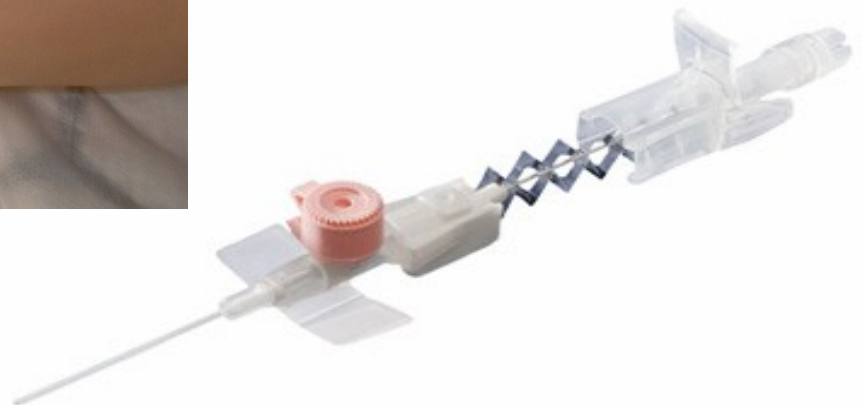
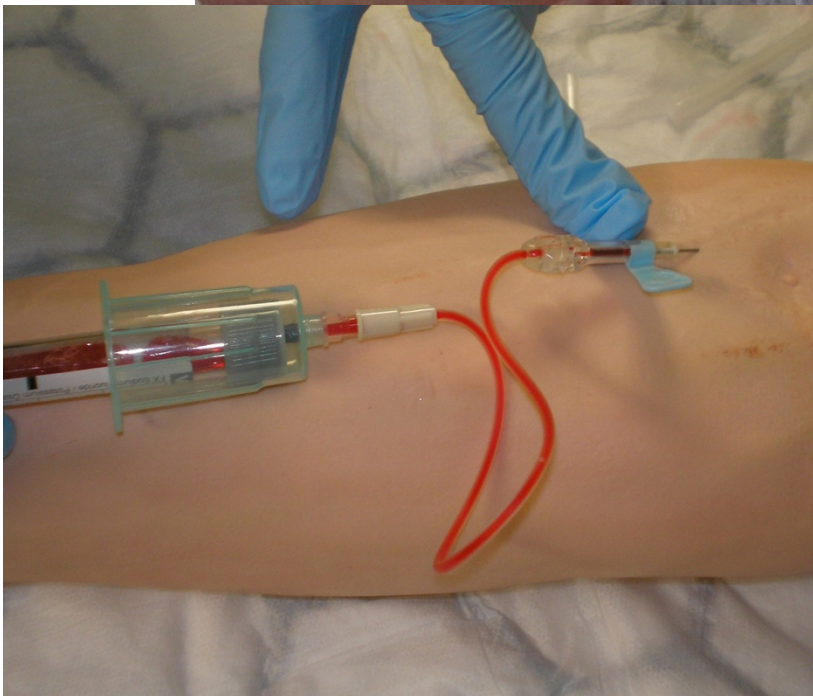
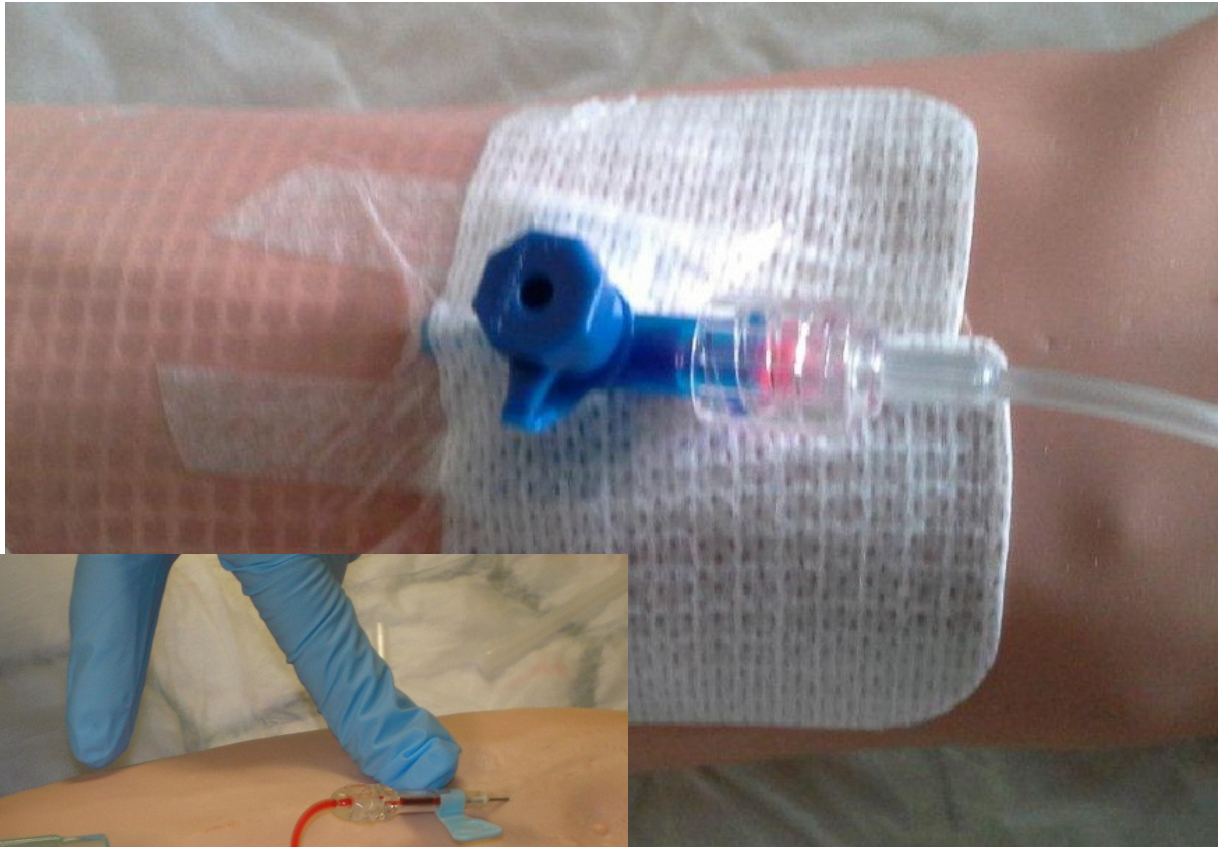




Venepuncture and Cannulation Clinical Skills Guidance



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Learning Objectives:

Following completion of the venepuncture and PVC insertion competency programme, practitioners will be able to:

1. Demonstrate the ability to undertake venepuncture and PVC insertion competently using an aseptic or non-touch technique.
2. Explain the infection risks and appropriate preventative measures.
3. Describe how to prepare a patient for venepuncture and PVC insertion.
4. Demonstrate an awareness of the NHS/GGC policies pertinent to venepuncture and PVC insertion.
5. Identify appropriate personal protective equipment (PPE).
6. Identify appropriate equipment for undertaking venepuncture and PVC insertion.
7. Identify issues surrounding potential complications and discuss appropriate actions to prevent or treat these complications.
8. Describe the procedure for reporting incidents and accidents involving self, patients and others.
9. Demonstrate the accurate completion of records appropriate to venepuncture and PVC insertion.

Section 1: Legal aspects and definition of competence and standards of care

Competence is described by Smith (2012) as “...includes the need for knowledge, skills, and reasoning with the need for ongoing development”. The Nursing and Midwifery Council (NMC) state “nurses or midwives who are competent and fit to practise should:

- *have the skills, experience and qualifications relevant to the part of the register they have joined*
- *demonstrate a commitment to keeping those skills up to date, and*
- *deliver a service that is capable, safe, knowledgeable, understanding and completely focused on the needs of the people in their care” (NMC, 2013)*

Consent is required before practitioners undertake any care for a patient. A patient may demonstrate their consent in a number of ways. If they agree to treatment and care, they may do so by implying (by co-operating), verbally or, if the treatment is risky, lengthy or complex, in writing. Equally they may withdraw or refuse consent in the same way. Verbal consent, or consent by implication (by co-operating), will normally be enough evidence when undertaking venepuncture and PVC insertion. However, it should be noted that written consent stands as a record that discussions have taken place and of the person's choice. If a patient refuses venepuncture and PVC insertion / treatment, making a written record of this is just as important.

