

VENEPUNCTURE AND PERIPHERAL VENOUS CANNULATION POLICY

		POLICY
Reference	CPG-TW-V&PVCPol	
Approving Body	Nursing, Midwifery and Allied Health Professional Board	
Date Approved	20 th December 2019	
Issue Date	v1.0, 6 th January 2020 v1.1, 22 nd September 2020	
Version	1.1	
Summary of Changes from Previous Version	v1.1 <ul style="list-style-type: none"> • Change of title to reflect inclusion of practice for infants, children and young people. • Clarity around competency and independent practice for nursing students (section 8.1) • Hyperlinks to paediatric procedural guidance. (Section 14) • Addition of Neonatal Procedural Guidance – Hyperlinked (Section 15) • Addition of a reference to “Selecting a Vein” from the B-Braun workbook • Update of chapter/version of Royal Marsden Online links 	
Supersedes	v1.0, Issued 6 th January 2020 to Review Date December 2022	
Document Category	<ul style="list-style-type: none"> • Clinical 	
Consultation Undertaken	<u>v1.0</u> Heads of Nursing, Matrons, Ward and Department Leaders. Yvonne Christley, Head of Professional Practice Development. Yvonne Simpson, Head of Corporate Nursing Rebecca Herring, Corporate Matron. Kerry Morris, Practice Development Matron for Paediatrics. Sally Palmer, Specialist Nurse, Infection Prevention and Control Team. Joy Simpson, Team Leader, Professional Education Training Team. Dee Kelsey, Medical Education Training Nurse.	Email : 01/11/2019 Email : 01/11/2019 Email 01/11/2019 Meeting 18/12/2019 Meeting 09/10/2019 Email : 01/11/2019 Meeting:6/6/2019 and Email: 14/06/19. Email 01/11/19 Meeting: 12/06/2019 Email 01/1119 Meeting:13/06/2019 and Email: 14/06/2019. Email: 01/11/2019 Email: 01/11/2019

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Date of Completion of Equality Impact Assessment	01/11/2019	
Date of Environmental Impact Assessment (if applicable)	Not Applicable	
Legal and/or Accreditation Implications	Not Applicable	
Target Audience	All clinical staff who undertake the procedure of Venepuncture and /or Cannulation as required of their role, within their job description or as a role development to their practice where it is required for optimisation of patient care.	
Review Date	December 2022	

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Lead Specialty/ Service/ Department	Nursing/ Professional Practice Development Team	
Position of Person able to provide Further Guidance/Information	Practice Development Matron	
Keywords	process, procedure, obtaining blood, IV access, PVC, VIP, VIPs, vascular, procedural guidance, equipment, complications, blood order of draw, removal, documentation, invasive	
Associated Documents/ Information	Date Associated Documents/ Information was reviewed	
<p>This policy should be read/ referred to in conjunction with the following Nursing/Allied Health /Non –registered specialist roles</p> <ul style="list-style-type: none"> • Venous Access – (excluding neonates) Precourse Training Package • Venepuncture (excluding neonates) OKS 140 • Insertion of Peripheral Cannula – (excluding neonates) OKS 108 • Posiflush® (Pre-filled 0.9% Sodium Chloride) – (excluding neonates) OKS 416 band 3 and 4 staff can only use for Posiflush® devices to flush cannulas as part of the insertion procedure. • Obtaining Blood Culture Sample (excluding Neonates) OKS 167 • Paediatric Procedural Guidance – Cannulation in infants, children and Young People • Paediatric Procedural Guidance – Venepuncture in Infants, Children and Young People • Neonatal Peripheral Intravenous Cannulation OKS579 • Neonatal Blood Sampling Training and Assessment OKS597 • Paediatric procedural guidance Venepuncture in Infants Children and Young People • Paediatric procedural guidance Cannulation in Infants Children and Young People • Neonatal Peripheral Venepuncture and Cannula Insertion • Neonatal Venous Blood Sampling 		<p>For Paediatric/ Neonatal procedural guidance please see Royal Marsden Manual</p>

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1.0 INTRODUCTION

This policy refers to the practices of venepuncture and peripheral venous cannulation.

At Sherwood Forest Hospitals NHS Foundation Trust (SFHFT), venepuncture and peripheral venous cannulation are amongst the most frequent invasive procedures that staff are required to perform as an essential element in carrying out timely investigations and instigating treatments for our patients.

To be responsive and meet the needs of our patients, the Trust provides its staff with programmes of education and training to ensure that the right people in its workforce have the right levels of knowledge and skills to deliver efficient and timely care (NHS Improvement, 2016). The Trust incorporates, aligns and develops skills and competencies for venepuncture and peripheral venous cannulation to support the current and future workforce.

At the Trust venepuncture and peripheral venous cannulation are carried out by registered staff, Health Care Support Workers, Phlebotomists and allied healthcare professionals (registered and non-registered). Staff must be able to demonstrate and provide evidence to show that they have completed the appropriate level of practical and theoretical training to carry out these procedures and must have evidence of practical competencies which have been signed off by a suitably qualified assessor.

Since both procedures breach the circulatory system, meticulous infection control measures must be adhered to by all staff undertaking the procedures in order to minimise the risk of injury and/or infection to themselves and the patient.

2.0 POLICY STATEMENT

The purpose of this policy is to guide and support clinical staff in the safe practice of venepuncture and peripheral cannulation for patients and applies to all healthcare professionals working within the organisation including Medical Staff, Nurses, Midwives, Allied Health Professionals, Assistant Practitioners, Health Care Assistants, Phlebotomists and students from the healthcare disciplines who are required to undertake these procedures as a recognised part of their role and/or training programmes (Nursing and Midwifery Council, 2018, Health and Care Professions Council, 2018).

This policy is focused on the processes and procedure of venepuncture from a peripheral vein and peripheral venous cannulation: including insertion, post insertion care, management and removal. A separate Trust policy exists for obtaining blood cultures.

The recommended clinical procedures, Royal Marsden (2020), ([Appendix 1](#) and [Appendix 3](#)) are based on evidence, recognised to lower the incidence of sharps injuries and optimise best practice in reducing venepuncture and cannula-related complications with an emphasis on the prevention of associated infection and injury risks. Care in the execution of venepuncture and peripheral venous cannulation is fundamental to reducing the risk of infection and injury to patients and staff.

