventing catheter-related bloodstream infections.

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Documentation • Date of insertion should be recorded in notes.

Appendix 2

Bundle of Care for Ongoing Care Actions for Patients with Central Lines
Hand hygiene • Decontaminate hands before and after each patient contact. • Use correct hand hygiene procedure.
Catheter site inspection • Regular observation for signs of infection, at least daily.
Dressing • An intact, dry, adherent transparent dressing should be present. • Transparent dressings should be changed every 7 days (CCaNNI 001)
Catheter access • Use aseptic technique and swab ports or hub with 2% chlorhexidine gluconate in 70% isopropyl alcohol prior to accessing the line for administering fluids or injections.
Administration set replacement • Following administration of blood, blood products - immediately. • Following total parenteral nutrition – after 24 hours (72 hours if no lipid). • With other fluid sets – after 72 hours.
No routine catheter replacement

Appendix 2

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No routine catheter replacement