The Cambridge online dictionary define **accountability** as “someone who is accountable is completely responsible for what they do and must be able to give a satisfactory reason for it”. The NMC also state that “as a professional, you are personally accountable for actions and omissions in your practice, and must always be able to justify your decisions” (NMC Code, 2008). Healthcare workers should be cognisant with their own code of conduct (NMC Code (2008), HCPC Standards of conduct, performance and ethics (2012) and Code of Conduct for Healthcare Support Workers (2009). This means that practitioners must be able to give a reason as to why they have chosen a particular site, technique and equipment when undertaking venepuncture/PVC insertion and equally when the practitioner does not perform venepuncture and PVC insertion.

Practitioners are required to abide by the procedures and policies set out by their employer. However, sometimes errors happen. Clinical incident reporting allows employers to update, amend and change policies to protect both patients and practitioners from harm. Therefore it is really important to report any and all clinical incidents.



Paediatrics and Neonates:

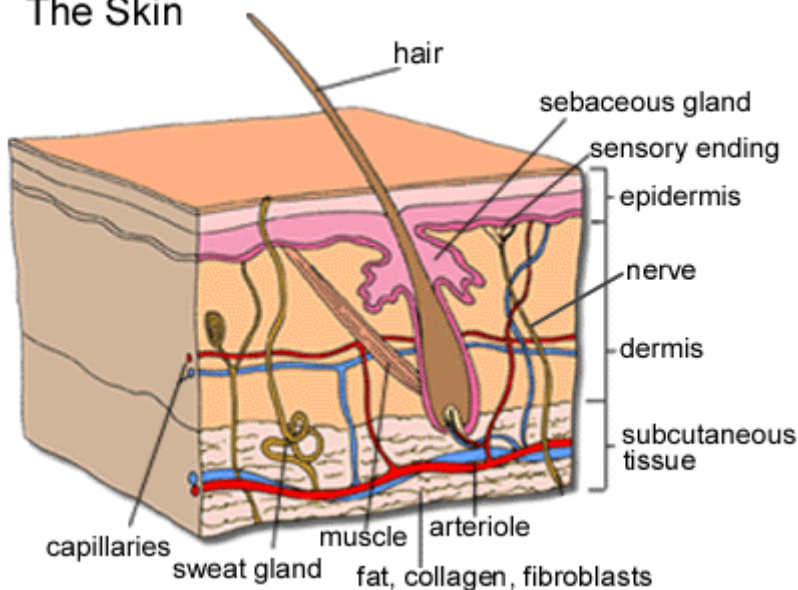
Consent - Children and young people should be involved in their care and treatment. Their ability to make decisions is not dependent on their age but on their capacity to consent. If a child is not legally competent, consent will be obtained from someone with parental responsibility unless it is an emergency. Emergency treatment can be provided without consent to save a life or prevent serious deterioration in health (Children and Young People Toolkit, BMA 2010; Age of Legal Capacity (Scotland) Act 1991).

Section 2 Anatomy and physiology

2.1 The Skin

The skin is the human body's largest organ. It consists of 3 separate but closely bound layers. It has various functions, one of which is to protect underlying tissues and structures. The **epidermis** layer is the outermost layer and is generally thinner. The epidermis layer constantly sheds skin cells and has resident bacteria – which is important for practitioners to remember when cleansing the skin and breaking the

The Skin



integrity of this protective layer.

The middle layer is the **dermis** and contains hair follicles, sweat glands and connective tissue. The innermost layer is the **subcutaneous** layer and contains veins, nerves and arteries.

2.2 Blood vessels

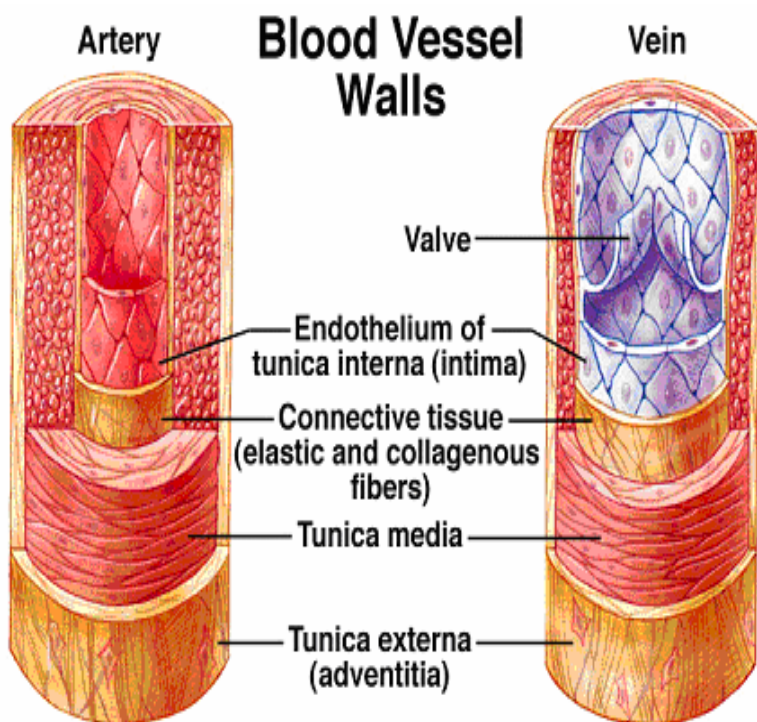
The structure of veins and arteries are similar. Both are made up of 3 layers. It is the thickness of the layers that is different between veins and arteries, in addition to veins having valves. Valves support the return of blood to the heart. It is important for practitioners to understand the anatomy and physiology of the venous system.

Arteries carry oxygenated blood from the heart to the tissues and peripheries of the body. The heart acts like a pump to push the blood through the arterial system. This means that the blood inside the artery is under a lot of pressure. Due to the nature of the heart beating, and the location of arteries when they are near the surface of the skin (such as at the wrist) you can feel the artery pulsate as the heart pumps, and the blood flows through.

Veins return blood to the heart. The blood in veins is not pressurised in the same way as arterial blood and does not have the same amount of oxygen in it. Venous blood can appear darker in colour and ooze out, rather than pulsate or spurt.

A good vein has several characteristics and should:

- feel **bouncy**
- feel soft
- refill when pressed (or pressure applied)
- be well supported (by surrounding tissues)



The walls of veins consist of three layers:

1. The **tunica intima** (inner layer): has a smooth endothelial lining allowing the passage of blood cells. If damaged the lining can become roughened resulting in an increased risk of thrombus formation. Also, within this layer are folds of endothelium, known as valves which prevent the backflow of blood and ensure blood continues to move towards

the heart. Valves are also noticeable in veins at points of branching, appearing as bulges within the vein. Valves can compress when withdrawing blood during venepuncture resulting in closure of the vein and preventing the withdrawal of blood. Venepuncture should be performed above the valve in order to obtain the sample successfully (Weinstein and Plummer 2007 cited by Dougherty and Lister 2011).

2. The **tunica media** (middle layer): is composed of nerve fibres and muscular tissue (vasoconstrictors and vasodilators) which stimulate the vein to contract and relax. This layer is less rigid than an artery and allows the vein to distend or collapse in response to

a rise or fall in blood pressure. Factors such as temperature, mechanical or chemical stimulation can cause venous spasm in this layer making venepuncture more difficult (Weinstein and Plummer 2007 cited by Dougherty and Lister 2011).

3. The **tunica adventitia** (outer layer): consists of connective tissue which surrounds and supports the vessels (Dougherty and Lister 2011).

Section 3 Tourniquets and selecting sites

3.1 Applying a tourniquet

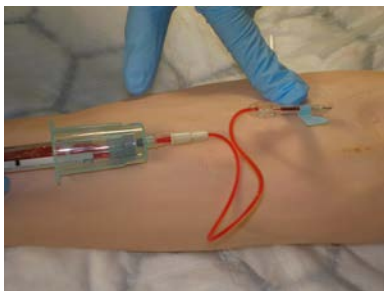
Tourniquets are used to impede the flow of blood from the vein and result in distending the vein (pooling of blood to fill the blood vessel) to ease access for venepuncture and PVC insertion.