2.1 Exclusions

There are no exclusions from this policy

3.0 DEFINITIONS/ ABBREVIATIONS

AHPs	Allied Health Professionals including Phlebotomy staff.
Assessor	A registered practitioner, who has completed training and can demonstrate competency and on-going practice in the identified roles of Venepuncture and/or Peripheral Venous Cannulation. This will not include persons either partially or not formally trained in the identified role.
APEL	Accreditation of prior experience and learning.
CP1/CP2/CP3	Clinical phase 1 (3rd year medical student) Clinical phase 2 (4 th year medical student) Clinical phase 3 (5th year medical student).
MACCS	Mandatory Assessment of Core Clinical Skills (undergraduate medical students only).
Managers	Includes Ward/Department Sisters/Charge Nurses /Leads Specialist Midwives, Matrons, Heads of Nursing, Clinical Leads and Allied Health Profession Managers.
Medical Education Team	Registered nurses who provide clinical education to medical students.
OLM	Oracle Learning Management. A database to record training on individual electronic staff records.
PDM	Practice Development Matron.
PVC	Peripheral Venous Cannulation. The procedure of inserting a peripheral venous cannula into a peripheral vein. Peripheral venous cannulation is an invasive intervention that should only be carried out by suitably trained practitioners.

PETT	Professional Education and Training Team.
PVC / Cannula / Device	Peripheral venous cannula – a thin plastic tube used to deliver medications and fluids intravenously as prescribed. The tube is inserted over a hollow needle introducer.
Role Development/ Expansions to practice/ Role expansion	Terms which are descriptors of role development. These are supported through specialised training / competency packages/ supervised practice and should be subject to regular review in line with an individual’s role.
Staff / Practitioners	Refers to employees of the Trust including Nursing, Midwifery, Allied Health Professional and medical disciplines (including students on placement from Higher Education Institutions providing healthcare professional education and training) who undertake venepuncture and cannulation as part of their role. This includes Bank, Agency and Temporary staff within the constraints of their role/job description who have achieved the required level of skills and competencies. The practice of these individuals will be covered by the Trust’s indemnity arrangement.
The Trust / SFHFT	Refers to Sherwood Forest Hospitals NHS Foundation Trust incorporating: Kings Mill, Newark and Mansfield Community Hospitals.
Venepuncture	The introduction of a needle into a vein to obtain a blood sample for haematological, biochemical or bacterial analysis. Venepuncture is an invasive intervention that should only be carried out by suitably trained practitioners.
VIPS	Visual Infusion Phlebitis Score – a score used to determine the health of a cannula site as an indicator of site infection (phlebitis) VIPS is recorded on the Trust Cannulation Documentation.

4.0 ROLES AND RESPONSIBILITIES

The Chief Nurse and Medical Director are responsible for the content and implementation of this policy.

Heads of Nursing and Heads of Department are responsible for ensuring that necessary measures are in place to support the safe implementation and monitoring of the use of this policy in practice. They will need to take steps to address issues where practice has been identified as potentially unsafe.

Matrons, Department Managers and Service Line Directors are responsible for ensuring that all staff accountable to them are aware of this policy and adhere to its statement. It is the manager’s responsibility to investigate and rectify any deviation from policy or identified discrepancies.

Ward Sister/Charge Nurses/Departmental Leaders will act as role models and are responsible and accountable for the policy implementation amongst staff in practice and the monitoring of all associated standards. They will ensure that all staff within the sphere of their responsibility have access to the required training to develop the necessary skills and competence. They are responsible for overseeing the timely completion of the associated study, workbooks and sign-offs within competency documentation.

All Healthcare staff/ Practitioners have a duty of care to their patients. They should only perform venepuncture or peripheral venous cannulation if required to do so as part of their role. This will be identified in their job description or be part of specific role development in support of patient care within their clinical setting. No Practitioner should attempt to undertake these roles unless they have completed the specific training and associated competencies.

Any person delegating these roles must be assured of the accountability and competency of the person to whom they are delegating.

Professional Education and Training Team (PETT) are responsible for the training, education and associated competency packages in the skills of venepuncture and peripheral venous cannulation at the Trust for all staff. Competency packages for the Trust are issued via the Sherwood e-Academy.

The Medical Education Team are responsible for overseeing the training and competencies of medical staff.

The Infection Prevention and Control Team are responsible for providing the training and education for the infection control elements of venepuncture and peripheral venous cannulation as part of the initial competency training for all staff groups except Medical staff. The Infection Prevention and Control Team audit practice for venepuncture and cannulation at ward and department level and provide specialist advice and support.

Practice Development Team / Corporate Head of Nursing are responsible for the production, issue and review of this policy and its contents.

5.0 APPROVAL

This policy has been approved following consultation by the Nursing, Midwifery and Allied Health Professional Board.

6.0 GENERAL PRINCIPLES

Venepuncture and peripheral venous cannulation must only be undertaken by Practitioners who have completed a programme of training provided by the Trusts Professional Education Training Team, or by Practitioners who have accessed programmes that are recognised and approved by the Trust, such as those delivered at Universities as part of Medical/Nursing/Midwifery and Allied Health professional education.

Independent practice cannot take place until the practitioner has achieved a level of proficiency under the direct supervision of a qualified and competent assessor and as detailed within a recognised competency document that aligns to their discipline and role.

Further information on Training requirements can be found in section 8 of the policy.

The procedures to follow can be found in:

- [Appendix 1](#) – Venepuncture: procedural guidance (adults)
- [Appendix 2](#) – Blood order of draw (adults)
- [Appendix 3](#) – Peripheral venous cannulation procedural guidance (adults)
- [Paediatric procedural guidance Venepuncture in Infants Children and Young People](#) (available via the Royal Marsden Manual)
- [Paediatric procedural guidance Cannulation in Infants Children and Young People](#) (available via the Royal Marsden Manual)
- [Neonatal Peripheral Venepuncture and Cannula Insertion](#) (available via the Royal Marsden Manual)
- [Neonatal Venous Blood Sampling](#) (Available via the Royal Marsden Manual)

In the event of a practitioner being unable to gain venous access they should escalate using the Trust's [Vascular Access Assistance Policy](#) for inpatient areas or the [Difficult Intravenous Access in the Emergency Department Pathway](#) (Emergency Department only).

