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Health Service Executive

Clinical Strategy and Programmes Division

Guiding Framework

for the Education, Training and Competence Validation in Venepuncture and Peripheral Intravenous Cannulation for Nurses and Midwives (2017)

Office of the
Nursing & Midwifery
Services Director

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Office of the Nursing & Midwifery Services Director

Foreword

Mary Wynne, Interim Nursing & Midwifery Services Director

The capacity to improve patient/client care is enshrined in the ethos of nursing and midwifery. Over the years we have embraced evidence based knowledge and skills related to advancing the clinical skills of Venepuncture and Peripheral Intravenous Cannulation, which are of crucial importance in meeting the needs of the patient/client safely, effectively and efficiently. Every day thousands of patients/clients undergo Venepuncture and Peripheral Intravenous Cannulation in hospitals and community settings across the Health Service. This document "Guiding Framework for Education, Training and Competence Validation in Venepuncture & Peripheral Intravenous Cannulation for Nurses & Midwives" (HSE 2017) updates the 2010 guidelines and provides a contemporaneous national standardised evidence based approach for the education and training of nurses and midwives in Venepuncture & Peripheral Intravenous Cannulation. It facilitates the transferability of these critical skills across hospitals and healthcare organisations, to ensure that adults, children, infants and neonates, throughout the country can benefit from the same high standards of care and quality of nursing and midwifery intervention in Venepuncture and Cannulation.

Nurses and midwives with clinical competence in venepuncture and peripheral intravenous cannulation, across hospitals and healthcare organisations, play a vital role in the frontline clinical settings, by promoting quality and continuity of care that enables patients/clients to be treated effectively and efficiently in the healthcare setting most appropriate to their needs.

It is with great pleasure that I introduce the HSE's Guiding Framework for Education, Training and Competence Validation in Venepuncture & Peripheral Intravenous Cannulation for Nurses & Midwives (2017). This document aims to support nurses and midwives, healthcare managers and educators to implement venepuncture and peripheral intravenous cannulation in their organisations and to assist in the delivery of a robust mechanism that will ensure quality and safety for patients/clients in our care.

I wish to acknowledge the effort and commitment of all those involved in developing the guiding framework and supporting material. Particular thanks are extended to James O'Shea, Director of Nurse Education, Mental Health (Chair of national working group), Cathriona Greene, Interim Director, Regional Centre for Nursing & Midwifery Education (project manager). Patrick Glackin, Area Director of Nursing & Midwifery Planning & Development (Leadership team representative) and the national working group for their time, commitment and expertise in updating this pivotal guiding framework.

Mary Wynne
Health Service Executive
Nursing & Midwifery Services Director

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Disclaimer: This Guiding Framework has been prepared to facilitate healthcare individuals working within the scope of this document, and must be read in conjunction with regulatory, professional, legislative and other key referenced documents. Access to and use of the information herein is supported by the Health Service Executive (HSE), therefore, the HSE shall not be liable for any changes or amendments made to this to document.

Abbreviations

This document has adhered to the Health Service Executive, Code of Practice for Healthcare Records Management: Abbreviations, Version 2.0 (2010) however, further abbreviations have been identified and are considered for use within this document as outlined;

AHR	Alcohol Hand Rub
ANTT®	Aseptic Non Touch Technique
CRBSI	Catheter-Related Bloodstream Infection
EMI	Emergency Management of Injuries
HCA-BSI	Healthcare Associated Bloodstream Infection
NMBI	Nursing and Midwifery Board of Ireland
ONMSD	Office of the Nursing and Midwifery Services Director
PIVC	Peripheral Intravenous Cannulation
PPPG's	Policy, procedure, protocol and guidelines
VIP	Visual Infusion Phlebitis

Glossary of Key Terms

Adult is defined as a person 16 years of age and over, in line with HSE National Consent Policy (2014).

Aseptic field is a designated aseptic working space that contains and protects the equipment used in the procedure from direct and indirect environmental contamination by micro-organisms. In Aseptic Non Touch Technique (ANTT®), aseptic fields are termed Critical or General Aseptic Fields.

Aseptic Non Touch Technique (ANTT®) An International standard for Aseptic Technique originated by Stephen Rowley in the mid 1990's provides a practice framework for Aseptic Technique to standardise practice language processes used during all invasive clinical procedures and the insertion, maintenance and removal of invasive medical devices (Rowley et al. 2010). ANTT® is based on the novel concept of Key-Part and Key-Site protection. Intravenous catheter-related bloodstream infections (CRBSI) have become a leading cause of healthcare associated bloodstream infections (HCA-BSI) (HPSC 2009). The main aim of ANTT® is to minimise cross contamination through the transfer of microorganism during invasive clinical procedures.

Assessor is a registered nurse and/or midwife who has undertaken training and is certified as a competent expert practitioner in venepuncture and/or peripheral intravenous cannulation. It is recommended that nurses and midwives develop their competence within specific disciplines according to their area of practice.

Candidate means a person who is following a course of study or a period of adaptation leading to first time registration with the Nursing & Midwifery Board of Ireland (NMBI).

Cannula is a short and flexible tube, containing a needle, or introducer, which pierces the peripheral vein, to provide access to the vascular circulation for the administration of intravenous fluids and medications.

Child refers to neonate, infant, child and adolescent's under 16 years of age unless otherwise stated.

Cleaning is defined as the reduction of bio burden and removes foreign material. In the health care environment this is typically undertaken using water and a neutral detergent or a commercially prepared wipe.

Clean Utility Room is a room designated for the storage and preparation of drugs and lotions, it is also the area where clean and sterile supplies are held; it may be used as a preparation area for dressing trolleys and for intravenous infusions (Health Building Note, 00-09 2013).

Clinical Governance is a framework through which healthcare teams are accountable for the quality, safety and satisfaction of those for whom they care.

Competency	is the ability of the nurse or midwife to practise safely and effectively fulfilling their professional responsibility within their scope of practice (NMBI 2015).
Critical aseptic field	is the main aseptic field used for Surgical ANTT® that requires critical management i.e. only sterilised equipment may come into contact with the field.
Decontamination Area	is an area separate from the clean utility non-used room that is designated for cleaning and disinfecting equipment.
Dirty Utility Room	is a room designated for the disposal of body fluids including water contaminated with body fluids, exudates, patient wash water. It is also used for the decontamination and storage of commodes, bedpans, emesis bowls and urine bottles. Demarcation between clean/unused equipment and dirty/soiled equipment is essential.
Disinfection	is defined as the destruction of pathogenic micro-organisms. This may be achieved using chemical or thermal processes.
Evidence-based practice	is the use of the best available evidence together with the nurse or midwife's expertise and a patient's values and preferences in making healthcare decisions (NMBI 2015).
Family Centred Care	is the professional support of the child and the family through a process of involvement and participation, underpinned by empowerment and negotiation. Family Centred Care is characterised by a relationship between healthcare professionals and the family, in which both parts engage in sharing the responsibility for the child's health care (Mikkelsen & Frederiksen 2011).
General aseptic field	is the main aseptic field used for standard ANTT® that promotes asepsis during procedures by providing basic protection for the care environment. Because of the small number and small size of Key-Parts, general aseptic fields do not require critical management, because Key-Parts can be easily protected by Micro Critical Aseptic Fields (caps and covers) and non touch technique.
Health Care Zone	is defined as all physical surfaces outside of the patient zone including other patients and their patient zones and the wider healthcare environment.
HSE funded Agencies	refer to a range of service providers under either section 38 or 39 arrangements. Section 38 documentation relates to the Agencies provided with funding under Section 38 of the Health Act, 2004. Section 39 documentation relates to Non-Acute/Community Agencies being provided with funding under Section 39 of the Health Act 2004.

Infant	are defined from one month to twelve months.
Intravenous attempt	is defined as the needle piercing the skin (Fields et al. 2014).
Key-Parts (active)	are the critical parts of the procedure equipment that come into contact with Key Sites, any liquid infusion, or with any other Key-Parts connected to the patient via a medical device. If Key-Parts become contaminated during the procedure pathogenic organisms may gain entry into the patient resulting in infection.
Key-Parts (inactive)	are Key-Parts that are not deemed active until used i.e. closed IV ports. They will be rendered aseptic prior to use by effective disinfection.
Key Sites	are defined as any portal of entry into the patient including open wounds including insertion and puncture sites for invasive medical devices.
Must	commands the action a nurse or midwife is obliged to take from which no deviation whatsoever is allowed (NMBI 2014).
Neonate	includes all preterm infants and term infants (birth – 28 days or while nursed) post delivery in the Neonatal Unit.
Order of Draw	refers to the sequence in which blood collection bottles should be filled (WHO 2010).
Patient	is a person who uses health and social care services. In some instances, the terms 'client', 'individual', 'person', 'people', 'resident', 'service user', 'mother', or 'baby' are used in place of the term patient depending on the health or social care setting (NMBI 2014).
Patient Zone	is the immediate space surrounding the patient that may be touched by the patient and may also be touched by the health care worker.
Peripheral Intravenous Cannula	is a short, flexible hollow plastic tube or cannula containing a needle or introducer, into a peripheral vein to provide access to the vascular circulation, for the administration of fluids and medications (RCN 2010).
Point of Care	is exactly where the care action takes place and is defined as the place where the three elements come together: the patient, the healthcare worker and care or treatment involving contact with the patient or his or her surroundings (WHO 2009).
Policy, procedure, protocol and guideline (PPPG)	they articulate consistent approaches for best practice and are essential tools in improving the quality of health care provision.

Positive Pressure	is constant even, force within the lumen of a catheter that prevents blood reflux; achieved by clamping while injecting (RCN 2010).
Practice Standards for Midwives	sets out the standards of midwifery care and awareness of the legislation and guidelines defining a registered midwife in Ireland role and describing their scope of practice (NMBI 2015b).
Registered midwife	is a midwife whose name is entered in the midwives division of the register of nurses and midwives (NMBI 2014).
Registered nurse	is a nurse whose name is entered in the nurses division of the register of nurses and midwives (NMBI 2014).
Safety Blood Collection Systems	is a single use, sterile, winged needle bonded to flexible tubing with a luer connector. Devices used locally may vary.
Scope of Practice	is the range of roles, functions, responsibilities and activities which a registered nurse or registered midwife is educated, competent and has authority to perform (NMBI 2015).
Should	indicates a strong recommendation to perform a particular action from which deviation in particular circumstances must be justified (NMBI 2015).
Standards	are authoritative statements developed, monitored and enforced by the Nursing and Midwifery Board of Ireland to describe the responsibilities and conduct expected of registered nurses and midwives. The standards are based on the principles and values that underpin professional practice (NMBI 2014).
Sterilisation	is defined as a process by which all viable forms of micro-organisms including spores are destroyed (APIC 2009).
Successful Intravenous placement	is an IV attempt that results in the ability to flush Normal saline 0.9% without the development of pain or swelling at the insertion site and subsequently enable use of the IV for medical care (Fields et al. 2014).
Venepuncture	is the introduction of a needle into a vein to obtain a blood sample for haematological, biochemical or bacteriological analysis -also known as phlebotomy, venesection, drawing or taking blood (Weller 2009).

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Section 1
Introduction to the Guiding Framework

1.0 Introduction to the Guiding Framework

1.1 Background

Nurses and midwives provide a significant volume of the care delivered within the healthcare system. Their role and function has developed extensively in order to streamline and safely augment the quality of the patient's journey. The primary focus of nursing and midwifery roles occurs through increased competency attainment for nurses and midwives, thereby, enhancing their range of clinical skills, capacity and opportunity to improve efficiency of care delivered to patients. The Health Service Executive (HSE) places an important emphasis on quality and patient safety, legislative changes and development of standards of care driven by quality improvement initiatives and risk management. Within this context, the purpose of this initiative to review the "Guiding Framework for Education, Training and Competence Validation in Venepuncture and Peripheral Intravenous Cannulation for Nurses and Midwives" is to foster and develop the capability of staff to improve the quality and safety processes of venepuncture and peripheral intravenous cannulation (PIVC) knowledge and skills in line with evidence based practice. The objective of this guiding framework is to create a standardised culture where quality and safety is the primary goal of all individuals undertaking these skills and that every clinical and social care action is aligned within the review of this Guiding Framework.

This guiding framework has adapted the HSE (2014) key principles for quality and safety, which emphasises that healthcare teams are accountable for the quality, safety and experience of each patient in the care they deliver (outlined in Table 1) (Appendix 1(a)). These principles support the ethos that service providers should ensure the best achievable healthcare outcomes are facilitated. The Health Services Corporate Plan 2015 – 2017 was approved by the Minister in 2015 and the plan sets out the vision for the health services; 'A healthier Ireland with a high quality health service valued by all'. This vision is underpinned by the core values of care, compassion, trust and learning (outlined in Table 2) (Appendix 1(b)). The Department of Health, in collaboration with the ONMSD (HSE) and Nursing & Midwifery Board of Ireland (NMBI) (2016) emphasise the core values, compassion, care, and commitment which are the ingrained values that guide the practice of nursing and midwives (outlined in Table 3) (Appendix 1(c)). NMBI is the statutory regulatory body which sets the standards for education, registration and conduct of nursing and midwifery in Ireland. Each nurse and midwife has a responsibility and accountability to ensure their actions reflect high standards of professional practice and protects the public, (NMBI 2014). This guiding framework supports the development and evaluation of education, training and competence validation in venepuncture and peripheral intravenous cannulation. It provides a consistent approach for teaching and competence assessment of venepuncture and peripheral intravenous cannulation skills across all services, utilising a step by step skill pathway within section 2.

The framework was developed in partnership with the Office of the Nursing and Midwifery Services Director (ONMSD), Nursing and Midwifery Planning and Development teams, Centres of Nursing/Midwifery/Children's Nurse Education, the Health Protection and Surveillance Centre, Librarian Services, Healthcare Professionals and Educators with expertise in venepuncture and peripheral intravenous cannulation. A comprehensive review of a wide range of literature, national, international and regulation was completed to inform this guideline document by a National Working Group Appendix 1 (d). This team, led by a Project Manager, collaborated extensively to progress this development. Following this comprehensive review to include best practice and evidence based research by the established National Working Group; the Guiding Framework was circulated to a Consultation Group Appendix 1 (e).

The Director of the ONMSD is grateful to the health service organisations whose education, practice development and clinical staff, involved in venepuncture and peripheral intravenous cannulation, gave of their time, expertise and educational material, which in turn guided and facilitated the development of this framework. The Director of the ONMSD views the development of clinical skills at all levels of responsibility as fundamental to the success of the organisation services and the person centred care being delivered.

1.2 Components of the Guiding Framework

The framework comprises of:

A Skill Pathway utilising a blended learning approach consisting of:

- An eLearning Module with on-line Self-Assessment – www.hseland.ie
- Skills Demonstration and Practice Session
- Clinical Supervised Practice
- Competence Assessment
- Maintenance of competence through self-assessment (Appendix 2 (a) and 2 (b)) in line with local policy.