- Should be disposable (or single patient use)
- Placed 7 – 8cm above intended puncture site
- Fitting around limb (2 fingered gap between cuff and skin)
- Apply tourniquet to the limb ensuring it does not obstruct arterial flow
- Check the patient is comfortable and the patient's hand is not blanching from the tourniquet being too tight
- Know how to use it before approaching patient!



A latex glove must never be used as tourniquet!

3.2 Selecting a site for venepuncture



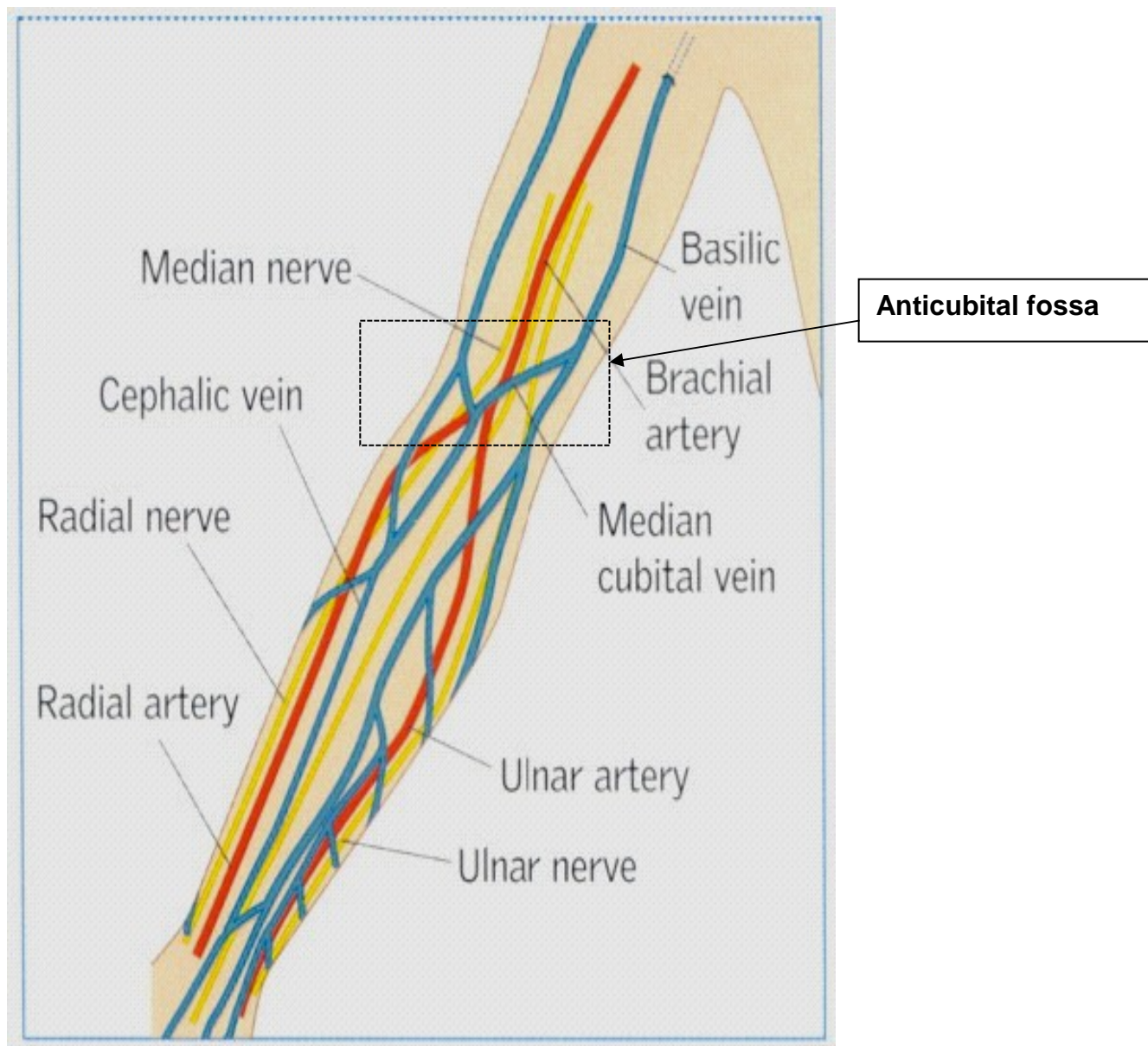
Venepuncture is described by Dougherty and Lister (2011) as the entering of a vein with a needle and is carried out for 2 reasons:

- To obtain a blood sample for diagnostic purposes
- To monitor levels of blood components (Hobson, 2008)

The choice of location of the vein to be accessed for venepuncture should be the one that is the best for the patient. **Visual inspection** and **palpation** are used by the practitioner to assess individual patients. Visual inspection should be done on both arms, and take note of any infection, previous puncture sites, oedema and bruising. Palpation should be done with two fingers of the non-dominant hand and the practitioner

is feeling for the location and condition of the vein. Practitioners should note that veins may not always be visible, but should always feel bouncy.

The **median cephalic** and **basilic veins** located in the **antecubital fossa** are normally used for venepuncture.



3.3 Selecting a site for cannulation (PVC insertion)



PVC insertion is the procedure of puncturing a patient's skin to allow insertion of a temporary plastic tube into a vein for the purpose of:

- Bolus injection
- Short term infusion
- Blood transfusion
- Dyes and contrast media (McCallum, 2012)

When selecting a site for PVC insertion, the hand would be considered first. This allows for sites further up the arm to be considered later for subsequent PVC insertion. When assessing the veins on the hand, always use the veins that run up and down and avoid the small veins that appear to go across the back of the hand. Cannulas should always 'point up' the arm, towards the shoulder.



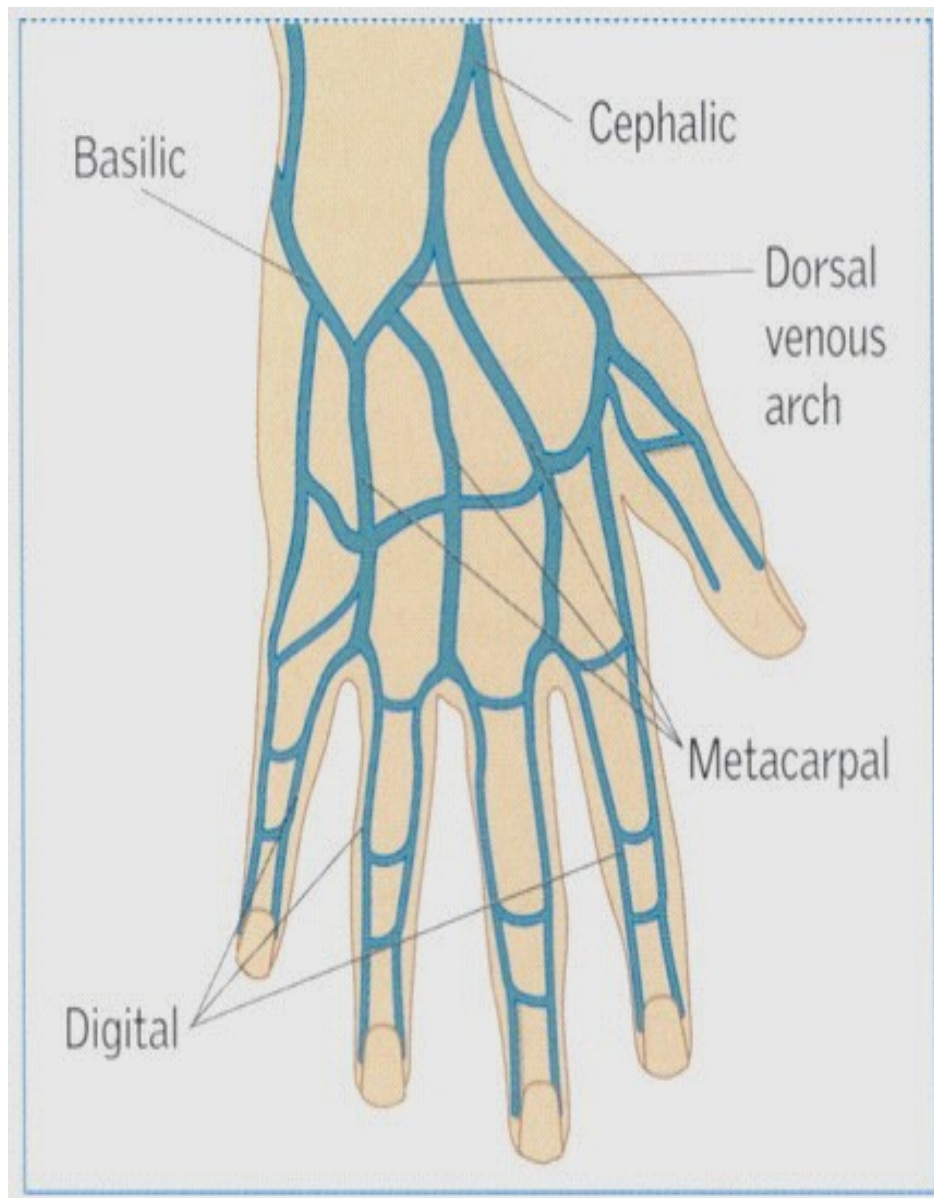
Venepuncture – start at antecubital fossa, and work down the arm.