7.0 MONITORING COMPLIANCE AND EFFECTIVENESS

Minimum Requirement to be Monitored (WHAT – element of compliance or effectiveness within the document will be monitored)	Responsible Individual (WHO – is going to monitor this element)	Process for Monitoring e.g. Audit (HOW – will this element be monitored (method used))	Frequency of Monitoring (WHEN – will this element be monitored (frequency/ how often))	Responsible Individual or Committee/ Group for Review of Results (WHERE – Which individual/ committee or group will this be reported to, in what format (eg verbal, formal report etc) and by who)
Adherence to the policy	Ward and Department Sisters and Charge Nurses / Leads Infection Prevention and Control Team	Observations and audits of practice Via monitoring of incidents/complaints	Monthly	Ward Leaders, Infection Control Committee
Education and Training	Ward and Department Leaders Professional Education Training Team Infection Prevention and Control Team Practice Development Team Clinical Educators Supervisors/Assessors in practice	Staff appraisals / timely completion of packages Attendance at related study Competition of packages Monitoring of Incidents Policy content and support in practice Support in practice Support in practice	Ongoing	

Minimum Requirement to be Monitored (WHAT – element of compliance or effectiveness within the document will be monitored)	Responsible Individual (WHO – is going to monitor this element)	Process for Monitoring e.g. Audit (HOW – will this element be monitored (method used))	Frequency of Monitoring (WHEN – will this element be monitored (frequency/ how often))	Responsible Individual or Committee/ Group for Review of Results (WHERE – Which individual/ committee or group will this be reported to, in what format (eg verbal, formal report etc) and by who)
Ongoing competency	Individual Practitioners Ward and Department Leaders Professional Education Training Team Practice Development Team Clinical Educators Supervisors/Assessors in practice	At appraisal At appraisal Via OLM Support in practice /review of policy Support in practice	Ongoing (appraisals annually)	

8.0 TRAINING AND IMPLEMENTATION

The policy and its contents will be delivered to staff as part of the training for the procedures.

Before performing the procedures, staff must demonstrate that they have read this policy and the associated procedures. They must be able to evidence this as part of their training and development. This will include newly qualified nursing staff as part of their Preceptorship Programme and other newly appointed staff as part of any induction packages.

All staff undertaking venepuncture and peripheral venous cannulation are required to have:

1. Accessed the relevant training /study sessions in-house and return all completed associated competency documents within 8 weeks of their training.
2. Evidence of previous related study and competency sign-off as part of pre-registration training, or training and competencies from other organisations.
3. Evidence of the maintenance of knowledge and skills in the use of the procedures for patient care or evidence of retraining where necessary.
4. Documented evidence of all of the above. Completion of training and competency /evidence of previous training will be recorded on the Trust OLM system.

8.1 Student Nurses and Student Midwives

Student nurses and Midwives will undertake theoretical training as part of their pre-registration course and will be required to complete supervised practice on placements to achieve competency in the skill. Competency is recorded within the student practice assessment documents and is assessed by a registered practitioner who has themselves been deemed as competent in the practice. This is a mandatory requirement to complete training and achieve NMC registration (for those qualifying from 2022 onwards only) Once competency has been achieved students may practice independently whilst on placement at the Trust.

8.2 Registered Nurses, Registered Midwives and Nursing Associates (who have not accessed pre-registration training in venepuncture and cannulation). Allied Health Professionals, Phlebotomists (band 2) Health Care Assistants (band 2) in ante-natal clinic and KTC only. Band 3 Health Care Assistants.

These staff groups will be required to complete the relevant pre-course workbook/s via the Sherwood e-Academy (refer to the associated documents section of this policy). They must attend the study session and then complete the competency documents in practice within a specified timescale (usually eight weeks). Competency is recorded on the Trust OLM system.

New starters to the Trust who were practising these procedures at other organisations can APEL their competency as specified in the Trust's [Role Development Policy](#).

8.3 Medical Students

Medical students complete venepuncture and PVC insertion as part of their pre- registration training. When joining the Trust they are only required to complete the Direct Observation of Practice (DOP) assessment.

Competency is recorded using the MACCS checklist criteria. The MACCS criteria is exactly the same for CP1 and CP3 with the exception that CP1 students are assessed using simulation and CP3 level students complete their assessments upon patients. This competency includes sign- off for performing flushing of cannulas.

9.0 IMPACT ASSESSMENTS

- This document has been subject to an Equality Impact Assessment, see completed form at [Appendix 4](#)
- This document is not subject to an Environmental Impact Assessment

10.0 EVIDENCE BASE (Relevant Legislation/ National Guidance) AND RELATED SFHFT DOCUMENTS

10.1 Evidence Base:

- B braun (2017) Peripheral Cannulation and Venepuncture. Distance Learning Workbook. Found at <https://www.iow.nhs.uk/Working-With-Us/learning-cannulation.pdf> Accessed 30/10/2019
- B braun (2017) **Page 23; Selecting a Vein** Peripheral Cannulation and Venepuncture. Distance Learning Workbook.:–Found at at <https://www.iow.nhs.uk/Working-With-Us/learning-cannulation.pdf> Accessed 26/08/2020
- Blood Order of Draw (2018). Becton Dickenson Life Sciences. bd.com/en-uk. Weu227.1
- Department of Health (2010). Clean Safe Care High Impact Intervention Central Venous Catheter Care Bundle and Peripheral IV Cannula Care Bundle. London. Department of Health.
- Department of Health (2015) The Health and Social care Act 2008 code of practice on the prevention and control of infections and related guidance at :- <https://www.gov.uk/government/publications/the-health-and-social-care-act-2008-code-ofpractice-on-the-prevention-and-control-of-infections-and-related-guidance> (accessed 19/05/2019)
- Health and Safety (Sharp Instruments in Healthcare) Regulations 2013 Guidance for employers and employees :from <http://www.hse.gov.uk/pubns/hsis7.pdf> Accessed 22/05/2019
- Healthcare Safety Investigation Branch (HSIB) (2019) Wrong patient details on blood sample: Healthcare safety investigation 2019/003. Farnborough: HSIB.
- Infection Prevention Society, National Infusion and Vascular Access Society, Royal College of Nursing (IPS, 2015) UK Vessel Health and Preservation from <https://www.3mlearning.co.uk/media/1155/vhp-poster.pdf>. Accessed 01/11/2019
- Health and Care Professions Council (2018) Standards for Proficiency: found at <https://www.hcpc-uk.org/standards/standards-of-proficiency/>. Accessed 09/10/2019
- Loveday. H., Wilson. J. Pratt. R., Golsorkhi., A. Tingle., Bak. A., Brown. J., Prieto. J., Wilcox. M. (2014). **Epic 3**: National Evidence based guidelines for preventing healthcare associated infections in NHS Hospitals in England. Journal of Hospital Infections 86S1. S1- S70
- Nursing and Midwifery Council (2018) Future nurse: Standards of proficiency for registered nurses <https://www.nmc.org.uk/globalassets/sitedocuments/education-standards/future-nurse-proficiencies.pdf> accessed 22/05/2019

- Royal College of Nursing (2016) Standards for Infusion Therapy.4th Edition. London
- Royal Marsden Manual of Nursing Procedures (2020) Tenth edition (online)
Chapter 13.1: [Venepuncture](#) ([Appendix 1](#)) accessed 15/09/2020
Chapter 17.4 [Peripheral Cannula Insertion](#) accessed 15/09/2020
- Supporting NHS providers: right skills, right staff, right place, right time (NHSI, 2016)
Expectation 2: Right skills found at <https://www.england.nhs.uk/wp-content/uploads/2013/04/nqb-guidance.pdf> accessed 07/05/2019