Section 1	Introduction to the Guiding Framework
Section 2	National Venepuncture and Peripheral Intravenous Cannulation Programme – Guidance for Educators and Learners Handbook (HSE 2017) available online i.e. HSE LanD; www.hseland.ie
Section 3	Infection Prevention & Control Guidelines for Venepuncture and Peripheral Intravenous Cannulation
Section 4	National Clinical and Procedural Guideline for Nurses and Midwives undertaking Venepuncture and/or Peripheral Intravenous Cannulation in **Adults** (for local adaptation) (HSE 2017)
Section 5	National Clinical and Procedural Guideline for Nurses and Midwives undertaking Venepuncture and/or Peripheral Intravenous Cannulation in **Infants and Children** (for local adaptation) (HSE 2017)
Section 6	National Clinical and Procedural Guideline for Nurses and Midwives undertaking Venepuncture and/or Peripheral Intravenous Cannulation in **Neonates** (for local adaptation) (HSE 2017).

1.3 Scope of the Framework

The Scope of the framework applies to:

- Nurses and midwives working with adults, infants, children and neonates within the HSE and/or HSE funded agencies who wish to undertake venepuncture and/or peripheral intravenous cannulation skills
- Agency nurses and midwives sourced and engaged or directly employed by an employment agency and who are provided to the HSE or HSE funded sites by the employment agency on a temporary basis
- Nurses and midwives registered with the Nursing & Midwifery Board of Ireland
- Pre-registration undergraduate nurses and midwives during their Internship period and taking cognisance of Domain 3: Knowledge and Cognitive Competences as per "knowledge and understanding of the health continuum, life and behavioural sciences and their applied principles that underpin a competent knowledge base for nursing and healthcare practice" as outlined in the document, "Nurse Registration Programmes Standards and Requirement" (NMBI 2016).

1.4 Key Principles and Values

The key principles and values underpinning the guiding framework are outlined in Tables 1, 2 and 3:

Table 1

- Patient first
- Safety
- Personal responsibility, Accountability, Authority
- Continuous quality improvement
- Standardisation
- Supporting performance
- Open culture
- Clinical Leadership

Adapted from - The Guiding Principles for Quality and Safety in the Report of the Quality and Safety Clinical Governance Development Initiative - Sharing our learning. We are all responsible and together we are creating a safer healthcare system. (HSE 2014) (Appendix 1 (a)).

Table 2

Adapted from - Building a high quality health service for a healthier Ireland (HSE Values Health Service Executive Corporate Plan 2015 – 2017) (Appendix 1(b)).

Table 3

Adapted from - Position Paper: One; Values for Nurses and Midwives in Ireland. (Department of Health, Nursing and Midwifery Board of Ireland and Office of Nursing and Midwifery Services Directorate 2016) (Appendix 1 (c)).

1.5 Aim

The aim of this guiding framework is to provide a standardised approach for the education, training and competence validation of nurses and midwives who undertake venepuncture and/or peripheral intravenous cannulation. It also enables the transferability and recognition of venepuncture and/or peripheral intravenous cannulation skills acquired by nurses and midwives. The framework supports safe, quality care for patients, who access healthcare across the HSE/HSE funded Agencies.

1.6 Purpose

The purpose of this revised and updated guiding framework is to provide:

- An outline of the roles and responsibilities associated with implementing the clinical skills of venepuncture and/or peripheral intravenous cannulation by nurses and midwives
- A standardised approach for education, training and competence validation for nurses and midwives who undertake the clinical skills of venepuncture and/or peripheral intravenous cannulation, utilising a blended learning approach
- A blended learning approach, whereby the theoretical and self-assessment component of the programme is provided in an eLearning module and is completed at the learner's own pace, accessible on www.hseland.ie, and the remaining elements are delivered through the Centres of Nursing/Midwifery/Children's Nurse Education, Practice Development Units or designated educational providers
- A skill pathway approach which outlines the steps required for the nurse or midwife to obtain competence in the clinical skill of venepuncture and/or peripheral intravenous cannulation
- Guidance for educators and learners which includes the following:
    - An outline of the Health Services Executive's core requirements for the education, training and assessment and continuing competence of nurses and midwives undertaking venepuncture and/or peripheral intravenous cannulation within the HSE and /or HSE funded Agencies
    - Criteria and application process, programme duration and accessibility, assessment, evaluation, certification, ratification and learning resources
    - The aims and learning outcomes for the venepuncture and peripheral intravenous cannulation programmes
    - A module outline and unit specific learning outcomes for the venepuncture and peripheral intravenous cannulation programmes.

1.7 Governance of the Programme

The eLearning component of the programme can be accessed on HSELanD whilst the remaining elements will be provided through the internal structures of the HSE and/or HSE funded organisations. The overall Governance for the Management and evaluation of the programme will rest with the Office of the Nursing & Midwifery Services Director (ONMSD) HSE.

The responsibility for the delivery and co-ordination of the programme will rest with the Director of Centres of Nursing/Midwifery/Children's Nurse Education, Practice Development Units or designated educators. Programmes delivered through other HSE and non-HSE agencies will be the responsibility of each named provider. A database of all staff who attend the programme should be maintained by the person responsible for the co-ordination of the programme. This information will be required for ongoing reviews, audits and reporting. HSELanD will maintain a database of the number of nurses and midwives who complete the eLearning module. The ONMSD will report on numbers of nurses and midwives trained on an annual basis or on other occasions as required. The review of the programme will be determined by the ONMSD Director.

1.8 Criteria for Nurses and Midwives

1.8.1 Criteria for Nurses and Midwives Commencing the Skill of Venepuncture and/or Peripheral Intravenous Cannulation

Nurses and midwives must:

- Be registered on the live register of nurses and midwives maintained by the NMBI or as a pre-registration nurse and/or midwife during their internship period of the undergraduate nursing and/or midwifery registration programme
- Be employed by the HSE/HSE Funded agencies
- Hold certification in Hand Hygiene within the last 1 to 2 years either from HSELanD Hand Hygiene module or locally approved training
- Have successfully completed and hold certification in the Management and Administration of Intravenous Medications programme, in advance of proceeding to undertake the skill of peripheral intravenous cannulation
- Be approved by their Clinical Nurse or Midwife Manager/Director as an appropriate person to expand their practice, to include venepuncture and/or peripheral intravenous cannulation
- Be employed in an area where venepuncture and/or peripheral intravenous cannulation is required to enhance the patient's journey and service provision
- Successfully complete the educational preparation and competence assessment, that is compliant with or equivalent to that outlined in the HSE/ONMSD Guiding Framework for the Education, Training and Competence Validation in Venepuncture and Peripheral Intravenous Cannulation for Nurses and Midwives (2017)
- Accept personal and professional responsibility and accountability for undertaking venepuncture and/or peripheral intravenous cannulation in accordance with local policies.

1.8.2 Criteria for Nurses and Midwives who have Successfully Undertaken a Venepuncture and/or Peripheral Intravenous Cannulation Programme and practice the skill of Venepuncture and/or Peripheral Intravenous Cannulation in another Employment.

To preclude unnecessary replication for nurses or midwives who are newly employed by the HSE and/or HSE Funded Agency, the following steps are necessary prior to undertaking venepuncture and/or peripheral intravenous cannulation:

- The relevant Clinical Nurse/Midwifery Manager or Director of Nursing/Midwifery must be satisfied that the content of the training programme is equivalent to that outlined in the HSE Guiding Framework for the Education, Training and Competence Validation in Venepuncture and Peripheral Intravenous Cannulation for Nurses and Midwives (2017).

The nurse or midwife must:

- Provide documentary evidence that they have completed a training programme, were deemed competent and have maintained their competence prior to their change of employment
- Become familiar with this organisation's guidelines and procedures related to venepuncture and/or peripheral intravenous cannulation and professional guidelines
- Nurses and midwives, who are not competent using the venepuncture and/or peripheral intravenous cannulation equipment of their new employment must enter the Skill Pathway on Step 6

- Nurses and midwives, whose education and training is not aligned to the HSE Guiding Framework for the Education, Training and Competence Validation in Venepuncture and Peripheral Intravenous Cannulation for Nurses and Midwives (2017) must undertake all eight steps of the Skill Pathway.

1.9 Roles and Responsibilities

1.9.1 Role and Responsibility of the Clinical Nurse/Midwife Manager/Director of Nursing/Midwifery

It is the responsibility of the Clinical Nurse/Midwife Manager or Director of Nursing/Midwifery to ensure that nurses and midwives working with adults, infants, children and neonates who are undertaking venepuncture and/or peripheral intravenous cannulation fulfil the required criteria as per 1.8 and that a Clinical Skills Assessor is in place.

1.9.2 Role and Responsibility of the Nurse and Midwife

It is the responsibility of each nurse and midwife to:

- Work within their Scope of Practice – "Scope of Nursing and Midwifery Practice Framework" (NMBI 2015)
- Comply with local organisational venepuncture and/or peripheral intravenous cannulation guidelines and procedures therein, when undertaking these clinical skills
- Become competent in the clinical skill of venepuncture and/or peripheral intravenous cannulation and the equipment specific to the procedure
- Be familiar and comply with the organisation's infection prevention and control, health & safety procedures and risk management policies as they apply to venepuncture and/or peripheral intravenous cannulation
- Develop and maintain competence in venepuncture and/or peripheral intravenous cannulation specific to the needs of the service and its users.

1.9.3 Role and Responsibility of the Clinical Practice Supervisor/Assessor:

The Clinical Skills Assessor should be a Registered Nurse/Midwife who is competent in venepuncture and/or peripheral intravenous cannulation and is approved by Nursing & Midwifery Practice Development/Director of Nursing/Midwifery to undertake the assessment:

- The Clinical Practice Supervisor/Assessor must be competent in the clinical skills to facilitate assessment and have knowledge of local policies and the assessment process required for venepuncture and/or peripheral intravenous cannulation procedure
- The Clinical Practice Supervisor/Assessor must assess the nurse/midwife undertaking each procedure and complete the Record of Supervised Practice and Competence Assessment as outlined within Section 2
- The Clinical Practice Supervisor/Assessor must have undertaken Teaching & Assessment and /or Preceptorship education programme and/or an equivalent qualification to support the nurse/midwife to undertake the required number of supervised clinical practice assessments, applicable to their area of clinical practice.

Please note:

In circumstances where there is not a competent registered nurse/midwife in venepuncture and/or peripheral intravenous cannulation available, then a competent practitioner in venepuncture and/or peripheral intravenous cannulation from another profession can assess a nurse/midwife provided they are approved by Nursing & Midwifery Practice Development or Director of Nursing/Midwifery to undertake the assessment.

1.10 Implementation Process

The National Working Group (Appendix 1(d)) under the auspices of the Office of the Nursing Midwifery Services Director, facilitated the development and implementation of the Guiding Framework for the Education, Training and Competence Validation in Venepuncture and Peripheral Intravenous Cannulation for Nurses and Midwives (2017).

Centres of Nursing/Midwifery/Children's Nurse Education, Practice Development Units or designated educators are charged with the co-ordination and implementation of the national standardised education and training programme for venepuncture and/or peripheral intravenous cannulation using the documentation to support the implementation process as outlined within Section 2. Directors of Nursing and Midwifery are responsible for ensuring that sufficient clinical nursing and midwifery staff undertake education and training programmes appropriate to their service requirements in accordance with this guiding framework.

Appendix 1 (a) Guiding Principles

Adapted from - The Guiding Principles for Quality and Safety in the Report of the Quality and Safety Clinical Governance Development Initiative - Sharing our learning. We are all responsible and together we are creating a safer healthcare system (HSE 2014).

Principles	Descriptor
Patient First	Based on a partnership of care between patients, families, carers and healthcare providers in achieving safe, easily accessible, timely and high quality service across the continuum of care.
Safety	Identification and control of risks to achieve effective, efficient and positive outcomes for patients and staff.
Personal Responsibility Accountability, Authority	Where individuals as members of healthcare teams, patients and members of the population take personal responsibility, accountability and authority for their own and others health needs. The scope given to staff at each level of the organisation to carry out their responsibilities and accepting accountability for their actions. The individual's authority to act, the resources available and the boundaries of the role are confirmed by their direct line manager.
Continuous quality improvement	A learning environment and system that seeks to improve the provision of services with an emphasis on maintaining quality in the future, not just controlling processes. Once specific expectations and the means to measure them have been established, implementation aims at preventing future failures and involves the setting of goals, education and the measurement of results so that the improvement is ongoing.
Inter-disciplinary collaboration	Where individuals, as members of healthcare teams collaborate professionally from diverse fields, who work in a proactive co-ordinated fashion in the provision of clinical and social care and toward a common goal for the patient. Inter-disciplinary working focuses on the interdependence between the individuals and groups in delivering services. This requires proactive collaboration.
Standardisation	Authoritative statements developed, monitored and enforced by the Nursing and Midwifery Board of Ireland to describe the responsibilities and conduct expected of registered nurses and midwives. The standards are based on the principles and values that underpin professional practice.
Supporting performance	Managing performance in a supportive way in a continuous process, taking account of clinical professionalism and autonomy in the organisational setting. Supporting a director/manager in managing the service and employees thereby contributing to the capability and the capacity of the individual and/or organisation. Measurement of the patients experience being central in performance measurement (as set out in the National Charter 2010).
Open culture	A culture of trust, openness, respect and caring where achievements are recognised. Open discussion of adverse events are embedded in everyday practice and communicated openly to patients. Staff willingly report adverse events and errors, so there can be a focus on learning, research and improvement, and appropriate action taken where there have been failings in the delivery of care.
Clinical Leadership	Motivating people towards a common goal and driving sustainable change to ensure safe high quality delivery of clinical and social care.

Appendix 1 (b) HSE Values:

Adapted from - Building a high quality health service for a healthier Ireland Health Service Executive Corporate Plan 2015-2017, (HSE 2015).

Values

Care

- We will provide care that is of the highest quality
- We will deliver evidence based best practice
- We will listen to the views and opinions of our patients and service users and consider them in how we plan and deliver our services

Compassion

- We will show respect, kindness, consideration and empathy in our communication and interaction with people
- We will be courteous and open in our communication with people and recognise their fundamental worth
- We will provide services with dignity and demonstrate professionalism at all times

Trust

- We will provide services in which people have trust and confidence
- We will be open and transparent in how we provide services
- We will show honesty, integrity, consistency and accountability in decisions and actions

Learning

- We will foster learning, innovation and creativity
- We will support and encourage our workforce to achieve their full potential
- We will acknowledge when something is wrong, apologise for it, take corrective action and learn from it

We will try to live our values every day and will continue to develop them over the course of this plan

Our Values
Care Compassion Trust Learning

Appendix 1 (c) Nursing & Midwifery Values:

Adapted from - Position Paper: One; Values for Nurses and Midwives in Ireland. Department of Health, Nursing and Midwifery Board of Ireland and Office of Nursing and Midwifery Services Directorate (2016).