PVC Insertion – start at the hand, and work up the arm.



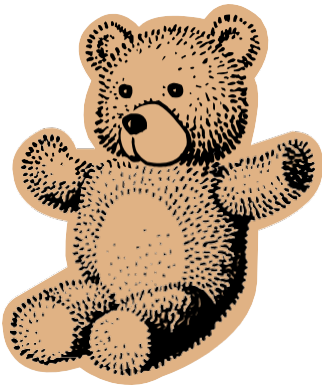
Paediatrics and Neonates:

Alternative sites may be used depending on the size and clinical condition of the child e.g. legs, feet and less commonly scalps in neonates. A risk assessment would be undertaken to determine the most appropriate position for the PVC.



Normally, PVC insertion would be performed in the largest vein necessary with the smallest cannula required. The practitioner would normally start with the hand and work **up** the limb for an access site suitable for PVC insertion. This is due to the fact that if something was to happen to the PVC and it required to be resited, then it could be resited further up the same vein. If the PVC was resited lower in the same vein, the fluid infused may leak from the original puncture site.

Paediatric and Neonates:



Preparation for procedure:







- Explain to the child/ young person and listen to the patients previous experiences
 - Discuss procedure with guardian
 - Distraction therapy can be an effective tool with the assistance of specialist play therapists
-
- Therapeutic holding may be necessary
 - Use of EMLA or AMETOP topical anaesthetics may be beneficial
 - Risk assessment may be done about the use of non-safety equipment used





Section 4 Equipment for venipuncture and cannulation (PVC insertion)

4.1 Venepuncture equipment

As for any procedure, you should gather all the equipment you require before you start.

Equipment required:

	Equipment	Rationale
	Personal Protective equipment (PPE) – apron and gloves	To prevent the spread of infection
	Tray	To carry equipment to bedside
	Sharps box	To dispose of sharps quickly and safely
	Disposable tourniquet	To allow good venous access and prevent the spread of infection
	Sterile 70% isopropyl alcohol impregnated swab	To cleanse skin. Use for 15secs and allow to dry naturally
	Sharp safe butterfly needle and vacuette holder	To reduce risk of needle stick injury. NB Butterfly must always be used with an vacuette holder and NEVER connected directly to blood sample bottle
OR		

	<p>Quickshield holder and visio plus needle</p>	<p>To reduce risk of needle stick injury</p>
<p>From Trakcare</p>	<p>Blood sample request form</p>	<p>To ensure appropriate blood sample bottles are used</p>
	<p>Blood sample collection bottles</p>	
	<p>Sterile gauze</p>	<p>To put pressure over puncture site following withdrawal of the needle</p>
	<p>Sterile adhesive dressing Alternatively, you may wish to use gauze and tape to cover the puncture site</p>	<p>To apply over puncture site and prevent leakage or contamination</p>

4.2 Multiple Blood Samples

The order in which sample bottles are used is important. Potentially some additives within the sample tubes could contaminate subsequent samples and adversely affect results. There are posters available that give further information on the 'order of draw' when taking multiple samples. Care should be taken to draw samples in the correct order.