10.2 Related SFHFT Documents:

- [Aseptic Non Touch Technique Policy \(IPC 39\)](#)
- [Policy for the Care of Suspected or Confirmed Patient with a Blood Borne Virus \(ICP 29\)](#)
- [Blood Cultures from Patient with Suspected or Confirmed Infections Policy \(ICP 32\)](#)
- [Clinical Record Keeping Standards Policy](#)
- [Difficult Intravenous Access in the Emergency Department Pathway](#)
- [Hand Hygiene Policy \(ICP 17\)](#)
- [Health and Safety Policy](#)
- [HIV / Post-exposure prophylaxis \(PEP\) Policy Following Occupational Exposure to HIV in the Healthcare Setting](#)
- [Incident Reporting Policy](#)
- [IV Policy - Care of the Patient Undergoing Bolus, Continuous and Intermittent IV Therapy](#)
- [IV Policy - IV Fluid Therapy Management in Adults in Hospitals](#)
- [IV Medication and Fluid Therapy Administration Through a Central Venous Access Device \(CVAD\) Policy](#)
- [Lone Working Policy](#)
- [Medical Device Management Policy](#)
- [Medical Equipment User Training Policy](#)
- [Medicines Policy](#)
- [Mental Capacity Act \(MCA\) Policy](#)
- [Operating Policy for Infection Prevention and Control \(ICP 1\)](#)
- [Personal Protective Equipment \(PPE\) Policy \(ICP 9\)](#)
- [Policy for Consent to Examination, Treatment and Care](#)
- [CCU Policy - Policy for Obtaining Blood Samples using Written and the Electronic Requesting System \(ICE\)](#)
- [Policy & Procedure for the Positive Identification of Patients](#)
- [Role Development Policy](#)
- [Sharps and Needlestick Policy](#)
- [Transfusion Policy, Procedures and Guidelines](#)
- [Vascular Access Assistance Policy](#)
- [Waste Policy](#)

10.3 Related guidelines and procedures

- Removal of peripheral cannula <https://www.rmmonline.co.uk/manual/c17-sec-0104>
- Clinical Guideline [Clinical Guideline for the Recognition, Diagnosis and Management of Sepsis](#)

11.0 Appendix 1

11.1 Venepuncture: Procedural Guidance (adults) (Royal Marsden, 2020)

Equipment

- Clean procedure tray or trolley
- Tourniquet (single use where possible)
- Chlorhexidine in 70% alcohol swab, or Isopropyl alcohol 70% on sterile gauze (check the patients allergy status)
- 21 gauge multiple sample safety needle or 21/23 gauge winged safety infusion device and multiple sample Luer adaptor
- Vacutainer / blood collection tube holder (checked expiry dates)
- Appropriate vacuumed specimen tubes
- Low-linting gauze swabs
- Sterile adhesive plaster or hypoallergenic tape (check the patients allergy status when selecting dressings)
- Specimen request form/s
- Non-sterile, well-fitting gloves
- Plastic apron
- Sharps bin

Procedure

1. Clean tray and gather required equipment (specified above).
2. ICE label/s (or a completed request form –Blood Transfusion Purposes) should be obtained before you approach your patient to aid positive patient identification
3. Confirm the identification of the patient as per the Trust's [Policy & Procedure for the Positive Identification of Patients](#).
4. Explain and discuss the procedure with the patient. Allow them time to ask questions where appropriate and discuss any problems which have arisen with venepuncture previously. Obtain verbal consent to proceed. If the patient lacks capacity, complete a Mental Capacity Act 2 stage test and Best Interests Checklist.
5. Ensure that the patient's privacy is maintained. Ensure that the area is well lit. Ask/assist the patient to position themselves to maximise their comfort during the procedure.
6. Perform hand hygiene and put on clean gloves.
7. Using the principles of Aseptic None Touch Technique (ANTT) prepare and assemble the equipment necessary for venepuncture on the clean tray or receiver.
8. Perform a visual check of the patient's veins, starting with those in the antecubital fossa, looking for a prominent vein that runs under the skin surface that is easy to palpate, assessing the size, depth and condition according to the amount of blood required. Peripheral veins in the hands and feet should be the last choice for venepuncture as they are painful for the patient (Infection Prevention Society, 2015)

9. Select the device, based on vein size, site and volume of blood required. Use a 23 gauge winged infusion device for small veins, metacarpal or feet veins
10. Place and support the patient's arm on a clean pillow.
11. Apply a tourniquet to the upper arm on the chosen side, making sure that it does not obstruct arterial flow. If the radial pulse cannot be palpated then the tourniquet is too tight. The position of the tourniquet should be varied according to the site of venepuncture; for example, if a vein in the hand is to be used it may be placed on the forearm.
12. Observe and palpate for a dilated vein. If the tourniquet does not improve venous access, the following methods can be used to improve venous access.

Either:

Place the arm in a dependent position with the palm facing upwards and ask them to gently clench their fist.

Or:

Tap or gently stroke the vein.

Or:

Remove the tourniquet and apply moist heat, for example a warm compress, soak limb in warm water or, with prescription, apply Glyceryl Trinitrate ointment/patch.

If there is any delay in performing the procedure the tourniquet must be released and steps 7-9 should be repeated.

13. Clean the patient's skin carefully for 30 seconds using a Chlorhexidine in 70% alcohol swab / Isopropyl alcohol 70% on sterile gauze (check the patients allergy status) and allow to air dry for 30 seconds. If you need to re-palpate or touch the skin the area will need cleaning again. Remove the cover from the needle and inspect the device carefully checking for any faults before starting the procedure (e.g. bent needles, broken or faulty safety closure). If any faults are present isolate the equipment, record the batch details and return to the manufacturer via the Trust procurement team.
14. Reassure the patient and anchor the vein by applying manual traction on the skin a few centimetres below the proposed insertion site.
15. Insert the needle smoothly at an angle of approximately 30°. Reduce the angle of descent of the needle as soon as a flashback of blood is seen in the tubing of a winged infusion device or when puncture of the vein wall is anticipated when using a vacutainer system.
16. Slightly advance the needle into the vein if possible in order to stabilise its position. Take care not to place any pressure on the needle itself.
17. Withdraw the required amount of blood using vacuumed blood collection specimen tubes. Consider if the tourniquet needs releasing prior to sampling to prevent inaccurate sampling measurements due to haemostasis e.g. calcium levels. Samples should be collected in the following order outlined in [Appendix 2](#).