Compassion

Compassion means showing empathy and respect for the person to ensure that the dignity of the person is upheld at all times. The nurse and midwife upholds the trust of the person by providing care that is based on integrity, genuineness, kindness, comfort and presence

The nurse/midwife demonstrates compassion by:

- Showing kindness and patience
- Displaying interest and empathic concern
- Understanding the person's perspective
- Being non-judgmental
- Being engaged and present with the person
- Prioritising the person's interest
- Going the extra mile
- Respecting cultural sensitivity and diversity
- Promoting dignity and comfort
- Responding to anxiety and distress for the person and his/her family
- Developing trusting relationships
- Making and taking time for the person
- Being genuine in interactions with the person families and colleagues

Care

Care means having the required knowledge, skill and competence to connect with a person by genuinely listening to and communicating with the person, demonstrating safe evidence-based and collaborative practice

The nurse/midwife demonstrates care by:

- Listening attentively
- Being open (open communication)
- Understanding and responding to each person's holistic needs
- Assessing carefully and making precise clinical decisions
- Ensuring evidence-based approaches to care
- Getting to know the person as an individual
- Advocating for the person
- Knowing what to do and who to call
- Being technically competent
- Explaining procedures and options
- Promoting health and wellbeing
- Encouraging personal choice in decision-making
- Providing quality and safe care

Commitment

Commitment means having a person-centred approach to professional practice. This requires professional courage, a commitment to lifelong learning that is demonstrated by intellectual engagement. Commitment is further demonstrated by a work ethic that is underpinned by a passion and drive for professionalism to develop self and support teams with diligence and resilience

The nurse/midwife demonstrates commitment by:

- Being professional
- Taking responsibility
- Working within his/her scope of practice
- Developing a therapeutic relationship with the person
- Providing individualised person-centred care
- Giving hope
- Engaging in effective communication
- Providing quality safe care
- Pursuing learning as a lifelong endeavour
- Displaying professional courage
- Developing self as a reflective practitioner
- Engaging in evidence-based practice
- Being open to embracing change

VALUES FOR NURSES AND MIDWIVES IN IRELAND

DEPARTMENT OF HEALTH POSITION PAPER: 1 JUNE 2016

Appendix 1 (d) Membership of the National Working Group

Name	Representation
James O'Shea	Chairperson, Director, RCNME, HSE South (Carlow, Kilkenny, South Tipperary, Waterford, Wexford); Director of Nurse Education (Mental Health from Dec. 2015 to date)
Cathriona Greene	Project Manager, Specialist Co-Ordinator, RCNME, HSE South (Carlow, Kilkenny, South Tipperary, Waterford, Wexford); Interim Director, RCNME, HSE South (from Dec. 2015 to date)
Patrick Glackin	Leadership Team Representative, Area Director, ONMSD, HSE West
Miriam Bell	Interim Director, NMPD, HSE South (Carlow, Kilkenny, South Tipperary, Waterford, Wexford)
Denise Doolan	NMPD Officer, HSE Dublin South, Kildare & Wicklow
Roisin McLoughlin	Specialist Co-Ordinator, CNME, Donegal
Glory George	Nurse Tutor/Education Facilitator, St. James's Hospital, Dublin
Patricia O'Hara	Co-ordinator Postgraduate Diploma (Neonatal Intensive Care), Coombe Women & Infants University Hospital
Siobhan Hackett	RANP (Neonatology) NICU, Our Lady of Lourdes Hospital, Drogheda
Helen Murphy	Infection Prevention & Control Manager, Health Protection & Surveillance Centre, HSE
Deirdre O'Hara	Clinical Nurse Specialist – Infection Prevention & Control, Dalkey Health Centre – representing Community Services - IPCI
Catherine Barrett-Boyce	ADON/SM, Infection Prevention & Control, Letterkenny University Hospital – representing Acute Services - IPCI
Catherine Tobin	Post Graduate Education Co-Ordinator, CNME, Ardee
Noreen Geoghegan	ADON, Mental Health Services, Cherry Orchard Hospital
Louisea Burke	Director of Nursing, Care of the Older Person Services, Mountmellick
Fionnuala O'Neill	Nursing Practice Development Coordinator, Our Lady's Children's Hospital, Crumlin
Brendan Leen	Regional Librarian, HSE South East Library Service
Kathleen Fitzmaurice	Nurse Tutor, CCNE, Our Lady's Children's Hospital, Crumlin
Siobhan Gilboy	Children's Clinical Facilitator, AMNCH
Siobhan O'Connor	Nursing Practice Development Co-ordinator (Child Health), AMNCH
Niamh Hegarty	Clinical Skills Facilitator, Neonatal Unit, Rotunda Hospital
Carmel O'Donnell	Director, CCNE, Our Lady's Children's Hospital, Crumlin
Elaine Conway	CPC, Maternity, Our Lady of Lourdes Hospital, Drogheda
Louise Beresford	Clerical Officer, RCNME, HSE South (Carlow, Kilkenny, South Tipperary, Waterford, Wexford)

Acknowledgements

Eileen Kelly, Director, CNE, Cork
Caroline Lamb, A/Critical Care Clinical Facilitator (ICU/HiDU), UHW for editorial input
James Lynch, Interim Director, NMPD, HSE Dublin North, Swords

Appendix 1 (e) Membership of the Consultation Group

Name	Representation
Anne Gallen	Directors of Nursing & Midwifery Planning and Development
Catherine Cannon	Associated Directors of Centres of Nursing & Midwifery Education (ADCNME)
Georgina Bassett	Irish Association of Directors of Nursing & Midwifery (IADNAM)
Imelda Noone	Irish Nursing & Midwifery Practice Development Association (INMPDA)
Cathy Barrett	Infection Prevention & Control Ireland Group
Padraig O'Beirne	Association of Mental Health Group
Philip Crowley	Quality & Patient Safety Directorate

Section 2

National Guidance Handbook for

Educators and Learners

in relation to the
Venepuncture and
Peripheral Intravenous
Cannulation training

2.0 Guidance for Educators and Learners

2.1 Standardised Approach

The HSE in conjunction with the ONMSD has developed this revised national standardised evidence based education and training programme in venepuncture and peripheral intravenous cannulation for nurses and midwives, based on the revised domains of competence as laid down by NMBI (2015). Nurses and midwives undertaking venepuncture and/or peripheral intravenous cannulation can access appropriate education, training and competence assessment, enabling them to perform these expanded roles safely and successfully for patients in their care. In order to ensure a national standardised approach all existing education programmes must be aligned with this Guiding Framework.

A blended learning approach is utilised, whereby the theoretical and self-assessment component of the programme is provided in an eLearning module and is completed at the learner's own time and pace. It is recommended that the theoretical component may be of sixty to ninety minutes duration, with the on-line self-assessment taking twenty minutes and is accessible for the learner through www.hseland.ie. The simulated practical clinical skills demonstration for both programmes is provided through the Centres of Nursing/Midwifery & Children's Nurse Education, Practice Development Units or designated educational providers and it is recommended that adequate time is give for the skill demonstrations and practice as per local need.

The clinical skills and competence assessments under supervision by an identified local clinical skill assessor must be undertaken in the clinical area and must be completed within a twelve week time frame from commencement of the eLearning theoretical component as outlined within the Skill Pathway. The revised guiding framework supports the provision of documentary evidence of skills acquisition in the practice of venepuncture and peripheral intravenous cannulation. It provides for existing venepuncture and peripheral intravenous cannulation education and training programmes to meet the core requirements and therefore, facilitates transferability of skills across health service organisations within the HSE/HSE funded agencies.

National Standardised Certificates of Competence Achievement have been developed to facilitate the transferability and recognition of nurses and midwives venepuncture skills and/or peripheral intravenous cannulation skills, as they work across service areas in the HSE/HSE funded agencies (see certificate templates Appendix 2 (c)).

2.1.1 Programme Philosophy

The programme philosophy is based on the values and beliefs that by nurses and midwives implementing new knowledge, skills and practice, they will meet the service needs of the patient to facilitate delivery of quality standards and evidence based safe care that respects their uniqueness. Nurses and midwives practice in ways that are independent, dependant and interdependent, when they practice with and amongst other healthcare professionals, within a changing and evolving healthcare environment. Therefore, they are required to constantly develop their knowledge, skills and attitudes, to respond to evolving healthcare need especially by expanding their practice. Nurses and midwives who successfully complete this structured programme will be more knowledgeable in evidence-based aspects of venepuncture and/or peripheral intravenous cannulation, thereby, enabling them to provide standardised quality care to patients and their families competently and confidently. Principles of adult education will underpin the delivery of this programme, with an emphasis on facilitating participants to critically evaluate their own learning needs and take responsibility for their professional development.

2.1.2 Rationale for the Programme

The Nurses and Midwives Act (2011), stresses that nurses and midwives should maintain professional competence on an ongoing basis while working confidently within their scope of practice. Ongoing competence to practice can only be achieved by a commitment to lifelong learning on the part of the nurse/midwife. A fundamental component of the "Report of the Quality and Safety Clinical Governance Development Initiative - Sharing our learning. We are all responsible and together we are creating a safer healthcare system", (HSE 2014) is a commitment to ensure that patients are treated in the healthcare setting most appropriate to their needs, while at the same time maximising the healthcare resources. The following documents provide a framework for the evolution of the nursing and midwifery role;

- The Code of Professional Conduct and Ethics for Registered Nurses and Registered Midwives (NMBI 2014)
- The Scope of Nursing & Midwifery Practice Framework (NMBI 2015)
- Guidance to Nurses and Midwives on Medication Management (ABA 2007) www.nmbi.ie
- Nursing Medical Interface – Task Transfer (Circular Ref: 3/2016).

In order for nurses and midwives to be prepared for this role evolution, they have professional responsibility and accountability to ensure they have the necessary knowledge, skills, attitude and competence to meet the needs of the patient. The ONMSD, working in collaboration with all key stakeholders, have reviewed this national programme to ensure it is an evidenced based standardisation of education, training and competence validation, in the skill of venepuncture and peripheral intravenous cannulation, for nurses and midwives.

2.1.3 Programme Ratification

The Guiding Framework for the Education, Training and Competence Validation in Venepuncture and Peripheral Intravenous Cannulation for Nurses and Midwives (2017) has been ratified by the ONMSD. The educational programme is currently in receipt of NMBI category one approval. Local, procedures and guidelines are ratified through local governance structures. Local procedural guideline should be reviewed as per local requirements.

2.1.4 Aim

The overall aim of this programme is to facilitate nurses and midwives to further develop their knowledge, skills, attitude and competence that will enable them to safely and confidently perform the clinical skill of venepuncture and/or peripheral intravenous cannulation for patients in their care.

2.1.5 Objectives

- Provide a standardised approach towards the education, training and competence validation of nurses and midwives, undertaking the clinical skill of venepuncture and/or peripheral intravenous cannulation
- Facilitate the transferability and recognition of a standardised approach to venepuncture and/or peripheral intravenous cannulation skills acquired by nurses and midwives across the HSE/HSE Funded agencies.

2.1.6 Application Process

Nurses and midwives who wish to undertake the education programme of venepuncture and/or peripheral intravenous cannulation must have approval from their Clinical Nurse/Midwife Manager/Director of Nursing/Midwifery, Practice Development Units and apply to their local educational provider.

2.1.7 Learning Resources

Nurses and midwives will have access to library resources, information technology and teaching accommodation to support their learning whilst undertaking the education programme.

2.1.8 Criteria to Undertake the Programme

Nurses and midwives must:

- Be registered on the live register of nurses and midwives maintained by the NMBI
- Pre-registration nurse and/or midwife during their internship period of the undergraduate nursing and/or midwifery registration programme
- Be employed by the HSE/HSE Funded agencies
- Hold certification in Hand Hygiene within the last 1 to 2 years either from HSELanD Hand Hygiene module or locally approved training
- Have successfully completed and hold certification in the Management and Administration of Intravenous Medications educational programme, in advance of proceeding to undertake the skill of peripheral intravenous cannulation
- Be approved by the Clinical Nurse or Midwife Manager or Director of Nursing/Midwifery as an appropriate person to expand their role to include venepuncture and/or peripheral intravenous cannulation
- Be employed in an area where venepuncture and/or peripheral intravenous cannulation is required to enhance the patient's journey and service provision
- Accept personal and professional responsibility and accountability for undertaking venepuncture and/or peripheral intravenous cannulation in accordance with local PPPG's
- Refer to the NMBI publications which identifies key areas for venepuncture and/or peripheral intravenous cannulation to include:
    - Clinical practice guidelines for best practice
    - Legislative framework
    - Risk management
    - Clinical skills practice
    - Experience of actual and/or simulated blood sampling by venepuncture and/or peripheral intravenous cannulation in the practice setting.

2.1.9 Core Requirements

All HSE/HSE funded agencies who facilitate venepuncture and/or peripheral intravenous cannulation education and training programmes shall incorporate the following core requirements:

- Approval by NMBI (Category One)
- Module Content to include the following units of learning:
  - Unit 1: Introduction
  - Unit 2: Venous Site Selection
  - Unit 3: Preparation for the Procedure
  - Unit 4: Procedure
  - Unit 5: Aftercare
- Explicit Aim and Learning Outcomes for each unit of learning
- Underpinned by the Domains of Competence (NMBI 2015)
- Explicit Learner Competence Assessment Process
- Quality assurance, auditing and review processes (to ensure the ongoing fitness for purpose of education and training programmes)
- Agreed locally the shared mechanisms for recording and reporting attendance and competence attainment of individuals at venepuncture and/or peripheral intravenous cannulation education and training.

2.1.10 Programme Accessibility

The programme will be facilitated through the Centres of Nursing/Midwifery & Children's Nurse Education, Nurse Practice Development Units or designated educational providers. The standardised eLearning theoretical modules are accessible for learners through www.hseland.ie. Where nurses and midwives cannot access the on-line theoretical component of venepuncture and/or peripheral intravenous cannulation, they may contact their local Centre of Nursing/Midwifery/Children's Nurse Education, Practice Development Units, local library or designated educational provider for further advice.

2.1.11 Programme Duration

The theoretical and self-assessment component of the programme is provided in an eLearning module and is completed at the learner's own pace. It is recommended that the theoretical component may be of sixty to ninety minutes duration, with the on-line self-assessment taking twenty minutes and is accessible for the learner through www.hseland.ie.

The supervised clinical simulated demonstration and practice session for both programmes is facilitated by Centres of Nursing/Midwifery & Children's Nurse Education, Practice Development Units or designated educational providers and it is recommended that adequate time is given for the skill demonstrations and practice as per local need.

The supervised clinical practice and competence assessments must be undertaken in the clinical area and must be completed within a twelve week time frame from commencement of the eLearning theoretical component as outlined within the Skill Pathway.