VACUETTE SELECTION CHART

North Glasgow University Hospitals NHS Trust

Item Number	Volume	Cop Colour	Cop Ring Colour	Contents	Tests	Special Instructions
01454	6ml	Red	Black	Clotting Accelerator	Thrombophilia All Antibiotic Assays Microbiology Tests Therapeutic Drugs - Stoebill Only	
01455	5ml	Yellow	Yellow	Clotting Accelerator and Separation Gel	Urea, Creatinine, Serum Uric Acid, Total Protein, Serum Albumin, Serum Cholesterol, Triglyceride, Serum Bilirubin, ALT, AST, ALP, GGT, Gamma-GT, Ferritin, Iron, TIBC, Vitamin D, Vitamin B12, Folate, Vitamin E, Vitamin K, Vitamin C, Vitamin A, Vitamin B1, Vitamin B2, Vitamin B6, Vitamin B9, Vitamin K1, Vitamin K2, Vitamin P, Vitamin Q, Vitamin R, Vitamin S, Vitamin T, Vitamin U, Vitamin V, Vitamin W, Vitamin X, Vitamin Y, Vitamin Z, Vitamin AA, Vitamin AB, Vitamin AC, Vitamin AD, Vitamin AE, Vitamin AF, Vitamin AG, Vitamin AH, Vitamin AI, Vitamin AJ, Vitamin AK, Vitamin AL, Vitamin AM, Vitamin AN, Vitamin AO, Vitamin AP, Vitamin AQ, Vitamin AR, Vitamin AS, Vitamin AT, Vitamin AU, Vitamin AV, Vitamin AW, Vitamin AX, Vitamin AY, Vitamin AZ, Vitamin BA, Vitamin BB, Vitamin BC, Vitamin BD, Vitamin BE, Vitamin BF, Vitamin BG, Vitamin BH, Vitamin BI, Vitamin BJ, Vitamin BK, Vitamin BL, Vitamin BM, Vitamin BN, Vitamin BO, Vitamin BP, Vitamin BQ, Vitamin BR, Vitamin BS, Vitamin BT, Vitamin BU, Vitamin BV, Vitamin BW, Vitamin BX, Vitamin BY, Vitamin BZ, Vitamin CA, Vitamin CB, Vitamin CC, Vitamin CD, Vitamin CE, Vitamin CF, Vitamin CG, Vitamin CH, Vitamin CI, Vitamin CJ, Vitamin CK, Vitamin CL, Vitamin CM, Vitamin CN, Vitamin CO, Vitamin CP, Vitamin CQ, Vitamin CR, Vitamin CS, Vitamin CT, Vitamin CU, Vitamin CV, Vitamin CW, Vitamin CX, Vitamin CY, Vitamin CZ, Vitamin DA, Vitamin DB, Vitamin DC, Vitamin DD, Vitamin DE, Vitamin DF, Vitamin DG, Vitamin DH, Vitamin DI, Vitamin DJ, Vitamin DK, Vitamin DL, Vitamin DM, Vitamin DN, Vitamin DO, Vitamin DP, Vitamin DQ, Vitamin DR, Vitamin DS, Vitamin DT, Vitamin DU, Vitamin DV, Vitamin DW, Vitamin DX, Vitamin DY, Vitamin DZ, Vitamin EA, Vitamin EB, Vitamin EC, Vitamin ED, Vitamin EE, Vitamin EF, Vitamin EG, Vitamin EH, Vitamin EI, Vitamin EJ, Vitamin EK, Vitamin EL, Vitamin EM, Vitamin EN, Vitamin EO, Vitamin EP, Vitamin EQ, Vitamin ER, Vitamin ES, Vitamin ET, Vitamin EU, Vitamin EV, Vitamin EW, Vitamin EX, Vitamin EY, Vitamin EZ, Vitamin FA, Vitamin FB, Vitamin FC, Vitamin FD, Vitamin FE, Vitamin FF, Vitamin FG, Vitamin FH, Vitamin FI, Vitamin FJ, Vitamin FK, Vitamin FL, Vitamin FM, Vitamin FN, Vitamin FO, Vitamin FP, Vitamin FQ, Vitamin FR, Vitamin FS, Vitamin FT, Vitamin FU, Vitamin FV, Vitamin FW, Vitamin FX, Vitamin FY, Vitamin FZ, Vitamin GA, Vitamin GB, Vitamin GC, Vitamin GD, Vitamin GE, Vitamin GF, Vitamin GG, Vitamin GH, Vitamin GI, Vitamin GJ, Vitamin GK, Vitamin GL, Vitamin GM, Vitamin GN, Vitamin GO, Vitamin GP, Vitamin GQ, Vitamin GR, Vitamin GS, Vitamin GT, Vitamin GU, Vitamin GV, Vitamin GW, Vitamin GX, Vitamin GY, Vitamin GZ, Vitamin HA, Vitamin HB, Vitamin HC, Vitamin HD, Vitamin HE, Vitamin HF, Vitamin HG, Vitamin HH, Vitamin HI, Vitamin HJ, Vitamin HK, Vitamin HL, Vitamin HM, Vitamin HN, Vitamin HO, Vitamin HP, Vitamin HQ, Vitamin HR, Vitamin HS, Vitamin HT, Vitamin HU, Vitamin HV, Vitamin HW, Vitamin HX, Vitamin HY, Vitamin HZ, Vitamin IA, Vitamin IB, Vitamin IC, Vitamin ID, Vitamin IE, Vitamin IF, Vitamin IG, Vitamin IH, Vitamin II, Vitamin IJ, Vitamin IK, Vitamin IL, Vitamin IM, Vitamin IN, Vitamin IO, Vitamin IP, Vitamin IQ, Vitamin IR, Vitamin IS, Vitamin IT, Vitamin IU, Vitamin IV, Vitamin IW, Vitamin IX, Vitamin IY, Vitamin IZ, Vitamin JA, Vitamin JB, Vitamin JC, Vitamin JD, Vitamin JE, Vitamin JF, Vitamin JG, Vitamin JH, Vitamin JI, Vitamin JJ, Vitamin JK, Vitamin JL, Vitamin JM, Vitamin JN, Vitamin JO, Vitamin JP, Vitamin JQ, Vitamin JR, Vitamin JS, Vitamin JT, Vitamin JU, Vitamin JV, Vitamin JW, Vitamin JX, Vitamin JY, Vitamin JZ, Vitamin KA, Vitamin KB, Vitamin KC, Vitamin KD, Vitamin KE, Vitamin KF, Vitamin KG, Vitamin KH, Vitamin KI, Vitamin KJ, Vitamin KK, Vitamin KL, Vitamin KM, Vitamin KN, Vitamin KO, Vitamin KP, Vitamin KQ, Vitamin KR, Vitamin KS, Vitamin KT, Vitamin KU, Vitamin KV, Vitamin KW, Vitamin KX, Vitamin KY, Vitamin KZ, Vitamin LA, Vitamin LB, Vitamin LC, Vitamin LD, Vitamin LE, Vitamin LF, Vitamin LG, Vitamin LH, Vitamin LI, Vitamin LJ, Vitamin LK, Vitamin LL, Vitamin LM, Vitamin LN, Vitamin LO, Vitamin LP, Vitamin LQ, Vitamin LR, Vitamin LS, Vitamin LT, Vitamin LU, Vitamin LV, Vitamin LW, Vitamin LX, Vitamin LY, Vitamin LZ, Vitamin MA, Vitamin MB, Vitamin MC, Vitamin MD, Vitamin ME, Vitamin MF, Vitamin MG, Vitamin MH, Vitamin MI, Vitamin MJ, Vitamin MK, Vitamin ML, Vitamin MM, Vitamin MN, Vitamin MO, Vitamin MP, Vitamin MQ, Vitamin MR, Vitamin MS, Vitamin MT, Vitamin MU, Vitamin MV, Vitamin MW, Vitamin MX, Vitamin MY, Vitamin MZ, Vitamin NA, Vitamin NB, Vitamin NC, Vitamin ND, Vitamin NE, Vitamin NF, Vitamin NG, Vitamin NH, Vitamin NI, Vitamin NJ, Vitamin NK, Vitamin NL, Vitamin NM, Vitamin NN, Vitamin NO, Vitamin NP, Vitamin NQ, Vitamin NR, Vitamin NS, Vitamin NT, Vitamin NU, Vitamin NV, Vitamin NW, Vitamin NX, Vitamin NY, Vitamin NZ, Vitamin OA, Vitamin OB, Vitamin OC, Vitamin OD, Vitamin OE, Vitamin OF, Vitamin OG, Vitamin OH, Vitamin OI, Vitamin OJ, Vitamin OK, Vitamin OL, Vitamin OM, Vitamin ON, Vitamin OO, Vitamin OP, Vitamin OQ, Vitamin OR, Vitamin OS, Vitamin OT, Vitamin OU, Vitamin OV, Vitamin OW, Vitamin OX, Vitamin OY, Vitamin OZ, Vitamin PA, Vitamin PB, Vitamin PC, Vitamin PD, Vitamin PE, Vitamin PF, Vitamin PG, Vitamin PH, Vitamin PI, Vitamin PJ, Vitamin PK, Vitamin PL, Vitamin PM, Vitamin PN, Vitamin PO, Vitamin PP, Vitamin PQ, Vitamin PR, Vitamin PS, Vitamin PT, Vitamin PU, Vitamin PV, Vitamin PW, Vitamin PX, Vitamin PY, Vitamin PZ, Vitamin QA, Vitamin QB, Vitamin QC, Vitamin QD, Vitamin QE, Vitamin QF, Vitamin QG, Vitamin QH, Vitamin QI, Vitamin QJ, Vitamin QK, Vitamin QL, Vitamin QM, Vitamin QN, Vitamin QO, Vitamin QP, Vitamin QQ, Vitamin QR, Vitamin QS, Vitamin QT, Vitamin QU, Vitamin QV, Vitamin QW, Vitamin QX, Vitamin QY, Vitamin QZ, Vitamin RA, Vitamin RB, Vitamin RC, Vitamin RD, Vitamin RE, Vitamin RF, Vitamin RG, Vitamin RH, Vitamin RI, Vitamin RJ, Vitamin RK, Vitamin RL, Vitamin RM, Vitamin RN, Vitamin RO, Vitamin RP, Vitamin RQ, Vitamin RR, Vitamin RS, Vitamin RT, Vitamin RU, Vitamin RV, Vitamin RW, Vitamin RX, Vitamin RY, Vitamin RZ, Vitamin SA, Vitamin SB, Vitamin SC, Vitamin SD, Vitamin SE, Vitamin SF, Vitamin SG, Vitamin SH, Vitamin SI, Vitamin SJ, Vitamin SK, Vitamin SL, Vitamin SM, Vitamin SN, Vitamin SO, Vitamin SP, Vitamin SQ, Vitamin SR, Vitamin SS, Vitamin ST, Vitamin SU, Vitamin SV, Vitamin SW, Vitamin SX, Vitamin SY, Vitamin SZ, Vitamin TA, Vitamin TB, Vitamin TC, Vitamin TD, Vitamin TE, Vitamin TF, Vitamin TG, Vitamin TH, Vitamin TI, Vitamin TJ, Vitamin TK, Vitamin TL, Vitamin TM, Vitamin TN, Vitamin TO, Vitamin TP, Vitamin TQ, Vitamin TR, Vitamin TS, Vitamin TT, Vitamin TU, Vitamin TV, Vitamin TW, Vitamin TX, Vitamin TY, Vitamin TZ, Vitamin UA, Vitamin UB, Vitamin UC, Vitamin UD, Vitamin UE, Vitamin UF, Vitamin UG, Vitamin UH, Vitamin UI, Vitamin UJ, Vitamin UK, Vitamin UL, Vitamin UM, Vitamin UN, Vitamin UO, Vitamin UP, Vitamin UQ, Vitamin UR, Vitamin US, Vitamin UT, Vitamin UY, Vitamin UZ, Vitamin VA, Vitamin VB, Vitamin VC, Vitamin VD, Vitamin VE, Vitamin VF, Vitamin VG, Vitamin VH, Vitamin VI, Vitamin VJ, Vitamin VK, Vitamin VL, Vitamin VM, Vitamin VN, Vitamin VO, Vitamin VP, Vitamin VQ, Vitamin VR, Vitamin VS, Vitamin VT, Vitamin VY, Vitamin VZ, Vitamin WA, Vitamin WB, Vitamin WC, Vitamin WD, Vitamin WE, Vitamin WF, Vitamin WG, Vitamin WH, Vitamin WI, Vitamin WJ, Vitamin WK, Vitamin WL, Vitamin WM, Vitamin WN, Vitamin WO, Vitamin WP, Vitamin WQ, Vitamin WR, Vitamin WS, Vitamin WT, Vitamin WY, Vitamin WZ, Vitamin XA, Vitamin XB, Vitamin XC, Vitamin XD, Vitamin XE, Vitamin XF, Vitamin XG, Vitamin XH, Vitamin XI, Vitamin XJ, Vitamin XK, Vitamin XL, Vitamin XM, Vitamin XN, Vitamin XO, Vitamin XP, Vitamin XQ, Vitamin XR, Vitamin XS, Vitamin XT, Vitamin XU, Vitamin XV, Vitamin XW, Vitamin XY, Vitamin XZ, Vitamin YA, Vitamin YB, Vitamin YC, Vitamin YD, Vitamin YE, Vitamin YF, Vitamin YG, Vitamin YH, Vitamin YI, Vitamin YJ, Vitamin YK, Vitamin YL, Vitamin YM, Vitamin YN, Vitamin YO, Vitamin YP, Vitamin YQ, Vitamin YR, Vitamin YS, Vitamin YT, Vitamin YU, Vitamin YV, Vitamin YW, Vitamin YX, Vitamin YY, Vitamin YZ, Vitamin ZA, Vitamin ZB, Vitamin ZC, Vitamin ZD, Vitamin ZE, Vitamin ZF, Vitamin ZG, Vitamin ZH, Vitamin ZI, Vitamin ZJ, Vitamin ZK, Vitamin ZL, Vitamin ZM, Vitamin ZN, Vitamin ZO, Vitamin ZP, Vitamin ZQ, Vitamin ZR, Vitamin ZS, Vitamin ZT, Vitamin ZU, Vitamin ZV, Vitamin ZW, Vitamin ZX, Vitamin ZY, Vitamin ZZ	
01452	3.5ml	Blue	Black	Trisodium Citrate	Coagulation Screen, D-Dimers, Antithrombin Concentration (DIN/APTT) - 1 tube Clotting Factors - 2 tubes Thrombophilia Tests - 4 tubes	
01451	4ml	Lavender	White	EDTA	FBG, ESR*, Hemoglobinopathy, Haemoglobin A1c, Red Cell Index, Malaria Screen, Plasma Viscosity, Rheumatoid Factor, Creatinine, PT/INR, U&A, Urinalysis	* ESR only Full blood profile (Bare G840) - requires 2 x 10ml samples
01456	6ml	Green	Black	Li Heparin	Red Cell Indices, Vitamins A, B, C & E, ACTH, Gastrin, Insulin, C-Peptide, Albumin, Cort Hormones (Rug. Add of Tested)	
01523	2ml	Grey	White	NaF/EDTA	Glucose Lactate Alcohol	
01527	1.8ml	Black	Black	Trisodium Citrate for ESR	ESR - STOBHILL ONLY	
01526	4ml	Pink	Black	EDTA for Chromatography	All Blood Transfusion Requests Inc Group, Antibody Screen, DACT, Crossmatch, Auto-haem. Serology	All sample tubes must be handwritten
05431	6ml	Royal Blue	Black	Sodium heparin Trace Elements	Copper, Zinc and other Trace Metals Excluding Lead and Cadmium. Available from Biochemistry Department Only	