1st. Blood cultures

2nd. Coagulation

3rd. Serum tube with or without clot activator or gel separator (glass, non-additive

tubes can be filled before the coagulation tube)

Additive tubes such as:

- 4th. Gel separator tubes (may contain clot activator or heparin)
- 5th. Heparin tubes
- 6th. EDTA
- 7th. All other tubes.

18. Release the tourniquet if not already done. Remove the last sample tube from the vacutainer tube.
19. Place a low-linting swab over the puncture point and remove the needle but do not apply pressure until the needle has been fully removed from the vein.
20. Activate the vacutainer safety device to prevent sharps injury and then discard the needle immediately into a sharps bin.
21. Apply digital pressure directly over the puncture site until bleeding has ceased; (approximately 1 minute, longer may be required if current disease or treatment affects the patient's clotting mechanisms).
22. If able, the patient may apply continued pressure with a finger but should be discouraged from bending the arm if a vein in the antecubital fossa is used.
23. Gently invert the filled sample tubes at least six times.
24. Check and confirm patient details again before applying the printed ICE label/s to the blood bottles. If you have not been able to print the ICE labels before bleeding the patient OR you have taken sample/s for Blood Transfusion hand label the blood bottles with the relevant details at the patient's side as per the [CCU Policy - Policy for Obtaining Blood Samples using Written and the Electronic Requesting System \(ICE\)](#) in order to ensure that the specimens from the right patient are delivered to the laboratory, the requested tests are performed and the results returned to the correct patient's records.

Post-procedure

25. Perform a final check of the puncture point.
26. Confirm whether the patient is allergic to adhesive plasters. Apply an adhesive plaster or alternative dressing as indicated.
27. Ensure that the patient is comfortable.
28. Remove gloves and discard waste as per the Trust [Waste Policy](#).
29. Perform hand hygiene.
30. If ICE labels were not available pre-procedure return to a printer to print. **N.B** Check the patient details that you have written on the blood bottles are identical to those on the ICE labels before applying to the blood bottles/s. Similarly if a request form was not completed prior to the venepuncture ensure the patient details match exactly with those on the sample bottle

31. Facilitate the prompt despatch of samples to the laboratory for processing according to the patients need/level of urgency.
32. Document the procedure in the patient's records

11.2 Complications associated with Venepuncture

Complications that may occur when venepuncture is performed may include arterial puncture, injury to the surrounding nerves, formation of a haematoma, vaso-vagal attacks and infection to the sample site.

Careful assessment and preparation will minimise the risks but should they occur then refer to the following guidance and take action immediately.

11.2.1 Inadvertent Arterial puncture

To prevent an arterial puncture, careful vein selection is necessary (Infection Prevention Society, 2015) and the following points should be considered;

- The Practitioner should palpate the vein before needle insertion to confirm the absence of a pulse.
- The angle of insertion should be less than 40° and in the event of failure to bleed, further probing with the needle should be avoided.
- An arterial puncture can be identified by bright red blood, rapid pulsatile blood flow and pain. The needle should be removed immediately and pressure applied for 5 minutes by the practitioner. A pressure dressing must be applied and the patient should receive advice to follow in the event of increased pain, swelling or loss of sensation.
- No tourniquet or blood pressure cuff should be reapplied to the arm for 24 hours.
- The incident should be documented in the patient's notes and recorded using the Trust DATIX system for incident reporting.

11.2.3 Nerve injury

Care when selecting the correct size device for use and insertion of the needle should minimise the risk of nerve injury (Infection Prevention Society, 2015)

- The angle of insertion should be less than 40° and blind probing should be avoided.
- The practitioner should suspect an injury to the nerve if the patient complains of the following; a sharp shooting pain, burning or electric shock –like sensation that radiates down the arm which may be accompanied by altered sensation or numbness/tingling in the fingers. In these circumstances the needle should be removed immediately to prevent further nerve damage.
- The patient should receive advice to follow if the pain/numbness continues for more than a few hours.
- The incident should be documented in the patient's notes and recorded using the Trust DATIX system for incident reporting.

11.2.4 Haematoma

Haematoma formation is the commonest complication of venepuncture. A haematoma develops when blood leaks from the vein into the surrounding tissues. It may be caused by the needle penetrating completely through the vein wall, the needle only being partially

inserted, or as a result of applying insufficient pressure on the site when the needle is removed. If a haematoma develops,

- The needle should be removed immediately and pressure applied. In the event of a large haematoma developing, the Practitioner can apply an ice pack to relieve pain and swelling.
- The patient should receive aftercare advice as a large haematoma may lead to a compression injury to the nerve.
- The occurrence should be documented in the patient's notes and recorded using the Trust DATIX system for incident reporting.
- Patients who are discharged should be given advice about when and who to contact if the haematoma gets worse or they develop any numbness in the limb.

11.2.5 Vaso –vagal episodes (fainting)

Fainting may occur during or immediately following venepuncture. The patient may complain of feeling light-headed and appear pale and sweaty. Loss of consciousness may occur suddenly so the Practitioner should be vigilant throughout the procedure and routinely confirm with the patient that they do not feel unwell or faint. In the event of the patient feeling faint;

- The procedure should be abandoned immediately, pressure applied to the site and the patient should be encouraged to lay down/lower their head and breathe deeply. The use of Oxygen should be considered as part of the ABCDE assessment of the patient.
- If the patient suffers a loss of consciousness, the Practitioner should call for assistance and ensure the patient's safety until they recover.
- The patient should not be allowed to leave the ward/department until fully recovered and be discharged to the care of a third party where possible.
- Prolonged or repeated episodes should prompt a medical review following initial first aid measures.

11.2.6 Infection

Infection at the venepuncture site is a rare occurrence. Aseptic technique should be maintained with careful attention to hand washing and skin preparation. The venepuncture site should not be re-palpated after cleaning and the site should be kept covered after being bled. For inpatients where there is suspicion of infection;

- Swabs and a medical review should be instigated.
- Where an infection is confirmed this should be recorded using the Trust DATIX system for incident reporting.
- Patients who leave the hospital following venepuncture should receive advice on care of the site of venepuncture and the dressing.