2.1.12 Programme Assessment

There are three aspects where assessment is undertaken within the venepuncture and/or peripheral intravenous cannulation programme which are as follows:

(a) Self-Assessment – an online component of the eLearning Module. The assessment is undertaken on completion of the theoretical instruction and provides the nurse or midwife with an indication of their knowledge base prior to proceeding to the clinical skills demonstration and practice session

(b) Clinical Supervised Practice – a pre-defined number of clinical supervised practice assessments (minimum of five) must be undertaken prior to achieving competency. The Record of Supervised Practice and Competence Assessment must be signed on each assessment by the clinical practice supervisor or skills assessor. A children's/infant/neonatal nurse may be required to undergo additional supervised practice in order to achieve competence for neonates, 0 to 1 year olds, 1 to 5 year olds and 5 years old and above

(c) Competence Assessment is the required assessment of clinical competence that deems the nurse or midwife proficient in the skill of venepuncture and/or peripheral intravenous cannulation. The Record of Supervised Practice and Competence Assessment must be completed within twelve weeks of undertaking the theoretical instruction. The nurse or midwife will receive a National Standardised Certificate of Competence Achievement (Appendix 2 (c)) on completion of the final competence assessment as per local arrangement. In the event of the nurse or midwife being unsuccessful in the final competence assessment, a further period of twelve weeks will be granted in order to achieve competence.

2.1.13 Programme Evaluation

Each programme delivered is evaluated by the educational provider. The programme is reviewed based on the findings of the evaluations from both the learners and the facilitators:

- Learner Evaluation of Blended Learning Programme (Appendix 2 (d))
- Facilitator Evaluation (Appendix 2 (e)).

2.1.14 Programme Certification Templates

Certification of competence achievement is issued on receipt of the Record of Supervised Practice and Competence Assessment Form. The National Standardised Certificate of Competence Achievement (Appendix 2 (c)) enables transferability and recognition of venepuncture and/or peripheral intravenous cannulation skills across service areas in the HSE/HSE funded agencies.

2.1.15 Skill Pathway for Venepuncture and/or Peripheral Intravenous Cannulation

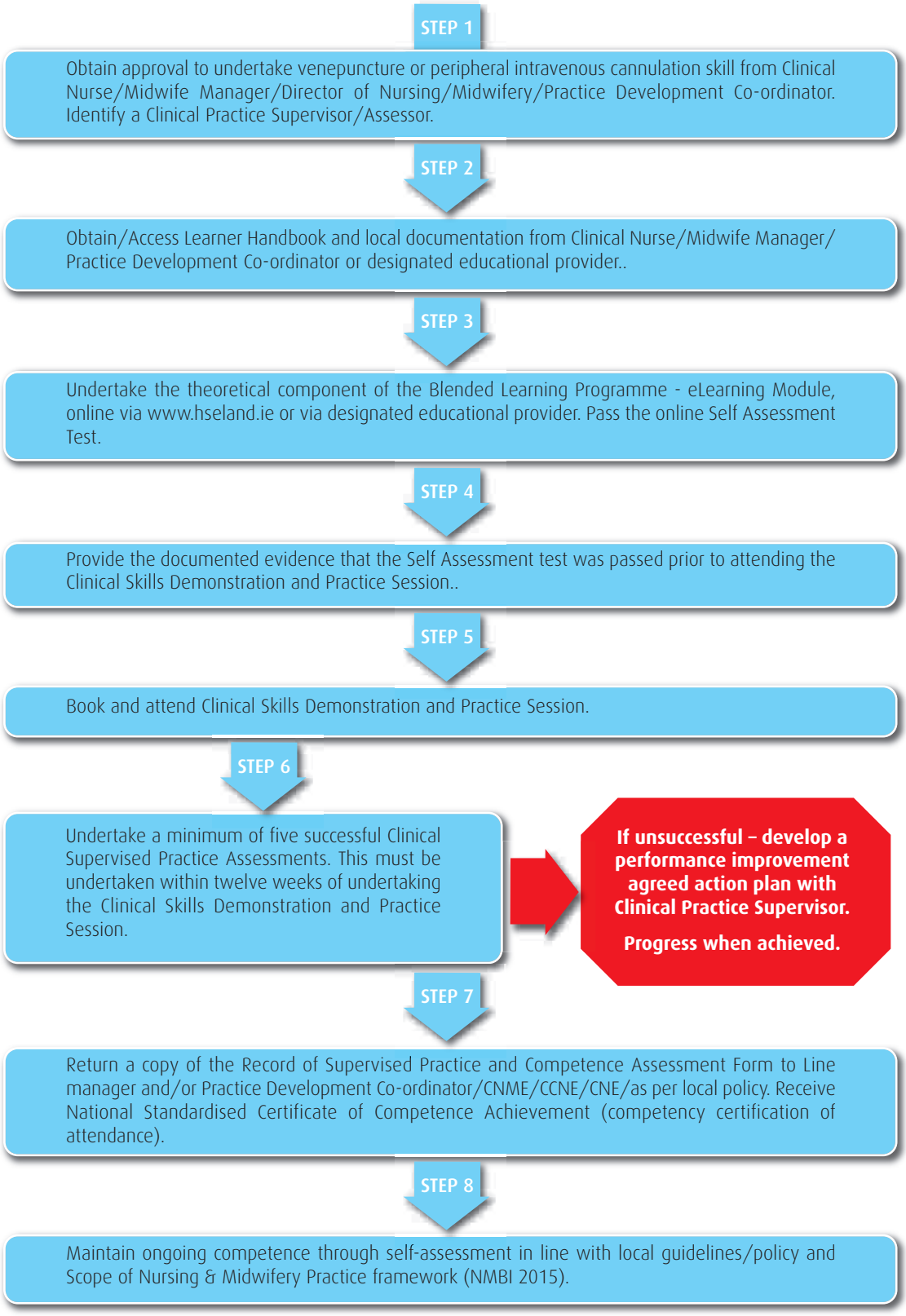
The following skill pathway outlines the eight steps the nurse or midwife must undertake in order to obtain competence in the skill of venepuncture and/or peripheral intravenous cannulation. The nurse/midwife must hold current/valid certification from the HSELanD www.hseland.ie Hand hygiene Module, or a locally approved hand hygiene training course (on induction or within the previous 1- 2 years). The skill pathway must be completed within a twelve week timeframe.

Please note:

If undertaking the peripheral intravenous cannulation programme, nurses and midwives must first successfully complete and hold certification for an approved education programme on the Management and Administration of Intravenous Medication.

Skill Pathway Algorithm

The skill pathway outlines the eight steps involved in order for the nurse/midwife to obtain competence in undertaking the clinical skills of venepuncture and/or peripheral intravenous cannulation (PIVC).



2.1.16 Introduction to Blended Learning Programme – Venepuncture and/or Peripheral Intravenous Cannulation

2.1.16.1 Aim

The overarching aim of the venepuncture and/or peripheral intravenous cannulation programme is to provide the essential evidence based knowledge, attitude, skills and competence to enable nurses and midwives to safely and successfully perform venepuncture and/or peripheral intravenous cannulation for patients in their care.

2.1.16.2 Learning Outcomes

On completion of the Blended Learning programme, the learner will be able to:

- Demonstrate the ability to apply Standard Precautions for Infection Prevention and Control during the procedure, for example:
  - WHO - 5 moments for hand hygiene
  - The principles of ANTT®
  - Effective skin antisepsis
  - Appropriate use of PPE, e.g. gloves and apron
  - Sharps and waste disposal
  - Safe injection practices
  - Decontamination of equipment
- Identify anatomical structures and explain the appropriate choice of venous sites applicable to venepuncture and/or peripheral intravenous cannulation
- Describe the role of the nurse and midwife in undertaking the skill of venepuncture and/or peripheral intravenous cannulation
- Outline the indications for venepuncture and/or peripheral intravenous cannulation
- Communicate with patients and their families to facilitate safe and effective venepuncture and/or peripheral intravenous cannulation
- Demonstrate knowledge of:
  - procedure preparation and how to obtain informed consent
  - the effective technique for the procedure
  - the documentation and management of complications
- Successfully complete the supervised practice assessments and the final competence assessment within a twelve week time frame from commencement of the theoretical component of the blended learning programme
- Practice independently and safely to maintain ongoing competence in accordance with scope of practice and healthcare organisation policy. Self-assessment forms have been developed within this document; see Self-Assessment of Competency for Venepuncture Appendix 2 (a) and Self-Assessment of Competency for Peripheral Intravenous Cannulation Appendix 2 (b).

2.1.17 Programme Outline for Venepuncture and/or Peripheral Intravenous Cannulation

There are four elements in this blended learning programme. Nurses and midwives must successfully complete all four elements of the programme to be deemed clinically competent.

1: eLearning Module	The eLearning element of the programme introduces the theory of venepuncture and/or peripheral intravenous cannulation and includes practical demonstrations on video. There is also an online self-assessment which is a prerequisite to undertaking the clinical skills demonstration practical session. The module should take between sixty to ninety minutes to complete with a further 15 to 20 minutes required for the on-line self-assessment.
2: Clinical Skills Demonstration and Practice Session	The Clinical Skills Demonstration and Practice session gives you the opportunity to practice the skill of venepuncture and/or peripheral intravenous cannulation in a safe simulated educational environment. Contact your line manager or local educational provider to arrange this.
3: Supervised Clinical Practice and Competence Assessment	Supervised Clinical Practice and Competence Assessment enables you to practice the skill of venepuncture and/or peripheral intravenous cannulation in a clinical environment under supervision. A minimum of Five successful supervised practice sessions and final assessment must be completed to be deemed competent. The venepuncture and/or peripheral intravenous cannulation competence assessment must be undertaken within the twelve week time frame from commencement of the eLearning module. A children's/neonatal nurse/midwife may be required to undergo additional supervised practice sessions in order to achieve competence for: • neonates • 0 to 1 year olds • 1 to five-year-olds • 5 year olds and above. The local organisation will identify the number of supervised clinical practice sessions required. These sessions must be arranged in conjunction with your line manager.
4: Competence Assessment and Maintenance	Complete the self-assessment document of the competency document and submit evidence of this to the line manager. See either Appendix 2 (a) Self-Assessment of Competency for Venepuncture or Appendix 2 (b) Self-Assessment of Competency for Peripheral Intravenous Cannulation (as appropriate).

2.2 eLearning Venepuncture Module Outline & Unit Specific Learning Outcomes

The venepuncture eLearning programme consists of five units containing learning outcomes, theoretical content, self assessment questions and resources provided for supplementary reading. The venepuncture module will align itself to the following standardised format:

Components		

Unit 1	**Introduction**
	• Welcome
	• Elements of the programme
	• Prerequisites to the blended learning programme
	• eLearning module contents
	• Using the eLearning module
	• Family centred care and evidence based practice
	• Implications of the European Union (Prevention of Sharps Injuries in the Healthcare Sector) Regulations 2014
	• Module Learning Outcomes
	• Completion of the online self-assessment
		Learning Outcomes
		• Demonstrate WHO 5 moments for Hand Hygiene
		• Identify anatomical structures and explain the appropriate choice of venous sites applicable to venepuncture.
		• Describe the role of the nurse and midwife in undertaking the skill of venepuncture.
		• Outline the indications for venepuncture.
		• Communicate with patients to facilitate safe and effective venepuncture.
		• Demonstrate an understanding of the principles of ANTT®
		• Demonstrate knowledge of:
		  ◦ preparation for procedure and how to obtain informed consent
		  ◦ the effective technique for the procedure
		  ◦ blood draw sequence and the correct use of equipment
		  ◦ documentation and correct labeling
		  ◦ management of complications
		• Demonstrate an understanding of the principles of safe selection, use and disposal of sharps, and actions required if needle stick injury occurs

Unit 2	**Venous Site Selection** • Learning Outcomes • Structure of Veins • Anatomy of Veins, Nerves and Arteries • Selection of a Venous Site • Clinical Assessment to Choose a Vein	**Learning Outcomes** • Identify the relevant veins, nerves and arteries that relate to venepuncture • Undertake a clinical assessment to choose the appropriate vein
Unit 3	**Preparation for Procedure** • Learning Outcomes • Hand Hygiene • Personal Protective Equipment • Management and Disposal of Sharps • Blood Borne Viruses • Choosing Equipment • Order of Blood Draw	**Learning Outcomes** • Identify the appropriate hand hygiene and personal protective equipment required for the procedure • Explain the safe management and disposal of sharps, and the risks associated with the transmission of blood borne viruses during the procedure • Determine the blood collection sets and bottles required for the procedure

Components		
Unit 4	**Procedure** • Learning Outcomes • Indications for Procedure • Communication • Consent • Topical Anaesthetic Agents • Pain relief in neonates/infants/ children • Skin antisepsis • Tourniquet Use and Application • Standard Equipment for Procedure • Venepuncture procedure	**Learning Outcomes** • Identify the indications for venepuncture and explain the five-step process to obtain informed consent as per HSE National Consent Policy (2014) • Recognise the importance of communicating effectively with the patient (adult or child) and family • Identify the pharmacological and non-pharmacological methods of pain relief • Follow the requirement for topical anaesthetic agents and be familiar with their indications and application • Identify when other health care professionals should be involved in assisting with the procedure • Discuss the application of the tourniquet • Identify the standard equipment required for the venepuncture procedure and how to safely carry it out • Describe the importance of ANTT®
Unit 5	**Aftercare** • Potential Problems and Complications • Documentation • Review local Care bundles	**Learning Outcomes** • Identify potential problems and complications associated with venepuncture and outline the appropriate actions to prevent and treat these complications • Critically discuss the importance of documentation in relation to the venepuncture procedure

2.2.1 Venepuncture - Record of Supervised Practice and Competence Assessment

Keep a copy of completed checklist for your own records and send copies to relevant stakeholders as per healthcare organisation policy.

Name & (Initials):	Job Title:		NMBI No.:
Department/Organisation:	Clinical Skill: **Venepuncture**	Date Started:	Competency Achieved Date:
Clinical Skills Assessor Name & (Initials):			
1.	2.	3.	4.

The nurse/midwife must be able to discuss the rationale for each of the actions and demonstrate competence in the practical application of these skills as applicable. Following a **minimum of 5 supervisions,** further supervision maybe required for some individuals.
Please be advised to copy this form if you require more supervised assessments.