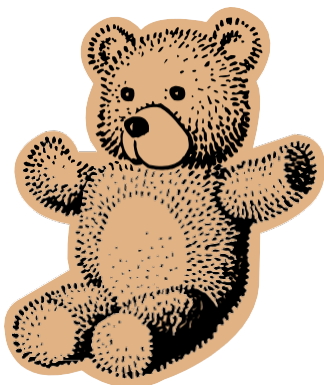
Recommended order of draw - serum, coagulation followed by all the other tubes with additives

 Paediatric
  Gel
  Standard

VACUETTE

Paediatrics and Neonates:

Currently, the vacutainer system is unsuitable for use in paediatrics as there is too great a pressure in the blood collection bottle and it causes the vein to collapse. Heel pricks may be used in young babies, adolescents may use the vacutainer system.



- Blood samples are taken using a 10mL syringe – care must be taken to transfer the sample to the appropriate specimen bottle as soon as possible ensuring the correct quantity is placed in each container.
- Label the specimen bottles and complete the request forms before leaving the patient.
- The sample bottles used are different from those used in the adult sector.

Paediatric SELECTION CHART

NHS GG South Glasgow
Operating Division

VACUETTE®



Item Number	Volume	Cap Colour	Tests	Special Instructions
5 459 071 <small>Serum / Gel</small>	1.3 ml	 Yellow	<ul style="list-style-type: none"> • CRP • Antibiotic assay 	Deliver to Bacteriology
5 459 036 <small>EDTA</small>	1.3 ml	 Lavender	<ul style="list-style-type: none"> • Routine Haematology 	Deliver to Haematology
5 459 084 <small>Lithium Heparin</small>	1.3 ml	 Green	<ul style="list-style-type: none"> • Routine Biochemistry 	Deliver to Biochemistry
5 459 085 <small>NAF / EDTA</small>	1.3 ml	 Grey	<ul style="list-style-type: none"> • Glucose • Lactate 	Deliver to Biochemistry
5 459 075 <small>Sodium Citrate</small>	1.3 ml	 Blue	<ul style="list-style-type: none"> • Routine Coagulation 	Deliver to Haematology
5 459 093 <small>EDTA</small>	1.3 ml	 Pink	<ul style="list-style-type: none"> • Routine Crossmatch • Group and Coombs test 	Deliver to Haematology













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Greiner Bio-One Ltd
 Stroudwater Business Park
 Stonehouse, Glos. GL10 3JX
 Tel: 01453 825233
 Fax: 01453 826266
 e-mail: sales@uk.gbo.com
 www.vacutec.com
 VASW03

4.3 Cannulation (PVC insertion) equipment

As for any procedure, you should gather all the equipment you require before you start.

Equipment required:

	Equipment	Rationale
	Personal Protective equipment (PPE) – apron and gloves	To prevent the spread of infection
	Tray	To carry equipment to bedside
	Sharps box	To dispose of sharps quickly and safely
	Disposable tourniquet	To allow good venous access and prevent the spread of infection
	Sterile 2% chlorhexidine and 70% isopropyl alcohol impregnated swab	To cleanse skin. Use for 15secs and allow to dry naturally
	Appropriate size of sterile safety PVC	To reduce risk of needle stick injury
	Needle free access device	To reduce risk of needle stick injury and catheter related blood stream infections (CRBSI)
	10mL syringe	To flush cannula. 10mL syringe is used to exert the correct pressure and prevent damage to the inner lumen of the cannula

	Sterile 0.9% Sodium Chloride	To flush cannula after insertion and check for patency Normally 5 mls is sufficient volume to check patency
	Sterile adhesive dressing	To secure cannula IV3000 dressings are semi-permeable allowing moisture vapour transfer to reduce moisture build-up and bacterial growth whilst view of the insertion site

4.4 Choosing appropriate PVC:

- Cannula – smallest cannula to suit purpose
- Veins – choose large veins for irritant drugs

Before you insert a PVC, think about the purpose the cannula has to perform – why is the PVC required? Is it for fluid administration – how quickly will these fluids be administered? Is it for a blood transfusion? The purpose the cannula has to fulfil will affect your decision on which size of PVC you choose.



Paediatric and neonates:

Safety PVC and venepuncture devices are not always used in paediatrics and neonates. A risk assessment is carried out and suitable equipment is chosen for the age and condition of the child. All sharps should be disposed of immediately following the correct procedure.