12.0 Appendix 2 Blood order of draw (adults)

(For paediatrics see Section 15 and Neonates see Section 16)

Tube Guide and Recommended Order of Draw*

BD Vacutainer®
BD Life Sciences - Preanalytical Systems

Cap Colour	Cat. No.	Tube Type	Determinations	Special instructions
	442192 442265	Blood Cultures	Aerobic followed by anaerobic- if insufficient blood for both culture bottles, use aerobic bottle only	
	Cat. No. 367691 Draw Volume 4.5 ml	Sodium Citrate	All coagulation tests- APTTs, Clotting Screens, D-Dimers, INRs, Lupus Anticoagulant, Thrombophilias	4 tubes required for Lupus A/C & Thrombophilia Investigation Mix 3-4 Times
	Cat. No. 368975 Draw Volume 4 ml	Serum	Clozapine, Clonazepam, Samples for Bone Bank. Other tests as advised by the laboratory.	Mix 5-6 Times
	Cat. No. 367954 Draw Volume 5ml	SST™ II	Routine Clinical Chemistry Investigations and Basic Endocrinology. Growth Hormone, Haematinks, IGF-1, Insulin and C-peptide (send within 30 min to lab). Routine Immunology, Serological Tests, Vitamin A and E (protect from light), Vitamin D, Routine tumour Markers, Haptoglobins, Therapeutic Drugs, Protein Electrophoresis, Troponin T, NT-pro BNP, Gastrin (on ice within 15 mins), Clonazepam	Mix 6 Times
	Cat. No. 367375 Draw Volume 4.5 ml	PST™ II	Fast Track Bloods, Biotinidase, Amino Acids, Acylcarnitine Profile, Calcitonin (fasting sample, on ice within 15 mins), VLCFA, Galactose-1-Phosphate Uridyl Transferase	Mix 8-10 Times
	Cat. No. 367839 Draw Volume 4 ml	EDTA	Renin (sent within 8h to lab), PTH (add. tube req. if FBC requested), Complement C3d (sent within 1h to lab), Cyclosporin, Tacrolimus, ESR, FBC, Haemoglobinopathy and Thalaassaemia Studies, Fluids for white cells, HbA1c, HLA, Immunophenotyping, Bacterial/Viral PCR, Red Cell Enzymes, Retics, Malaria, Chromium, Cobalt, Lead, ACTH (sent within 4h to lab), Ammonia (please contact lab ext 4082 prior to taking sample), Gut Hormone Profile (fasting, on ice within 15 min, 2 tubes required), TPMT, Azathioprine Metabolites	Mix 8-10 Times
	Cat. No. 367941 Draw Volume 6 ml	EDTA Crossmatch	Group and Screen, X-Match, Kleihauer, DAT, Maternal and Cord Delivery Samples, Cold Agglutinins Screen	Mix 8-10 Times
	Cat. No. 368920 Draw Volume 2 ml	Fluoride Oxalate	Alcohol, Blood Glucose, CSF Glucose, CSF Lactate, Fluid Glucose	Mix 8-10 Times
	Cat. No. 368380 Draw Volume 6 ml	Trace Element	Trace metal analysis (Cu, Zn, Se)	Mix 8-10 Times

Determinations and Special Instructions contained within this guide have been provided by the named Institute and are not BD recommendations or Instructions for the BD products described. Please consult your organisation's guidelines or contact BD should you have any questions.

*Clinical and Laboratory Standards Institute (CLSI) Guidelines GP11-ED7 (formerly H3A6, 6th Edition)

IMPORTANT MIXING GUIDELINES
All BD Vacutainer® tubes require immediate mixing following collection. Insufficient mixing can result in inaccurate test results and the need to re-draw. Correct mixing technique is to gently invert (180° and back) each tube the recommended number of times shown on the right hand side of the table.

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13.0 Appendix 3

13.1 Peripheral Venous Cannulation Procedural Guidance (adults) (Royal Marsden, 2020)

Equipment

- Clean procedure tray or trolley.
- A selection of various gauges of peripheral cannulas
- Alcohol based hand rub
- Chlorhexadine 2% in 70% alcohol swabs or Isopropyl alcohol 70% on sterile gauze (check the patients allergy status)
- Torniquet
- Needle free access device.
- Extension set.
- Gloves and apron.
- Semi-permeable dressing (check the patients allergy status when selecting dressings)
- Hypoallergenic tape.
- 10ml Syringe
- Blunt fill needle with filter
- 0.9% Saline/or Posiflush ® device
- Sharps bin

Optional Equipment - according to the patients need.

Topical local anaesthetic and an occlusive dressing (check the patients allergy status).

Procedure

1. Clean tray and gather required equipment (specified above).
2. Confirm the identification of the patient as per the [Trusts Policy & Procedure for the Positive Identification of Patients](#)
3. Explain and discuss the procedure with the patient. Allow them time to ask questions where appropriate and discuss any problems which have arisen with cannulation previously. Obtain their verbal consent to proceed. If the patient lacks capacity, complete a Mental Capacity Act 2 stage test and Best Interests Checklist.
4. Assist the patient to find a comfortable and stable position to rest. If the patient requires a prescribed topical; local anaesthetic, apply it to the potential peripheral cannulation site/s and apply occlusive dressing/s. Use in advance of cannulation as prescribed according to the manufacturer's instructions.
5. Perform hand hygiene in and put on clean gloves.
6. Using the principles of ANTT check, prepare and assemble the equipment necessary for cannulation on the clean tray or trolley and move them to the patient area. Prime the extension set with a syringe of 0.9% sodium chloride (unless taking blood samples immediately after cannulation).

7. Ensure that the patient's privacy is maintained. Ensure that the area is well lit. Ask/assist the patient to position themselves to maximise their comfort during the procedure.
8. Place and support the patient's chosen limb for cannulation on a clean pillow.
9. Apply a tourniquet to the upper arm on the chosen side, making sure that it does not obstruct arterial flow. (If the radial pulse cannot be palpated then the tourniquet is too tight). The position of the tourniquet should be varied according to the site of venepuncture; for example, if a vein in the hand is to be used it may be placed on the forearm.
10. Observe and palpate for a dilated vein. If the tourniquet does not improve venous access, the following methods can be used to improve venous access.

Either:

Place the arm in a dependent position and ask them to gently clench their fist.

Or:

Tap or gently stroke the vein.

Or:

Remove the tourniquet and apply moist heat, for example a warm compress, soak limb in warm water or, with prescription, apply Glyceryl Trinitrate ointment/patch.

11. Assess and select the vein.
12. Select the device based on the vein size, purpose and intended length of use. The decision should also be based on pH of any medication to be introduced. (Infection Prevention Society, 2015)
13. Perform hand hygiene. Put on clean gloves, place gauze and a dressing onto the tray/trolley.
14. Prepare a clean working area near to the patient, place a sterile dressing towel under the patients arm/limb selected for cannulation.
15. Apply gloves.
16. Clean the patient's skin and the selected vein for at least 30 seconds using 2% Chlorhexidine 70% alcohol swab using back-and-forth strokes with friction and allow to dry for 30 seconds. Do not re-palpate the vein or touch the skin.
17. Remove the cover from the needle and inspect the device carefully checking for any faults before starting the procedure (eg bent needles, broken or faulty safety closure) If any faults are present isolate the equipment, record the batch details and return to the manufacturer via the Trust procurement team.
18. Reassure the patient and anchor the selected vein for use with the non-dominant hand by applying manual traction on the skin a few centimetres below the proposed site of insertion.