	Skill Required Achieved = √ Not Achieved = X	**5 Supervised Practice Assessments** 1	2	3	4	5	Competence Demonstrated **Pass**	**Refer**
A	Perform hand hygiene as per WHO 5 moments for hand hygiene							
B	Check correct identification of patient and any allergies the patient has e.g. to tape or skin cleaning solutions							
C	Obtain verbal consent for this procedure. Ensure appropriate preparation of and communication with patient throughout procedure							
D	Correct positioning of patient and preparation of environment							
E	Considers personal safety and that of others e.g. use of PPE etc.							
F	Selects appropriate vein site and equipment for procedure							
G	Provides local anaesthesia (as per healthcare organisation policy)							
H	Completes venepuncture procedure correctly and safely using ANTT®							
I	Correct order of draw for multiple samples							
J	Demonstrates appropriate troubleshooting techniques if required							
K	Demonstrates aseptic non touch technique (ANTT®), throughout the procedure							
L	Demonstrates disposal of sharps and equipment correctly and safely							
M	Demonstrates appropriate decontamination of equipment used (as per IP&C)							
N	Completes documentation in healthcare records (as per healthcare organisation policy)							

Initial of Clinical Skills Assessor:		
Initial of Nurse/Midwife:		
Date:		
Outcome (tick √) **Pass** ☐ **Refer** ☐		
Final outcome agreed	Nurse/Midwife:	Clinical Skills Assessor: NMBI No.:
Date:	Sign:	Sign:

Note of action plan if referred for further assessment:

PERFORMANCE IMPROVEMENT ACTION PLAN AGREED

Date:	Nurse/Midwife:	Clinical Skills Assessor:

I have read *Name of Organisation* _____ "Venepuncture Policy" ☐
I have read the "Code of Professional Conduct and Ethics for Registered Nurses and Registered Midwives" (NMBI 2014) ☐
I have read the "Scope of Nursing and Midwifery Practice Framework" (NMBI 2015) ☐
Competence agreed for Venepuncture
I agree to maintain my clinical competence in Venepuncture in line with the "Scope of Nursing and Midwifery Practice Framework"(NMBI 2015) ☐

Date:	Nurse/Midwife:	Clinical Skills Assessor:

Clinical Nurse/Midwife Manager:	I am satisfied that the above named person has attended the necessary education & training and has completed the related competence assessment ☐		
Date:	Signed by:	Print Name:	NMBI No.:

2.3 e Learning Peripheral Intravenous Cannulation Module Outline & Unit Specific Learning Outcomes

The peripheral intravenous cannulation eLearning module consists of five units containing learning outcomes, theoretical content, self-assessment questions and resources provided for supplementary reading. The peripheral intravenous cannulation module consists of the following:

Components		Learning Outcomes

Unit 1	**Introduction**
	• Introduction
	• Welcome
	• Elements of the programme
	• Prerequisites to the blended learning programme
	• eLearning module contents
	• Using the eLearning module
	• Family centred care and evidence based practice
	• Implications of the European Union (Prevention of Sharps Injuries in the Healthcare Sector) Regulations 2014
	• Module Learning Outcomes
	• Completion of the online self-assessment
		• Demonstrate WHO 5 moments for Hand Hygiene
		• Identify anatomical structures and explain the appropriate choice of venous sites applicable to peripheral intravenous cannulation.
		• Describe the role of the nurse and midwife in undertaking the skill of peripheral intravenous cannulation.
		• Outline the indications for peripheral intravenous cannulation.
		• Communicate with patients to facilitate safe and effective peripheral intravenous cannulation
		• Demonstrate the principles of ANTT®
		• Demonstrate knowledge of:
		  ◦ preparation for procedure and how to obtain informed consent
		  ◦ the effective technique for the procedure
		  ◦ blood draw sequence and the correct use of equipment
		  ◦ documentation and correct labeling
		  ◦ management of complications
		• Demonstrate principles of safe selection, use and disposal of sharps, and actions required if needle stick injury occurs

Unit 2	**Venous Site Selection** • Structure of Veins • Anatomy of Veins, Nerves and Arteries • Selection of a Venous Site • Clinical Assessment to Choose a Vein	• Identify the relevant veins, nerves and arteries that relate to peripheral intravenous cannulation • Undertake a clinical assessment to choose the appropriate vein
Unit 3	**Preparation for Procedure** • Hand Hygiene • Personal Protective Equipment • Management and Disposal of Sharps • Blood Borne Viruses • Choosing Equipment	• Identify the appropriate hand hygiene and personal protective equipment required for the procedure • Explain the safe management and disposal of sharps and the risks associated with the transmission of blood borne viruses during the procedure • Determine the type of peripheral intravenous cannula required

Unit 4	**Procedure** • Learning Outcomes • Indications for Procedure • Communication • Consent • Topical Anaesthetic Agents • Pain relief in neonates/infants/ children • Skin anti sepsis • Tourniquet Use and Application • Standard Equipment for Procedure • Peripheral Intravenous Cannulation Procedure	• Outline the indications for peripheral intravenous cannulation and explain the five-step process to obtain informed consent as per HSE National Consent Policy (2014) • Describe the importance of communicating effectively with the patient (adult or child) and family • Describe the pharmacological and non-pharmacological methods of pain relief • Explain the requirement for topical anaesthetic agents and be familiar with their indications and application • Identify when other health care professionals should be involved in assisting with the procedure • Discuss the application of the tourniquet • Describe the standard equipment required and how to safely carry out the peripheral intravenous cannulation procedure • Describe the importance of ANTT®
Unit 5	**Aftercare** • Maintenance of a Peripheral Intravenous Cannula • Complications • Removal of a Peripheral Intravenous Cannula • Documentation • Review local Care bundles	• Outline the monitoring and maintenance of the peripheral intravenous cannula taking account of the Peripheral Vascular Catheter Care Bundle • Identify potential complications associated with peripheral intravenous cannulation and outline the appropriate actions to prevent and treat these complications • Explain the indications and procedure for removal of a peripheral intravenous cannula • Critically discuss the importance of documentation in relation to the peripheral intravenous cannulation procedure • Discuss the rational and benefits of care bundles

2.3.1 Peripheral Intravenous Cannulation - Record of Supervised Practice and Competence Assessment

Keep a copy of completed checklist for your own records and send copies to relevant stakeholders as per healthcare organisation policy.

Name & (Initials):	Job Title:		NMBI No.:
Department/Organisation:	Clinical Skill: **Peripheral Intravenous Cannulation**	Date Started:	Competency Achieved Date:
Clinical Skills Assessor Name & (Initials):			
1.	2.	3.	4.

The nurse/midwife must be able to discuss the rationale for each of the actions and demonstrate competence in the practical application of these skills as applicable. Following a **minimum of 5 supervisions,** further supervision maybe required for some individuals.
Please be advised to copy this form if you require more supervised assessments.

	Skill Required Achieved = √ Not Achieved = X	**5 Supervised Practice Assessments** 1	2	3	4	5	Competence Demonstrated **Pass**	**Refer**
A	Perform hand hygiene as per WHO 5 moments for hand hygiene							
B	Check correct identification of patient and any allergies the patient has e.g. to tape or skin cleaning solutions							
C	Obtain verbal consent for this procedure. Ensure appropriate preparation of and communication with patient throughout procedure							
D	Correct positioning of patient and preparation of environment							
E	Considers personal safety and that of others e.g. use of PPE etc.							
F	Selects appropriate vein site and equipment for procedure							
G	Provides local anaesthesia (as per health care organisation policy)							
H	Completes cannula insertion procedure correctly and safely using ANTT®							
I	Secures and anchors cannula safely and effectively							
J	Demonstrates appropriate troubleshooting techniques if required							
K	Demonstrates aseptic non touch technique (ANTT®) , throughout the procedure							
L	Demonstrates disposal of sharps and equipment correctly and safely							
M	Demonstrates appropriate decontamination of equipment used (as per IP&C)							
N	Completes documentation in healthcare records (as per healthcare organisation policy)							

Initial of Clinical Skills Assessor:			
Initial of Nurse/Midwife:			
Date:			
Outcome (tick √) **Pass** ☐ **Refer** ☐			
Final outcome agreed	Nurse/Midwife:	Clinical Skills Assessor:	NMBI No.:
Date:	Sign:	Sign:	

Note of action plan if referred for further assessment:

PERFORMANCE IMPROVEMENT ACTION PLAN AGREED

Date:	Nurse/Midwife:	Clinical Skills Assessor:

I have read *Name of Organisation* _____ "Peripheral Intravenous Cannulation Policy" ☐
I have read the "Code of Professional Conduct and Ethics for Registered Nurses and Registered Midwives" (NMBI 2014) ☐
I have read the "Scope of Nursing and Midwifery Practice Framework" (NMBI 2015) ☐

Competence agreed for Peripheral Intravenous Cannulation

I agree to maintain my clinical competence in peripheral intravenous cannulation in line with the "Scope of Nursing and Midwifery Practice Framework"(NMBI 2015) ☐

Date:	Nurse/Midwife:	Clinical Skills Assessor:

Clinical Nurse/Midwife Manager:	I am satisfied that the above named person has attended the necessary education & training and has completed the related competence assessment ☐		
Date:	Signed by:	Print Name:	NMBI No.:

Appendix 2 (a) Self-Assessment of Competency for Venepuncture

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive
Clinical Strategy and Programmes Division

Office of the
Nursing & Midwifery
Services Director

Self-Assessment of Competency

Name of Nurse/Midwife: _____ NMBI No. _____ Ward/Dept _____

It is recommended that all registered nurses/midwives renew their Venepuncture competency annually and must be prepared to demonstrate their competence if required (Code of Professional Conduct and Ethics for Registered Nurses and Registered Midwives, NMBI 2014).

Nurses/Midwives should take cognisance of NMBI Domains of Competence (2016)

Domain 1: Professional values and conduct of the nurse competences

Domain 2: Nursing practice and clinical decision making competences

Domain 3: Knowledge and cognitive competences

Domain 4: Communication and inter personal competences

Domain 5: Management and team competences

Domain 6: Leadership potential and professional scholarship competences

I have sufficient theoretical knowledge and practice to undertake venepuncture independently and I acknowledge my responsibility to maintain my own competence in line with the Scope of Nursing and Midwifery Practice Framework (NMBI 2015).

Nurse/Midwife Signature: _____ Date: _____

If any deficits in theory and /or clinical practice are identified, the nurse/midwife must discuss with the line manager / clinical supports and implement appropriate actions to achieve competency within an agreed time frame.

Action Plan (for use if needed to reach competences)

Action necessary to achieve competence: Date to be achieved: .....

.....

.....

.....

Supporting evidence of measures taken to achieve competence:

.....

.....

.....

Nurse/Midwife Signature: _____ Date: _____

Keep a copy of this self-assessment of competence for your own records and submit a copy to your line manager.

Appendix 2 (b) Self-Assessment of Competency for Peripheral Intravenous Cannulation

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Clinical Strategy and Programmes Division

Office of the
Nursing & Midwifery
Services Director

Self-Assessment of Competency

Name of Nurse/Midwife: _____ NMBI No. _____ Ward/Dept _____

It is recommended that all registered nurses/midwives renew their Peripheral Intravenous Cannulation competency annually and must be prepared to demonstrate their competence if required (Code of Professional Conduct and Ethics for Registered Nurses and Registered Midwives, NMBI 2014).

Nurses/Midwives should take cognisance of NMBI Domains of Competence (2016)

Domain 1: Professional values and conduct of the nurse competences

Domain 2: Nursing practice and clinical decision making competences

Domain 3: Knowledge and cognitive competences

Domain 4: Communication and inter personal competences

Domain 5: Management and team competences

Domain 6: Leadership potential and professional scholarship competences

I have sufficient theoretical knowledge and practice to undertake Peripheral Intravenous Cannulation independently and I acknowledge my responsibility to maintain my own competence in line with the Scope of Nursing and Midwifery Practice Framework (NMBI 2015)

Nurse/Midwife Signature: _____ Date: _____

If any deficits in theory and /or clinical practice are identified, the nurse/midwife must discuss with the line manager / clinical supports and implement appropriate actions to achieve competency within an agreed time frame.

Action Plan (for use if needed to reach competences)

Action necessary to achieve competence: Date to be achieved: .....

.....

.....

.....

Supporting evidence of measures taken to achieve competence:

.....

.....

.....

Nurse/Midwife Signature: _____ Date: _____

Keep a copy of this self-assessment of competence for your own records and submit a copy to your line manager.

Appendix 2 (c) National Standardised Certificate of Competence Achievement Templates

Venepuncture – Adult Services

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Clinical Strategy and Programmes Division

Office of the
Nursing & Midwifery
Services Director

Hospital / Service Name _____

Record of Competence Achievement

Name: _____ NMBI PIN: _____

Has successfully completed the National Venepuncture Programme

NMBI CEU's = _____

Adult ☐

Facilitator's Name: _____ NMBI PIN: _____ Date: _____

Peripheral Intravenous Cannulation - Adult Services

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Clinical Strategy and Programmes Division

Office of the
Nursing & Midwifery
Services Director

Hospital / Service Name _____

Record of Competence Achievement

Name: _____ NMBI PIN: _____

Has successfully completed the National Peripheral Intravenous Cannulation Programme

NMBI CEU's = _____

Adult ☐

Facilitator's Name: _____ NMBI PIN: _____ Date: _____

Venepuncture – Infant & Child Services

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Clinical Strategy and Programmes Division

Office of the
Nursing & Midwifery
Services Director

Hospital / Service Name _____

Record of Competence Achievement

Name: _____ NMBI PIN: _____

Has successfully completed the National Venepuncture Programme

NMBI CEU's = _____

0 to 1 year old ☐

1 to 5 year old ☐

5 years and above ☐

Facilitator's Name: _____ NMBI PIN: _____ Date: _____

Peripheral Intravenous Cannulation - Infant & Child Services

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Clinical Strategy and Programmes Division

Office of the **Nursing & Midwifery** Services Director

Hospital / Service Name _____

Record of Competence Achievement

Name: _____ NMBI PIN: _____

Has successfully completed the National Peripheral Intravenous Cannulation Programme

NMBI CEU's = _____

0 to 1 year old ☐

1 to 5 year old ☐

5 years and above ☐

Facilitator's Name: _____ NMBI PIN: _____ Date: _____

Venepuncture - Neonate Services

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Clinical Strategy and Programmes Division

Office of the
Nursing & Midwifery
Services Director

Hospital / Service Name _____

Record of Competence Achievement

Name: _____ NMBI PIN: _____

Has successfully completed the National Venepuncture Programme

NMBI CEU's = _____

Neonate ☐

Facilitator's Name: _____ NMBI PIN: _____ Date: _____

Peripheral Intravenous Cannulation – Neonate Services

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Clinical Strategy and Programmes Division

Office of the
Nursing & Midwifery
Services Director

Hospital / Service Name _____

Record of Competence Achievement

Name: _____ NMBI PIN: _____

Has successfully completed the National Peripheral Intravenous Cannulation Programme

NMBI CEU's = _____

Neonate ☐

Facilitator's Name: _____ NMBI PIN: _____ Date: _____

Appendix 2 (d) Learner Evaluation – Blended Learning Programme

Clinical Strategy and Programmes Division

Office of the Nursing & Midwifery Services Director

Programme For Registered Nurses and Midwives To Undertake Venepuncture and/or Peripheral Intravenous Cannulation LEARNER EVALUATION - BLENDED LEARNING PROGRAMME

Please Complete And Return Form To Programme Facilitator At The End Of The Programme.

Provider: ..... Date: .....

Please indicate by placing a √ as to which programme you undertook

Venepuncture Yes ☐ Peripheral Intravenous Cannulation Yes ☐

1. Did the theoretical component of the Blended Learning programme – eLearning Module (via www.hseland.ie) or via a designated educational provider support your knowledge in developing your skills?