Cannula flow rates

Colour	Gauge	Flow rate mls/min	Infusion type
Orange	14	343	Rapid blood transfusion Emergencies
Grey	16	196	Rapid blood transfusion Emergencies
Green	18	90	Blood products Medicine administration General crystalloid infusion
Pink	20	61	Blood products Medicine administration General crystalloid infusion
Blue	22	36	General crystalloid infusion Paediatrics Oncology
Yellow	24	22	Paediatrics/Neonates Oncology Elderly

Section 5 Procedures for Venepuncture and PVC insertion

5.1 Procedure for venepuncture

	Action	Rationale
1	Explain the procedure to the patient and gain informed consent	To obtain patient consent and co-operation
2	Perform hand hygiene and assess / inspect patient for suitability for venepuncture	To maintain patient safety and comfort and gain cooperation
3	Gather together all equipment on a clean tray, including sharps bin	To minimise risk of needle stick injury
4	Perform hand hygiene and don PPE	To minimize cross infection and protect hands, hand hygiene protects the patient, gloves protect the practitioner
5	Assess and palpate vein to choose site	To locate vein
6	Apply disposable tourniquet approximately 7-8cm above venepuncture site	To allow engorgement of the vein for easier access
7	Cleanse skin with 70% isopropyl alcohol impregnated swab – minimum of 15 secs and allow to dry naturally	To disinfect the skin and minimise risk of contamination at venepuncture site
8	Prepare equipment - connect sharp safe needle and quickshield or butterfly and vacutainer system	To allow time for alcohol to evaporate and minimise the risk of contamination of sterile equipment
9	Anchor the vein with non-dominant hand. Using dominant hand with open end of needle facing upwards advance the needle at approx 30° angle to the skin	To minimize risk of patient moving and to allow free flow of blood into needle
10	Once flashback is visualised in flashback chamber, use non dominant hand to connect appropriate blood bottles into vacutainer holder, using order of draw if necessary	To ensure the vein has been accessed and the needle is not advanced any further into the vein
11	Once all blood bottles have been adequately filled, release tourniquet and loosely cover puncture site with gauze using quickshield safety device - remove needle from vein and activate safety device cover over needle on nearest solid surface	To reduce the engorgement of the vein. To reduce the incidence of needle stick injury
	using butterfly - press safety catch to withdraw needle In both instances you should hear an audible click when safety device is activated	To reduce the incidence of needle stick injury
12	Immediately put sharp in sharps box ' Skin to bin! '	To reduce the incidence of needle stick injury

13	Apply pressure to puncture site until haemostasis is achieved	To minimise the risk of haematoma formation or prolonged bleed time
14	Apply sterile airstrip plaster if no patient allergies. Alternatively gauze and tape may be used	To minimise the risk of contamination
15	Label the blood bottles and send to appropriate laboratory	To minimise the risk of mix up and incorrect labelling of samples
16	Remove PPE and decontaminate hands	To minimise the risk of cross infection
17	Document appropriately	To ensure good records and record keeping

5.2 Procedure for PVC insertion

	Action	Rationale
1	Explain the procedure to the patient and gain informed consent	To obtain patient consent and co-operation
2	Perform hand hygiene and assess / inspect patient for suitability for PVC insertion	To maintain patient safety and comfort and gain cooperation
3	Gather together all equipment on a clean tray, including sharps bin	To minimise risk of needle stick injury
4	Perform hand hygiene and don PPE	To minimize cross infection and protect hands; hand hygiene protects the patient, gloves protect the practitioner
5	Draw up flush using 10ml syringe and sterile 0.9% sodium chloride solution. Connect to syringe and flush needle free access device (Smartsite)	To allow easy connection to PVC once sited Flush and prime Smartsite to allow better flow of fluids once in place and prevent air embolism
6	Assess and palpate vein to choose site	To locate vein
7	Apply disposable tourniquet approximately 7-8cm above PVC Insertion site	To allow engorgement of the vein for easier access
8	Cleanse skin with 2% chlorhexidine and 70% isopropyl alcohol impregnated swab (clinelle wipes) – minimum of 15 secs and allow to dry naturally In situation of allergy to chlorhexidine, alcoholic povidone - iodine solution can be used as an alternative	To disinfect the skin and minimise risk of contamination at PVC Insertion site
9	Remove cannula from packaging and flatten out wings	To allow time for alcohol to evaporate and allow the cannula to sit flush to the skin once inserted

10	Anchor the vein with non-dominant hand. Using dominant hand with open end of cannula facing upwards advance the cannula at approx 30° angle to the skin	To minimize risk of patient moving and to allow free flow of blood into cannula
11	Once 1 st flashback is visualised in flashback chamber, lower the device to a level of approximately 15° to the skin. Use non dominant hand to stabilise the stylet and the dominant hand to advance the cannula into the vein over the stylet visualising the 2 nd flashback up the length of the cannula	To ensure the vein has been accessed and the stylet is not advanced any further into the vein. The cannula is then advanced into the vein
12	Once cannula is fully advanced: <ol style="list-style-type: none"> 1. secure cannula to skin with finger or thumb 2. press on vein just above the cannula 3. release tourniquet 	To prevent the cannula being dislodged To prevent further blood loss To reduce the engorgement of the vein
13	Immediately put sharp in sharps box ' Skin to bin! '	To reduce the incidence of needle stick injury
14	Connect 10ml syringe previously prepared with sodium chloride flush and needle free access device (SmartSite)	To flush cannula to confirm placement within a vein and to ensure patency of cannula
15	Administer flush solution using push pause technique	To ensure patency of cannula and removal of blood products from cannula lumen to avoid blockage
16	Disconnect 10ml syringe leaving needle free access device (Smartsite) attached to cannula	To minimise the risk of infection and contamination
17	Apply sterile semi-permeable dressing to secure cannula in place. (IV3000 dressing)	To minimise the risk of dislodgement
18	Remove PPE and decontaminate hands	To prevent cross contamination
19	Document appropriately in patient records and PVC careplan	To ensure good records and record keeping

Section 6 Complications

6.1 Needlestick injury

Needlestick injury is the most common complication of venepuncture and PVC insertion. The risk of this happening can be minimised through good practice and use of safety equipment. Needlestick injury can occur before, during or after venepuncture or PVC insertion.

Good Practice:

- Always use safety equipment – listen for **audible click**
- **Skin to Bin** – disposal of sharps at the bedside into sharps bin
- Always dispose of needles in sharps bin at earliest opportunity
- Never overfill sharps bins and use temporary closure mechanism
- Follow NHSGGC Management of Occupational and non-occupational exposures to blood borne viruses including needlestick injuries and sexual exposures (2013)

In the event of a needlestick injury occurring, you should:

1. Make the site bleed under warm running water
2. Report to nurse in charge and /or line manager who would undertake a risk assessment
3. Contact occupational health or your local Emergency Department within 1 hour for advice
4. Datix the incident occurring You

should avoid:

- Sucking/licking the injury
- Contaminating the area or equipment
- Ignore that it has happened!!

6.2 Infiltration

Infiltration is the leakage of **non-vesicant** fluid from the vein to the surrounding tissues.

A non-vesicant fluid is a fluid that does not cause local tissue damage. Infiltration is caused by the PVC piercing the vessel wall, usually due to poor technique on insertion, or poor securing of the PVC.

Signs and symptoms include:

- Swelling
- Pain
- Paraesthesia (numbness)
- Cold peripheries

Treatment:

- Stop infusion
- Remove PVC and resite
- Document in PVC care plan or bundle and nursing notes

You may also wish to support and elevate the affected limb to encourage lymphatic drainage of the excess fluid.

6.3 Extravasation

Extravasation is described by Dougherty and Lister (2011) as being the leakage of a vesicant fluid from the vein into the surrounding tissues. A vesicant fluid is one which causes local tissue damage and necrosis. This is usually due to the pH (acidity/alkalinity) of the fluid.