19. Holding the cannula in the dominant hand, ensure that it is in the bevel-up position and place the device directly over the vein; insert the cannula through the skin at the selected angle (approximately 30 degrees) according to the depth of the vein.
20. Wait for the first flashback of blood in the flashback chamber of the needle as an indication that the vein has been reached.
21. Level the device by gently decreasing the angle between the cannula and the skin. Advance the cannula slightly to ensure entry into the lumen of the vein.
22. Withdraw the needle of the cannula slightly with the dominant hand and a second flashback of blood will be seen along the shaft of the cannula.
23. Maintaining skin traction with the non-dominant hand and using the dominant hand, slowly advance the cannula off the needle and into the vein.
24. Release the tourniquet.
25. Apply digital pressure to the vein above the cannula tip and remove the needle.
26. Immediately dispose of the needle into the sharps bin.
27. If blood samples are required, take them at this point. (refer to [Appendix 1](#) and [Appendix 2](#)) **Blood Culture samples must never be taken from peripheral venous cannulas.**
28. Attach the closed primed extension set, needle free access device or administration set to the end of the cannula.
29. Secure the cannula using an IV cannula dressing and enter the date of insertion on the dressing and on the VIPS chart.
30. Aspirate the cannula to check for patency, observing for blood flashback, then flush the cannula with 0.9% Sodium Chloride/Posiflush® device using a pulsatile flush ending with positive pressure. **Band 3 and Band 4 staff must only deliver flushes using the Posiflush® system.**
31. Observe the site for signs of swelling or leakage and ask the patient if they are experiencing any discomfort or pain.
32. Check that the device is secured. Remind the patient to take care of the cannula and the site whilst in situ. Ensure that the needle free access device lines are clamped.

Post-procedure

33. Remove gloves and discard waste as per the Trust [Waste Policy](#)
34. Document date and time of insertion, site and size of cannula, number of attempts and sign in patient's notes or care plan. Document date/time of insertion on the cannula dressing. Ensure that a VIPS chart is commenced for each new cannula.

35. The cannula should be secured using a specific IV Cannula semi-permeable dressing. Non-sterile tape should be used to a minimum and not cover the insertion site, taping should enable the site to remain visible at all times.

13.2 Ongoing care

Cannulas can cause complications for the patient which can include the risk of infection at the site of insertion or, more seriously, bloodstream infections. Such infections are largely avoidable with correct maintenance of devices whilst in use. The site should also be inspected for signs of infiltration, extravasation and leakage during and after administration of medicines/infusions.

As required by the Trust Infection Control VIP Management Guidance

All patients with an intravenous cannula in place must have

- The subsequent score and action(s) taken (if any) must be documented.
- The IV site checked each time it is used or at a minimum of 8 –hourly intervals for signs of infusion phlebitis and the frequency changed to 2 hourly if scoring 1.

Key to V.I.P. Score			
0	No sign of phlebitis • observe cannula	3	Medium stage of phlebitis • resite cannula • consider treatment
1	Possible first signs of phlebitis • observe cannula	4	Advanced stage of phlebitis or start of thrombophlebitis • resite cannula • consider treatment
2	Early stage of phlebitis • resite cannula	5	Advanced stage of thrombophlebitis • initiate treatment • resite cannula

The incidence of infusion phlebitis varies. The following points may assist in reducing the incidence:

- Replace loose or contaminated dressings.
- Insert cannulas away from the joints whenever possible.
- Aseptic technique must be followed.
- Use the smallest gauge cannula most suitable for the patient's needs.
- Replace the cannula at the first indication of infusion phlebitis (stage 2 on the VIPS)

A peripheral cannula should be flushed before and after each use to check for patency prior to administration of a medication and at least daily if not in use, using 0.9% sodium chloride.

Refer to the following policies:

- [IV Policy - Care of the Patient Undergoing Bolus, Continuous and Intermittent IV Therapy](#)
- [IV Policy - IV Fluid Therapy Management in Adults in Hospitals](#)

13.3 Removal of a peripheral venous cannula

Equipment

- Clean procedure tray or receiver
- Alcohol based hand rub
- Clean gloves
- Adhesive dressing / sterile low- linting swab (check the patients allergy status when selecting a dressing)
- Gauze or dental roll if a small pressure dressing is required.
- Hypoallergenic tape

Procedure

1. Clean tray and gather required equipment (specified above).
2. Confirm the identification of the patient as per the Trust [Policy & Procedure for the Positive Identification of Patients](#)
3. Explain and discuss the procedure with the patient. Allow them time to ask questions where appropriate and discuss any problems which have previously occurred during cannula removal. Obtain their verbal consent to proceed. If the patient lacks capacity, complete a Mental Capacity Act 2 stage test and Best Interests Checklist.
4. Assist the patient to find a comfortable and stable position to rest.
5. Perform hand hygiene in and put on clean gloves.
6. Loosen the semi-permeable dressing from around the cannula site.
7. The cannula should be removed carefully using a slow, steady movement whilst observing and giving the patient reassurance.
8. Once the cannula is removed, pressure should be applied until haemostasis is achieved. This pressure should be firm and not involve any rubbing movement. A haematoma will occur if the device is carelessly removed, causing discomfort and a focus for infection.
9. The cannula integrity should be checked to ensure the complete device has been removed. A medical review should be sought immediately if there is any suspicion of any part of the cannula having been inadvertently left in situ.

Removal of the intravenous device or cannula should be an aseptic procedure. The site should be quickly inspected to ensure bleeding has stopped and should then be covered with a sterile dressing. A small pressure dressing may be used on top of this if required.

13.4 Documentation

On insertion, the Practitioner should complete a Cannulation Documentation Form. (A separate form must be used for each new cannula as it is sited). The form must be completed at every inspection of the cannula site and each time it is used.

This documentation ensures adequate records for the continued care of the device and patient as well as enabling audit of practice and compliance.

13.5 Complications associated with Peripheral Venous Cannulation

On insertion

13.5.1 Pain

Pain can be caused by the following:

- Tentative stop–start insertion (often associated with hesitant or new Practitioners)
- Hitting an artery, nerve or valve
- Poor technique – inadequate anchoring causes the skin to gather as the needle is inserted
- Alcohol based skin preparation is not allowed to dry adequately before insertion, resulting in stinging pain
- Using a frequently punctured, recently used or bruised vein
- An anxious patient with a low pain threshold
- Use of large-gauge device
- Use of veins in sensitive areas

Practitioners should take every opportunity to minimise pain for their patient including consideration of the prescription and use of local anaesthetic creams or injections where appropriate.