   Yes ☐ No ☐

2. Did the Clinical Skills Demonstration & Practice Session support your knowledge in developing your skills?

   Yes ☐ No ☐

3. Please rate the programme content overall (theoretical & practical components)

   Very Good 5 4 3 2 1 Poor

4. Would you recommend this Programme to a colleague?

   Yes ☐ No ☐

5. Can you suggest any changes that would enhance the programme to meet your personal objectives?

   .....

   .....

   .....

Thank you for taking the time to fill out this evaluation. Your comments will help to continuously evaluate the programme.

Appendix 2 (e) Facilitator Evaluation

Clinical Strategy and Programmes Division

Office of the Nursing & Midwifery Services Director

Programme For Registered Nurses and Midwives To Undertake Venepuncture and/or Peripheral Intravenous Cannulation FACILITATOR EVALUATION

Please Complete And Return Form To Programme Provider At The End Of The Programme.

Provider: ..... Date: .....

How was the practice session received by the group?

.....

.....

.....

.....

Was there interaction between yourself and the group? Please comment

.....

.....

.....

.....

Did the resources provided in the classroom meet your requirements? (i.e. multi-media, flip chart etc.). Please comment:

.....

.....

.....

.....

How would you rate your delivery overall?

Very Good 5 4 3 2 1 Not Good

Thank you for taking the time to fill out this evaluation. Your comments will help to continuously evaluate the programme.

Section 3

Infection Prevention & Control

National Clinical Procedure for Nurses and Midwives undertaking Venepuncture and/or Peripheral Intravenous Cannulation

3.0 Aseptic Non Touch Technique (ANTT®) for Venepuncture and Peripheral Intravenous Cannulation

3.1 Introduction

Health care associated infections (HCAI) are increasingly associated with the use of invasive medical devices including intravascular catheters. Peripheral intravascular cannula (PIVC) are the devices most frequently used to allow vascular access. Intravascular catheter related blood stream infections (CRBSI) are the leading cause of healthcare associated blood stream infections. Although the incidence of blood stream infections associated with PIVC use is low, when infection does occur, it can cause considerable morbidity and mortality. The prevention of infection is therefore crucial during the insertion and management of peripheral intravascular catheters (HPSC 2012).

*** Wards/units/health centres should be designed so that the flow of goods, services and waste materials is such that cross contamination between contaminated and clean items is minimised (HPSC 2012).

3.2 Hand Hygiene

Hand hygiene must be performed at the point-of-care and must follow the **"My 5 Moments for Hand Hygiene"** approach to care delivery as outlined by the World Health Organization (HPSC 2014, WHO 2009). The **"My 5 Moments for Hand Hygiene"** approach defines 5 key opportunities when hand hygiene must be performed when within the Patient Zone (Figure i).

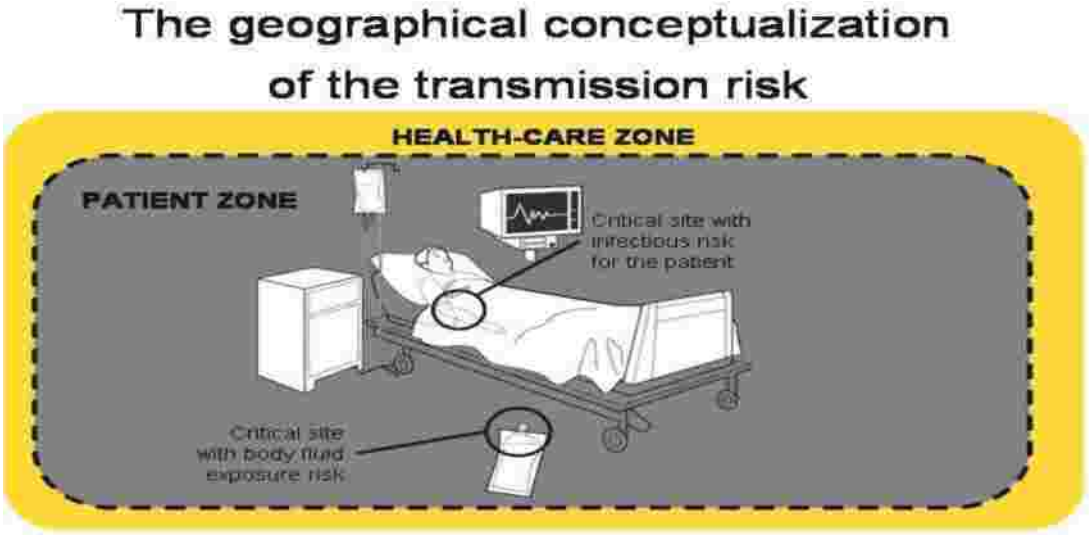


Figure i The geographical conceptualization of the transmission risk

This approach recommends health-care workers to perform hand hygiene (Figure ii) at the following indications:

- 1 Before touching a patient
- 2 Before clean/aseptic procedures
- 3 After body fluid exposure/risk
- 4 After touching a patient
- 5 After touching a patient surroundings.

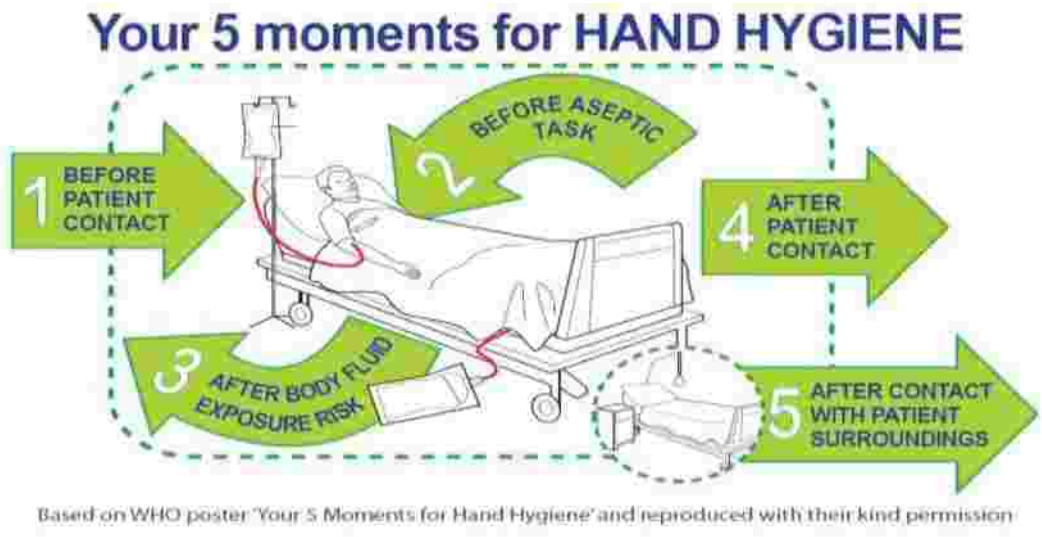


Figure ii Your 5 moments for HAND HYGIENE

3.3 Aseptic Non Touch Technique (ANTT®) for Venepuncture and/or Peripheral Intravenous cannulation

3.3.1 Aseptic Non Touch Technique (ANTT®)

Aseptic non touch technique provides a framework to standardise practical language and processes used during invasive clinical procedures and the insertion, maintenance and removal of invasive medical devices (Rowley et al. 2010). Intravenous catheter-related bloodstream infections (CRBSI) have become a leading cause of healthcare associated bloodstream infections (HCA-BSI) (HPSC 2016). The main aim of ANTT® is to minimise cross contamination through the transfer of microorganism during invasive clinical procedures.

The ANTT® Clinical Practice Framework concentrates on promoting the concept of protecting Key-Parts and Key-Sites supported by basic infection prevention and control principles, staff and patient safety issues such as appropriate hand hygiene, as well as equipment decontamination and Aseptic Field Management (Rowley et. al. 2010). There are two types of ANTT®, Standard ANTT® and Surgical ANTT®. Most common IV procedures are performed using Standard ANTT®.

3.4 Principles of ANTT®

Before every clinical procedure staff must review the whole procedure to ensure that the principles of ANTT® will be followed throughout the whole procedure.

3.4.1 What are Key-Parts and Key-Sites?

Protection of Key-Parts and Key-Sites is the fundamental principle of ANTT®. Key-Parts are the components of the equipment that have direct contact with the patient and therefore if contaminated have the potential to transmit microorganisms directly to or into the patient via a Key-Site such as a peripheral intravenous cannulae puncture or a wound. Being able to identify the Key-Parts and Key-Sites is pivotal to implementing ANTT® appropriately.

Examples of Key-Parts and Key-Sites include: (this is not an exhaustive list)

- Syringe tips
- Needles (both needle tip and needle hub)
- Needless access device attached to catheter lumen
- The side of the dressing that comes in direct contact with the skin
- The skin preparation wipe
- Sterile gauze
- Rubber stoppers of medication vials
- Items used to protect syringe tips
- IV infusion lines include several Key-Parts e.g. fluid bag spikes, all bungs, caps, three way tap, all ports and the end of the infusion line that connects to the extension line that is attached to the cannula. Extension lines must be used to bridge the connection between the cannula and the patient.

3.5 Glove Selection

Wearing appropriate and well-fitting gloves are another important component of ANTT®. Gloves should neither be too small thereby increasing potential for ripping nor so large as to impede manual dexterity.

Prior to commencement staff must decide if the procedure can be completed without touching Key-Parts of the equipment or Key-Sites of the patient. Non sterile gloves should be worn for peripheral intravenous cannulation, venepuncture and intravenous medication administration. Sterile gloves should be worn where it is anticipated that Key-Parts or Key-Sites cannot be protected (i.e. during difficult access e.g. neonatal or a novice practitioner). Sterile gloves should be used when a luer needless connector is disconnected e.g. manipulation of a catheter, (Loveday 2014).

3.6 Aseptic Field Management

Aseptic fields help protect the Key-Parts and Key-Sites from contamination from the environment. The size of the aseptic field will depend upon the size and complexity of the procedure. Sterile packaging/covers can be used as Micro Critical Aseptic Fields to protect syringe tips and other Key-Parts, as figure iii (NICE 2012).

Figure iii – Standard ANTT – Key-Parts protected by Micro Critical Aseptic Fields within a General Aseptic Field

3.7 Equipment Decontamination

Equipment used during procedures requiring aseptic non touch technique must be fit for purpose. Equipment should be well maintained and cleaned effectively. Items such as procedure trays or trolleys should be thoroughly cleaned and disinfected (both internally and externally) before and after each use. Local guidelines should be adhered to in relation to which product to use (Rowley et al 2010).

3.8 Care Bundle

A "care bundle" is a collection of evidenced based interventions that may be applied to the management of a particular condition, in this case the insertion, care and management of PIVC's see Appendix 3 (a) (HSPC 2014). Compliance with the care bundle is defined as the percentage of patients with a PIVC for whom all elements of the PIVC care bundle are documented. Further information and an example of a PIVC care bundle may be found at:
http://www.hpsc.ie/A-Z/MicrobiologyAntimicrobialResistance/CareBundles/PeripheralVascularCatheterPVC/

3.9 Sharps Regulations

The HSE (2016) acknowledges that employees may be exposed, through work activities, to sharps. The Regulations define sharps as 'objects or instruments necessary for the exercise of specific healthcare activities, which are able to cut, prick or cause injury or infection'. This includes equipment such as needles, cannula and blades (such as scalpels) and other sharp medical instruments. Sharps are considered to be work equipment within the meaning of Regulation 2 of the Safety, Health and Welfare at Work (General Application) Regulations 2007.

Prevention of exposure to blood borne pathogens is an underlying principle of the Regulations. To ensure this preventative principle is followed sharps risk assessments must be undertaken to determine if existing workplace controls are adequate. Where additional controls are identified they must take account of the hierarchy of controls and principles of prevention. The Regulations apply to all employers and employees in the healthcare sector.

Where there is a risk of exposure to injury and/or infection from sharps, the Regulations require the employer to eliminate the unnecessary use of sharps. Examples include, eliminating unnecessary injections and introducing the use of needle-free systems. The European Union (Prevention of Sharps Injuries in the Healthcare Sector) Regulations 2014 (S.I. No. 135 of 2014) transpose into Irish law Council Directive 2010/32/EU (HSE, 2016) See Appendix 3 (b).

Further information may be found at:
http://www.hsa.ie/eng/Publications_and_Forms/Publications/Healthcare_Sector/Sharps_Regulations_Guidelines_2014.pdf

3.10 Emergency Management of Injuries (EMI)

3.10.1 Purpose and Scope

The purpose of these guidelines is to provide comprehensive guidance on the appropriate management of injuries where there is a risk of transmission of blood borne viruses (BBV's) and other infections.

These guidelines are intended for use in emergency medical settings where a patient first presents with an injury (including needlestick or other sharp injury, sexual exposure, human bite, exposure of broken skin or of mucous membrane) where there is a risk of transmission of infection, in particular BBV (HSPC 2016).

3.10.2 Outline of Injuries

Injuries where there is a risk of transmission of infection frequently present in emergency departments, occupational health departments and primary care settings. BBV infections such as hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus (HIV) are of particular concern because of the potential long-term health effects for people who become infected, the anxiety experienced by the injured persons, and the increase in their prevalence in the population in recent decades. The appropriate management of such injuries, in the emergency and follow-up periods, has important implications in terms of minimising the risk of transmission of BBVs and in allaying the psychological impact on the injured person. Many emergency departments and occupational health departments throughout Ireland have developed guidelines for the management of injuries where there is a risk of BBV transmission. However, these guidelines differ in their scope (eg all BBVs versus HIV; all exposures versus occupational or sexual), their level of detail, and recommended actions, such as testing schedules and the use of post-exposure prophylaxis (PEP). The development of these guidelines was prompted by the idea of having standardised guidelines on the management of these injuries that could be used in all relevant settings throughout the country and that would be based on best available evidence and expert opinion see Appendix 3 (c) (HSPC 2016).