Signs and symptoms include:

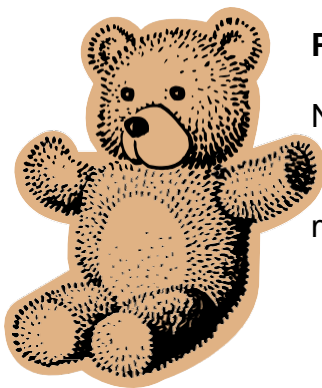
- Pain
- Parasthesia (numbness)



- Cold peripheries
- Necrosis / discolouration / redness
- Swelling

Treatment:

- Stop infusion immediately
- Leave cannula insitu
- Aspirate (draw back) any fluid you can but NEVER flush PVC
- Seek advice from pharmacy and medical staff prior to removing PVC, who may advise administration suitable neutralising agent (the best way to do this is through the cannula that caused the vesicant fluid to leak)
- Remove PVC and resite
- Apply hot pack or cold pack, if appropriate
- Subsequent management depends upon the drug involved and degree of damage
- Mark area of redness with skin marker
- Document in PVC care plan or bundle and nursing notes
- Report in Datix



Paediatrics and Neonates:

Neonate infiltration and extravasation guidelines can be accessed via Staffnet (The care of Peripheral IV cannula: prevention and management of infiltration/extravasation injuries 2009).

6.4 Phlebitis

Phlebitis is the inflammation of the intima layer of the vein. There are 3 main types:

Mechanical – caused by a PVC irritating the lumen of the vein e.g. a large cannula in a small vein

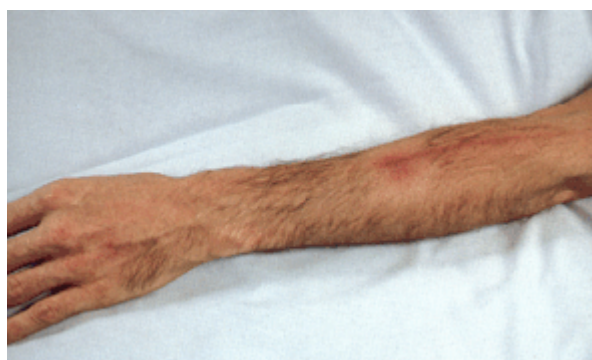
Chemical – caused by irritation from chemicals e.g. medications and chemotherapy

Bacterial – caused by infection - commonly from poor insertion technique and lack of hand washing. Infection can present in a number of ways:

- Local Site Infection
- Microbial Phlebitis
- Systemic Infection

Signs and symptoms:

- Tenderness
- Erythema
- Swelling
- Purulent discharge
- Palpable venous cord



Treatment will vary depending on the individual patient, and severity of the phlebitis.

NHSGGC use a modified Phlebitis Score to allow a consistent measure of the degree of phlebitis to be assessed and recorded.

Modified V.I.P (Visual Infusion Phlebitis) Score		
IV site appears healthy	0	No phlebitis : Observe Cannula
One of the following is evident : slight pain or redness near site	1	Possible first signs: Observe cannula
Two or more of the following are evident: pain, redness, swelling	2	Early stage of phlebitis : Remove and resite cannula
All of the following are evident: pain, redness, hardening of surrounding tissue	3	Phlebitis/ Thrombophlebitis: Remove & resite cannula Seek further advice
As above including : palpable venous cord	4	
As above including: pyrexia	5	

6.5 Haematoma

Haematoma is a swelling of blood under the skin causing a hard, painful lump. It usually occurs during insertion of the PVC. There are various causes including:

- Transfixation or transection of the vein (piercing through both sides of the vein)
- Inadequate pressure to puncture site on removal of device, or unsuccessful attempt.

Other more uncommon, but not unheard of complications may include:

- Damage to surrounding nerves
- Cannula embolism
- Pulmonary embolism
- Arterial puncture
- Catheter fracture
- Thromboembolism

Section 7 Advantages and disadvantages (indication and contraindications)

7.1 Sites to avoid

1. on or near site of infection or phlebitis – to prevent the introduction of blood stream infection
2. Small superficial veins – poor blood flow
3. Bruised areas – hard to see signs of subsequent phlebitis and potential for damage to vein to cause bruise
4. Arterio-venous (AV) fistula – not appropriate for normal venepuncture or PVC Insertion
5. Areas of scarring – sensation is altered, patient will not feel tenderness or phlebitis
6. Limb where IV infusion is running
7. Oedematous areas - hard to palpate vein and undertake procedure
8. Previous venepuncture sites – multiple attempts can cause scarring of the vein
9. Limb affected by injury/disease – e.g. patients following Cerebral Vascular Accident (CVA) can have altered sensation and may not feel tenderness and phlebitis
10. Mastectomy – if had axillary clearance then lymphatic drainage may be affected causing lymph oedema. The lymphatic system drains into the venous system, and lymph oedema would disrupt this

Section 8 Maintaining Peripheral Venous Cannula (PVC)

8.1 PVC care plan

NHSGGC have a care plan for patients with a PVC in place. This should be started and documented by the person who inserts the cannula. In some instances, the PVC care plan is not commenced. It should then be started at the earliest opportunity. Remember the mantra – if it is not documented, then there is no evidence it happened! Therefore, all patients with a PVC should have a PVC care plan. The current Adult PVC care plan can be found at the back of this workbook.

Paediatrics and neonates:

Paediatric PVC bundle – Checking Sheet is used to document cannulation equipment and checks. A copy can be found at the back of this workbook.

Safety PVC and venepuncture devices are not always used in paediatrics and neonates. A risk assessment is carried out and suitable equipment is chosen. All sharps should be disposed of immediately following the correct procedure.



8.2 Care of the site

Bandaging to secure a PVC should not routinely be used. Any bandaging around the access site must be kept to a minimum, placed in such a way that the PVC insertion site can be seen regularly without removing the bandage every time an inspection is made, before and after any intravenous administration. Any covering must be replaced every 24 hours.

Paediatrics and neonates:

Bandaging is not used in neonates. Small splints are used to retain the PVC securely. It may be necessary to remove the splint to allow close inspection of the under surface of the limb as there may be oedema underneath the limb and allow comparison with the opposite limb.



8.3 Removal of cannula

PVCs should be removed at the earliest opportunity when no longer required. PVC use should be monitored closely by practitioners and the site inspected and documented on the PVC care plan. Normally, the PVC should be removed (and resited if necessary) 72 hours (3 days) following insertion. However, there are particular circumstances where the practitioner may use clinical judgement and risk assess the need for a PVC, with the clinical availability of veins to cannulate or resite the PVC. In some circumstances the practitioner may decide to keep the existing PVC in place – this **must** be documented on the PVC care plan and reviewed at least every 24 hours thereafter.

Procedure for removing PVC

	Action	Rationale
1.	Explain the procedure to the patient and obtain verbal consent	To obtain patient consent and co-operation
2.	Ensure that alternative vascular access has been established if necessary	To minimise the time without therapeutic treatment
3.	Assess patients bleeding risk and if they are either therapeutically anti- coagulated or have an abnormal clotting screen seek advise from patients consultant prior to removal	To ensure haemostasis is established, minimise the risk of haematoma formation or prolonged bleed time
4.	Stop all fluids being infused via the PVC	To prevent spillage and contamination or cross infection
5.	Collect equipment	To maintain patient and practitioner safety
6.	Decontaminate hands & apply PPE	To minimise cross infection and protect hands, hand hygiene protects the patient, gloves protect the practitioner
7.	Carefully remove the PVC dressing noting that scissors must not be used to loosen or remove dressing	To prevent dislodgement of the PVC. Scissors should not be used in case of injury to the patient or damage to the device
8.	Hold a piece of dry cotton gauze over the insertion site and remove the PVC	To minimise the risk of contamination
9.	Apply firm pressure immediately to insertion site for approximately 2-3mins or long enough to ensure that there is no subcutaneous leakage of blood	To ensure haemostasis is established, minimise the risk of haematoma formation or prolonged bleed time
10.	After removal the PVC should be inspected for integrity and damage	To ensure it has been removed in its entirety
11.	Apply sterile adhesive dressing to the insertion site, checking for any allergies	To minimise the risk of contamination
12.	Ensure patient is comfortable	To maintain patient safety and comfort
13.	Dispose of waste, remove PPE & decontaminate hands. Record procedure in nursing documentation and the PVC careplan	To minimise the risk of cross infection To ensure good records and record keeping

Section 9 Reference list and further reading

9.1 References

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9.2 Further reading

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