The Practitioner should avoid the use of bruised, used or sensitive areas. If the patient complains of pain, depending on the cause (e.g. a nerve or artery has been inadvertently injured), it may be necessary to remove the device immediately. Reassure the patient and ensure that they are provided with suitable pain relief and monitor pain levels until they have resolved. Document actions taken.

13.5.2 Haematoma

This is caused through leakage of blood into the tissues and is indicated by rapid swelling which occurs during the insertion procedure or after removal.

This can be caused by:

- Penetration of the posterior vein wall
- Incorrect choice of needle to vein size
- Fragile veins
- Patients receiving anticoagulant therapy
- Excessive or blind probing to locate the vein
- Spontaneous rupture of the vessel on application of the tourniquet or cleaning of the skin
- Inadequate pressure on venepuncture site following removal of the cannula

Prevention includes good vein and device selection and using a careful technique and the following points should be noted:

- Patients with fragile veins or those on anticoagulant therapy may be more challenging to cannulate and inexperienced Practitioners may require support with these individuals.

- A tourniquet should not be applied to a limb where recent venepuncture has occurred and the tourniquet should not be left in place for any longer than necessary.
- On removal of the cannula, adequate pressure should be applied to the site.
- Alcohol pads inhibit clotting and should not be used.
- In the event of a haematoma occurring, the needle should be removed immediately and pressure applied to the site for a few minutes. Elevate the extremity if appropriate and reassure the patient and explain the reason for the bruise. Apply a pressure dressing if required and an ice pack if bruising is extensive.
- In the event of a Haematoma forming, the incident should be documented in the patient's notes and recorded using the Trust DATIX system for incident reporting and the patient should be given reassurance and information.
- Patients who are discharged should be given advice about when and who to contact if the haematoma gets worse or they develop any numbness in the limb.

13.5.3 Inadvertent arterial puncture

This is characterized by pain and bright red blood caused by accidental puncture of an artery. It can be prevented by adequate assessment and recognition of arteries prior to performing the procedure. It is rare when proper procedures are followed and can be associated with deep or blind probing.

However, should this happen;

- The cannula should be removed immediately and pressure applied to the puncture site for up to 5 minutes or until the bleeding has stopped.
- Reassure the patient but do not reapply the tourniquet to the affected limb. If an inadvertent arterial puncture goes undetected, accumulation of blood can result in compression injury and damage nearby nerves.
- The incident must be documented and the patient monitored further for any altered sensation in the limb. Patients who are discharged should be given advice about when and who to contact if they experience these symptoms.

13.5.4 Nerve injury

Inadvertently hitting a nerve during cannulation will result in pain – described as severe shooting pain, painful burning sensation or a sharp electric tingling sensation that radiates down the nerve. This can occur as a result of poor vein selection, inserting the needle too deeply or quickly or blind probing. It can lead to injury and possible permanent damage. Prevention is achieved by ensuring that the location of superficial nerves is known.

In the event of touching a nerve:

- Release the tourniquet and remove the needle immediately.
- Reassure the patient and explain that the pain may last for a few hours and the area may feel numb.
- Ensure that the patient has adequate pain relief and monitor their pain level.
- Give explanations and reassurances and if discharged from hospital encourage them to seek medical advice if symptoms persist or worsen.

In situ

13.5.6 Phlebitis

This is inflammation of the intima of the vein which is characterized by pain and tenderness along the cannulated vein, erythema, warmth and streak formation with/without a palpable cord. The patient should be referred to the doctor if the phlebitis rating is over 3.

There are three main types.

- Bacterial - when the site becomes infected. If bacterial phlebitis is suspected then the insertion site should be cultured and the cannula tip sent to microbiology.
- Mechanical - related to irritation and damage to a vein by large-gauge cannulas, sited where there is movement, for example antecubital fossa, not secured adequately or increased dwell time.
- Chemical - related to chemical irritation from drugs with high or low pH there are numerous drugs that can cause this problem.

Influencing factors that increase the risk of phlebitis include being female, cannula dwell time, large-gauge cannulas, higher number of doses of irritating medications such as antibiotics,;

Prevention is key and includes appropriate device and vein selection, dilution of drugs and pharmacological methods, for example application of Glycerol Trinitrate (GTN) subject to prescription.

Treatment includes

- Discontinuing the infusion at the first signs of phlebitis (grade 1) and seeking a medical review.
- Using warm or cold compresses, applied to the affected site if mechanical or chemical cause.

*for information and guidance on Extravasation and infiltration refer to the following links

[Extravasation Information Links - Medicines Information Centre, Pharmacy](#)

[Policy for the Care of the Patient Undergoing Intravenous Therapy \(bolus/ intermittent/ continuous\)](#)

16.0 APPENDIX 4 EQUALITY IMPACT ASSESSMENT FORM (EQIA)

Name of service/policy/procedure being reviewed: Venepuncture and Peripheral Venous Cannulation Policy			
New or existing service/policy/procedure: Existing			
Date of Assessment: September 2020			
For the service/policy/procedure and its implementation answer the questions a – c below against each characteristic (if relevant consider breaking the policy or implementation down into areas)			
Protected Characteristic	a) Using data and supporting information, what issues, needs or barriers could the protected characteristic groups' experience? For example, are there any known health inequality or access issues to consider?	b) What is already in place in the policy or its implementation to address any inequalities or barriers to access including under representation at clinics, screening?	c) Please state any barriers that still need to be addressed and any proposed actions to eliminate inequality
The area of policy or its implementation being assessed:			
Race and Ethnicity	none	n/a	none
Gender	none	n/a	none
Age	none	n/a	none
Religion	none	n/a	none
Disability	none	n/a	none
Sexuality	none	n/a	none
Pregnancy and Maternity	none	n/a	none
Gender Reassignment	none	n/a	none
Marriage and Civil Partnership	none	n/a	none

Socio-Economic Factors (i.e. living in a poorer neighbourhood / social deprivation)	<p>none</p>	<p>n/a</p>	<p>none</p>
What consultation with protected characteristic groups including patient groups have you carried out? <ul style="list-style-type: none"> • None required 			
What data or information did you use in support of this EqIA? <ul style="list-style-type: none"> • Job descriptions and person specifications 			
As far as you are aware are there any Human Rights issues be taken into account such as arising from surveys, questionnaires, comments, concerns, complaints or compliments? <ul style="list-style-type: none"> • None 			
Level of impact From the information provided above and following EQIA guidance document Guidance on how to complete an EIA (click here), please indicate the perceived level of impact: Low Level of Impact For high or medium levels of impact, please forward a copy of this form to the HR Secretaries for inclusion at the next Diversity and Inclusivity meeting.			
Name of Responsible Person undertaking this assessment: Alison Davidson			
Signature: Alison Davidson			
Date: September 2020			