Further information may be found at:
http://www.hpsc.ie/A-Z/EMIToolkit/EMIToolkit.pdf or
http://www.hpsc.ie/A-Z/EMIToolkit/ appendices/app2.pdf

Appendix 3 (a) Adapted from Health Protection Surveillance Centre (2014) Care Bundles for Peripheral Vascular Catheter (PVC)

Example of a Peripheral Vascular Catheter Maintenance Care Bundle – Standard Operating Procedure

Objectives:

1. **To optimise peripheral vascular catheter care in OUR ward and reduce as far as possible any infectious complications**
2. **To be able to demonstrate quality peripheral vascular catheter in OUR ward**

Requirements	Before the Peripheral Vascular Catheter Bundle Procedure can be considered: • Measurement of compliance with the care bundle should be performed as part of a ward/unit/directorate quality improvement programme for infection prevention and results used to monitor the effect of this programme • Relevant clinical teams (consultants and NCHDs), director of nursing and nurse team should be involved in designing/adapting the bundle, deciding how frequently and who will monitor compliance and how often and how results will be fed back to relevant staff Prior to starting the Peripheral Vascular Catheter Bundle procedure: Personal Protective Equipment (PPE): Gloves, plastic apron (as appropriate as per local infection prevention and control policy).
Procedure	1. Perform hand hygiene as per the 5 moments of hand hygiene. Collect a data collection form (if using a paper collection method) 2. Proceed to the first patient and introduce yourself. Explain that you are checking all peripheral vascular catheters to see if any need removal 3. If it is not obvious, ask 'Do you have any needles or drips?' If the answer is 'no' move on to the next patient and go back to step 2. If the answer is 'yes' proceed to step 4 4. Maintaining the patient's privacy, ask to see the peripheral vascular catheter insertion site – complete the bundle questions • Is the peripheral vascular catheter in use? If so, select "yes". If the catheter is in situ but not in use and not required, remove it aseptically as outlined in your local infection control guidelines (or discuss with medical team if unsure) and select "no" to this question • Use Visual Infusion Phlebitis score to assess for extravasation or inflammation. Extravasation may still be detected even if there is a sterile gauze dressing over the insertion site, however, NEVER remove a dressing just to view an insertion site. If there is gauze dressing in situ, the site should be palpated through the dressing for tenderness and if patient complains of local tenderness, remove dressing to view site • Peripheral vascular catheter dressing – if not intact, either replace dressing or remove the catheter (e.g., if the catheter has become dislodged because of the non-intact dressing)

- Check if there is documentation that the insertion site has been assessed at least twice daily for signs of complications
- Check hand hygiene practices by using one or more of these methods:
  i. Observe healthcare staff prior to accessing the peripheral vascular catheter
  ii. Ask the patient if staff undertake hand hygiene before accessing the peripheral vascular catheter
  iii. Use a buddy system

5. Record findings on the data collection form. If necessary record in the patient's notes
6. Go back and repeat steps 2 – 5 until all patients in the ward have been visited.

After care

Complete form and ensure Excel Tool is updated (if using the HPSC excel tool). Discuss and display the data when it has been returned as outlined below.

Appendix 3 (b) Adapted from HSE Policy for the Prevention of Sharps Injuries (HSE 2016)

1. Eliminate the unnecessary use of sharps

Where a risk of exposure to injury and/or infection from sharps has been identified, the Sharps Regulations require the employer to eliminate the risk in so far as is reasonably practicable by (this list is non-exhaustive):

- Specifying and implementing safe procedures for using and disposing of sharps and disposing of contaminated waste
- Eliminating the unnecessary use of sharps by implementing changes in practice
- Providing medical devices incorporating safety engineered sharps protection mechanisms (where available and appropriate)
- Eliminating the procedure of re-sheathing/re-capping. The recapping of needles is prohibited (where there is a risk of injury and/or infection)
- Where safety engineered devices are introduced, old stock should be disposed of appropriately.

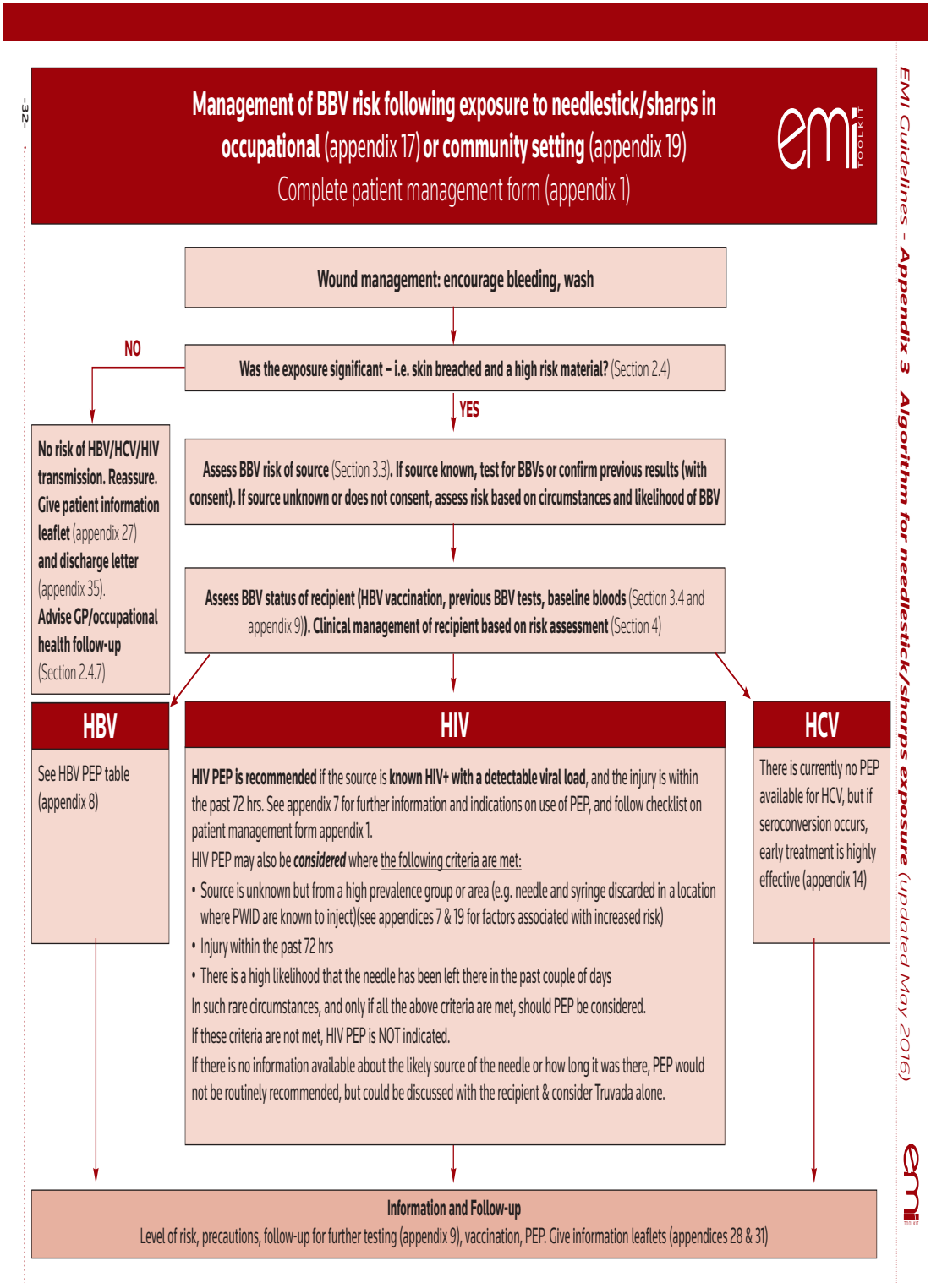
2 Substitution and Engineering controls

When elimination is not possible, the Sharps Regulations require that sharps must be substituted for a safer device. That is, a device that incorporates a safety-engineered protection mechanism, referred to as 'safer sharps'.

Safer sharps have a safety feature which retracts, blunts or sheaths the sharp, is integral to the device, and prevents or minimises injury before, during and after use. The safety feature must remain in place after disposal. Devices can be passive or active. Passive devices have an automatic safety mechanism that is activated after use, such as when a cannula is withdrawn from a patient' vein. An active device needs to be manually activated by the employee. In general passive device are preferable. Where these devices are provided, healthcare employees must be trained in their correct use.

For further information refer to HSE Policy for the Prevention of Sharps Injuries (HSE 2016).

Appendix 3 (c) Adapted from Guidelines for the Emergency Management of Injuries and Post-exposure Prophylaxis (PEP) (Health Protection Surveillance Centre 2016)



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Section 4

National Clinical Procedural Guideline for Nurses and Midwives undertaking Venepuncture and/or Peripheral Intravenous Cannulation in

Adults

For local adaptation by the Health Service Provider

4.0 Introduction

Please refer to Sections 1 to 3 as appropriate in conjunction with the Adult section.

Adult is defined as a person 16 years of age and over in line with HSE National Consent Policy (2014).

4.1 Guideline Statement

It is the policy of the HSE/HSE funded agencies that nurses and midwives undertaking venepuncture and/or peripheral intravenous cannulation must have successfully achieved competence having completed an education programme that is compliant with the HSE's Guiding Framework for the Education, Training and Competence Validation in Venepuncture and Peripheral Intravenous Cannulation for Nurses and Midwives (2017). In addition, nurses and midwives undertaking venepuncture and/or peripheral intravenous cannulation will do so in accordance with the procedural elements as outlined in this guideline.

4.1.1 Purpose

The purpose of this guideline is to:

- Outline the roles and responsibilities of the clinical nurse/midwifery line manager and the nurse or midwife undertaking the skill of venepuncture and/or peripheral intravenous cannulation
- Set out procedures based on best evidence, aligned with the national HSE standardised approach, which safeguards the adult and guide the nurse or midwife in the performance of venepuncture and/or peripheral intravenous cannulation
- Aid in the preparation and support of the adult and their family as appropriate while undergoing venepuncture and/or peripheral intravenous cannulation.

4.1.2 Scope

This guideline applies to all nurses and midwives working with adults, who have successfully completed the required education, training and competence assessment to carry out venepuncture and/or peripheral intravenous cannulation. Each nurse and midwife undertaking education and training in venepuncture and/or peripheral intravenous cannulation is accountable for his/her practice and decisions made to support practice. They must be prepared to make explicit the rationale for those decisions and justify them in the context of legislation, case law, professional standards and guidelines, evidence based practice, professional and ethical conduct (NMBI 2015).

Please note:

In absence of Upper Limb selection, the decision to use an alternative site must be made in cognisance with the Algorithm when accessing peripheral venous sites (Appendix 4 (c)). The aim of the algorithm is to provide guidance to further support nurses and midwives across all services, using a step by step decision making tool to ensure correct safe judgements and decisions are made in the process to safely and successfully perform venepuncture and/or peripheral intravenous cannulation procedures in the best interest of the patient. Nurses and midwives are also encouraged to refer to the Decision Making Flowchart within the Scope of Nursing & Midwifery Practice Framework (NMBI 2015), (Appendix 4 (d)).

4.1.3 Disclaimer

The information contained within this guideline document is the most accurate and up to date, at the date of approval. The document contains a procedural guideline and it is the responsibility of the local organisation, to update this guideline, according to best practice.

4.1.4 Roles and Responsibilities

4.1.4.1 Role and Responsibility of the Clinical Nurse/Midwife Manager/Director of Nursing/Midwifery

It is the responsibility of the Clinical Nurse/Midwife Manager/Director of Nursing/Midwifery to ensure that nurses and midwives working with adults, who are undertaking the clinical skills of venepuncture and/or peripheral intravenous cannulation fulfil the required criteria as per 1.8.

4.1.4.2 Role and Responsibility of the Nurse and Midwife

It is the responsibility of each nurse and midwife to:

- Work within their Scope of Practice–Scope of Nursing and Midwifery Practice Framework, (NMBI 2015)
- Comply with local organisational venepuncture and/or peripheral intravenous cannulation procedures therein, when undertaking these clinical skills
- Become competent in the clinical skill of venepuncture and/or peripheral intravenous cannulation and the equipment specific to the procedure
- Be familiar and comply with this organisation's infection prevention and control, health and safety procedures and risk management policies as they apply to venepuncture and/or peripheral intravenous cannulation
- Develop and maintain competence in venepuncture and/or peripheral intravenous cannulation specific to the needs of the service, its users and in line with their Scope of Practice.

4.1.4.3 Role and Responsibility of the Clinical Practice Supervisor/Assessor:

The Clinical Practice Supervisor/Assessor' should be a Registered Nurse/Midwife who is competent in venepuncture and/or peripheral intravenous cannulation and is approved by Nursing & Midwifery Practice Development/Director of Nursing/Midwifery to undertake the assessment:

- The Clinical Practice Supervisor/Assessor must be competent in the clinical skills to facilitate assessment and have knowledge of local policies and the assessment process required for venepuncture and/or peripheral intravenous cannulation procedure
- The Clinical Practice Supervisor/Assessor must assess the nurse/midwife undertaking each procedure and complete the Record of Supervised Practice and Competence Assessment as outlined within Section 2
- The Clinical Practice Supervisor/Assessor must have undertaken Teaching & Assessment and /or Preceptorship education programme and/or an equivalent qualification to support the nurse/midwife to undertake the required number of supervised clinical practice assessments, applicable to their area of clinical practice.

Please note:

In circumstances where there is no resource of a venepuncture and/or peripheral intravenous cannulation competent Registered Nurses/Midwives available, then a competent practitioner in venepuncture and/or peripheral intravenous cannulation from another profession, can assess a nurse/midwife, provided he/she is approved by Nursing & Midwifery Practice Development/Director of Nursing/Midwifery, to undertake the assessment.

4.2 Procedural Guideline for Venepuncture – Adults

4.2.1 Indications for the Venepuncture Procedure

Venepuncture is the procedure of entering a vein with a needle and is undertaken to:

- Obtain a blood sample for diagnostic purposes using haematological, biochemical and bacteriological analysis
- Monitor levels of blood components.

4.2.2 Considerations When Undertaking the Venepuncture Procedure

Venepuncture is one of the most common invasive procedures, it can be traumatic. It should only be ordered when necessary. A clinical environmental assessment should be undertaken prior to the procedure:

- Assess the environment for the appropriateness of undertaking the procedure
- Minimise disruptions i.e. phone off the hook, sign on door (particularly in community settings)
- Allow adequate time for transportation of bloods to laboratory.

4.2.3 Informed Consent

- Informed verbal consent should be obtained from the adult or legal guardian prior to the procedure and as per local organisational policy and must be documented in the healthcare records (for further information on consent please refer to the HSE National Consent Policy (2014))
- Where challenges may be encountered undertaking the procedures, they should be addressed in line with relevant national guidance and subsequent legislation (Government of Ireland 2015).

4.2.4 Psychological, Pharmacological and Non-Pharmacological Methods of Pain Relief

Anxiety, phobia or pain associated with the clinical skill of Venepuncture in adults may be reduced by effective communication skills, distraction and/or relaxation techniques and by applying measures that previously relieved these experiences for the individual, (Weinstein & Plumer 2007, Dougherty 2008, Garza & Becan–McBride 2013).

4.2.4.1 Topical Anaesthetic Agents

The need for topical anaesthetic agents prior to the procedure should be considered on an individual basis, must be prescribed and used in accordance with the manufacturer's instructions, especially for those individuals who have had previous bad experience or suffer from needle phobia, both of which may induce 'anticipatory' feelings of increased distress and anxiety before Venepuncture is carried out (Weinstein & Plumer 2007).

4.2.5 Vein Selection in Adults

Choosing the correct vein is important. When selecting the appropriate site of vein for Venepuncture, it is best practice to begin in the most distal aspect of the vein. This allows for further attempts above the selected vein which will not have been impeded. When undertaking venepuncture in adults, the specific advantages and disadvantages of potential venous sites must be considered. These are outlined in Table 1.

Table 1: Summary of possible veins that may be used for Venepuncture in Adults

Veins	Advantages and Disadvantages
Median Cubital Vein in the Antecubital Fossa	**Advantages** • Clearly visible and accessible • Deep veins with rich blood supply • Easy to palpate • Well supported by subcutaneous tissue (prevents vein rolling under the needle) • Accessible in thin people **Disadvantages** • Brachial artery and radial nerve in close proximity • Difficult to locate with increased subcutaneous fat
Cephalic and Basilic Veins in the Forearm	**Advantages** • Easy to locate • Larger veins **Disadvantages** • Cannot be used if site is used for arteriovenous fistula • Not well supported by subcutaneous tissue (vein can roll from needle) • Brachial artery close to both veins • Median nerve close to basilic vein • Radial nerve close to cephalic vein
Metacarpal Veins in the Dorsal Venous Network	**Advantages** • Easily accessible, easily visualised and palpable • Prominent in obese adult's **Disadvantages** • Difficult to secure • Skin can be delicate and subcutaneous tissue is diminished (small veins may only offer small volumes of blood) • Only suitable for small blood collection set (23G Butterfly system)

Anatomy of upper extremity veins:

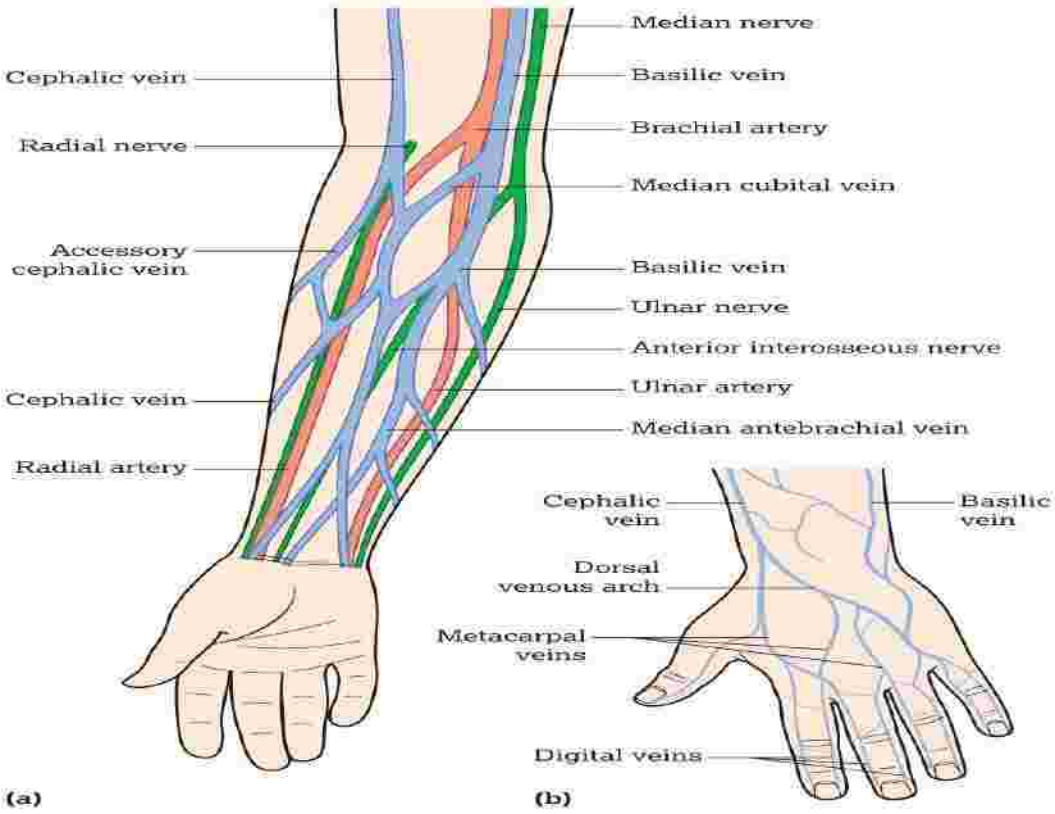

Figure i (a) Superficial veins of the forearm. (b) Superficial veins of dorsal aspect of the hand.

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Please note:

In some instances, vein viewing equipment may be available and must to be used in accordance with local Policies, Procedures, Protocols and Guidelines (PPPG's).

Please note:

Adults may also require venepuncture in either the foot or in the leg. These are not very common sites and should only be carried out by suitably trained/experienced practitioners when all other sites are inaccessible. Refer to section 4.1.2 and Appendix 4(c) for more details. Veins of the lower limb extremities should not be routinely used in adults due to the risk of emboli and thrombophlebitis (RCN 2010, INS 2011).

4.2.6 Clinical Assessment

A clinical assessment should be carried out by the nurse or midwife prior to the venepuncture procedure. Consideration must be given to the adult's cognitive and mobility needs when selecting a site. A Four Step Approach is outlined as follows:

Four Step Approach to Clinical Assessment

1. **Check**
   - the indication for venepuncture to determine equipment and specific bottles to use
   - if the adult has fasted as required for specific tests
   - the clinical condition (acute/chronic/emergency) of the patient
   - the location and length of the vein
   - the condition of the vein (visual and palpation)
   - area is warm prior to the venepuncture procedure (veins constrict if cold, making the procedure more difficult)
   - for allergies
   - for needle phobia
   - for previous history of difficult venepuncture procedures
   - for increased amounts of subcutaneous fat
   - for history of bleeding disorders or if receiving anticoagulation therapy.

2. **Choose**
   - most distal aspect of the vein
   - non-dominant hand
   - correct location, avoiding arteries and nerves
   - appropriate equipment to undertake procedure
   - appropriate topical anaesthetic agent as prescribed.

3. **Avoid**
   - hard, sclerosed, fibrosed, knotty, thrombosed veins or previous venepuncture sites/obvious scarring from previous intravenous drug use (track marks)
   - sites with intravenous infusions in situ
   - sites where circulation is impaired
   - sites that may require peripheral intravenous central catheter (PICC) insertion or arterial monitoring
   - valves in the vein (if visible or palpable)
   - duplication of blood orders
   - veins suitable for peripheral intravenous cannulation and treatment if the patient requires repeated treatments such as chemotherapy.

4. **Do Not Use Limb**
   - with obvious infection or bruising
   - with a fracture
   - with an arteriovenous (AV) fistula
   - affected by a stroke
   - affected by lymphoedema or where axillary node clearance has taken place, for example post mastectomy
   - affected with burns.

4.2.7 Equipment

4.2.7.1 List of Equipment for Venepuncture in Adults

When undertaking the venepuncture procedure, it is important that only the equipment required is brought to the bedside. This is to prevent cross contamination from occurring. The equipment required should be based on the assessment of the adult and the specific blood tests requested as outlined in Table 2.

Table 2: List of Equipment required for Venepuncture Procedure in Adult

• A clean clinical tray • Appropriate clinical waste discard bag (yellow) • Sharps container (large enough to accommodate the blood collection system) • Disposable non-sterile sheet-(optional in case of blood spillage) • Personal protective equipment (e.g., pairs of well fitting non-sterile gloves, protective plastic apron, safety goggles/visor/mask with eye shield) • Skin disinfectant as per local guidelines • Alcohol hand rub (AHR) • Clean single use tourniquet	• Topical anaesthetic agent if prescribed • Required safety blood collection systems • Required blood specimen bottles • Blood requisition forms (fully completed with patient details) • A biohazard bag/safe transportation system for transport of specimens • Sterile gauze-(to apply pressure and absorb any blood spillages) • Sterile plaster/band aid • Spill kit
As per standard precautions the use of a plastic apron and/or face protection should be assessed by each healthcare worker based on the risk of blood splashing or spraying during the procedure	

4.2.8 Types of Safety Blood Collection Systems

The nurse and midwife should be familiar with the types of safety blood collection systems used in their organisation.

The blood collection bottles and tubes will vary depending on the safety blood collection system utilised.

4.2.9 Recommended Order of Draw

The order of blood draw is the sequence in which blood collection bottles should be filled. The needle which pierces the bottle can carry additives from one bottle into the next, and so the sequence of draw is standardised so that any cross-contamination of additives will not affect laboratory results.

The general principles applied to the order of blood draw are:

- 1st Sample - no additives
- 2nd Sample - anticoagulants
- 3rd Sample – additives

(WHO 2010) see Appendix 4 (e) and refer to local policy for further guidance.

4.2.10 Venepuncture Procedure - Adults

The venepuncture procedure follows the aseptic non touch technique (ANTT®) as outlined within Section 3, see Appendix 4 (a).

Please note:

Two attempts **ONLY** should be made at the venepuncture procedure. If unsuccessful refer to another practitioner as outlined in Appendix 4 (c) and in accordance with the Decision Making Flowchart within the Scope of Nursing & Midwifery Practice Framework (NMBI 2015) see Appendix 4 (d).

Prior to Procedure

1. Confirm indication for procedure, checking requisition forms for specific blood tests required
2. Perform hand hygiene as per local guidelines
3. Preparation should be carried out in designated clean area
4. Collect the appropriate equipment as per Table 2 and inspect its integrity including expiry dates
5. Disinfect a clean clinical tray, as per local guidelines. Allow to dry naturally.

At the bedside: Patient Zone

1. Perform hand hygiene using an alcohol hand rub (AHR) as per Moment 1 "Before Patient Contact" (WHO 2009)
2. Confirm the identity of the adult and check date of birth
3. Obtain informed verbal consent
4. Check the adult has received and followed any special instructions prior to taking bloods e.g. fasting, time of last medication dose ingested
5. Explain the procedure, to the patient and seek clarification of understanding
6. Check for allergies
7. Discuss pain relief (Pharmacological and non-pharmacological methods) as per local guidelines
8. Ensure the adult is in a comfortable position
9. Palpate the site to check for rebound elasticity - press lightly with two fingers and release
10. Choose the appropriate vein.

Please note:

(a) If at any time you think that a piece of equipment has been contaminated you must discard immediately and use a new piece.

(b) When applying a tourniquet to the upper arm on the chosen side, make sure it does not obstruct arterial flow. If the radial pulse cannot be palpated then the tourniquet is too tight (Weinstein and Plumer 2007). The position of the tourniquet may be varied; for example, if a vein in the hand is to be used it may be placed on the forearm. A sphygmomanometer cuff may be used as an alternative (Royal Marsden 2015).

Precautions When Using a Tourniquet: When applying a tourniquet to the upper arm on the chosen side, make sure it does not obstruct arterial flow. If the radial pulse cannot be palpated then the tourniquet is too tight (Weinstein and Plumer 2007). The position of the tourniquet may be varied; for example, if a vein in the hand is to be used it may be placed on the forearm. A sphygmomanometer cuff may be used as an alternative (Royal Marsden 2015). Do not allow the tourniquet to be applied for more than **1 minute**. Extended application of the tourniquet may result in local stasis and the possible haematoma formation. If a tourniquet must be applied for the preliminary vein selection, it should be released and **reapplied after a 2-minute rest period** (Clinical and Laboratory Standards Institute 2007).

Preparation

1. Perform hand hygiene using AHR, allow to dry
2. Open equipment carefully by peeling back packaging. Ensure that all Key-Parts remain uncontaminated and covered until use
3. Place disposable non-sterile sheet under the patient's arm (optional)
4. Apply the tourniquet (5/6cms above chosen site) and tighten slowly (Do not leave on for longer than one minute to avoid restriction of blood flow)
5. Ask the adult to open/close their fist and keep fist closed or place arm below heart level to encourage venous filling
6. Palpate the site to check for rebound elasticity -press lightly with two fingers and release
7. Choose the appropriate vein
8. Release tourniquet and leave it in position, ready to re-use
9. Decontaminate hands using an AHR as per Moment 2 "Before Aseptic/Clean Procedure" (WHO 2009)
10. Don non-sterile, appropriate size gloves. Additional personal protective equipment i.e. apron and/or goggles may be required following risk assessment of an increased exposure to blood
11. Disinfect the patients skin, as per local policy, for at least 30 seconds and allow to dry
12. Dispose of used skin disinfectant wipe appropriately by placing it in the clinical waste discard bag
13. Do not touch or re-palpate the site
14. If re-palpation is required, hand hygiene and skin disinfection must be performed again
15. Reapply the tourniquet. (ensure a rest period of 2 minutes has elapsed) (Clinical and Laboratory Standards Institute 2007)

Venepuncture Procedure

1. Use your non-dominant hand to achieve skin traction below the puncture site and to stabilise vein
2. Hold the blood collection set between your thumb and index finger
3. Position the needle-facing bevel upwards
4. Insert the needle, directly above the vein, through the skin (angle 10-30 degrees) depending on the depth of the vein
5. When the needle punctures the vein, observe for flashback as appropriate. The flashback may not be evident, this will depend on the procedure and safety blood collection system being used
6. Lower the angle between the needle and the skin
7. When multiple blood tests are required, ensure the blood tests are taken in the proper order of draw
8. Loosen and release the tourniquet while supporting the device insitu
9. Invert bottles gently to mix appropriately, in accordance with the order of draw
10. Do not shake bottles

11. Apply sterile gauze over the puncture site. Do not apply the pressure before you remove the needle activating the needle safety device
12. Remove the needle and place the used blood collection system into the sharps box
13. Maintain gentle digital pressure on the puncture site to prevent blood leakage
14. The adult arm can be elevated while applying pressure to prevent haematoma formation but do not bend the arm
15. Discard the blood contaminated gauze in the clinical waste discard bag
16. Apply sterile dressing or plaster over the puncture site
17. Remove gloves and discard into appropriate receptacle as per local guidelines
18. Perform hand hygiene using an AHR as per Moment 3 "After Body Fluid Exposure".

After Care

1. Inform the adult of potential complications and advise to report same
2. Ensure the patient is in a comfortable position and reassure
3. If further contact with the adult or the adult's surroundings occurs, hand hygiene must be performed using an AHR as per Moment 4 "After Patient Contact" and Moment 5 "After Contact with Patients Surroundings"
4. Ensure blood collection bottles and requisition forms are correctly labelled at the patient's bedside
5. Place all blood collection bottles and forms into the biohazard bag and send to the laboratory as per local policy
6. Document the procedure in healthcare records, communicate and inform relevant staff of the outcome.

Post Procedure: Designated Decontamination

1. Bring used clinical tray and equipment to the designated utility area
2. Dispose of healthcare risk and non-risk waste appropriately
3. Decontaminate the clinical tray/dispose if single use
4. Decontaminate re-usable personal protective equipment e.g. re-usable eye shield as per manufacturer's instructions, if applicable
5. Remove gloves and apron and carry out appropriate Hand Hygiene using an AHR
6. Arrange for blood samples to be transported to the laboratory (where applicable).

4.2.11 Management of Potential Complications

Potential problems such as fear and anxiety, inability to draw blood or cessation of blood flow may arise and it is important to know how these may be overcome. Complications such as venous spasm, arterial puncture, haematoma, phlebitis, nerve injury, and/or needle stick injury can occur and it is important that the nurse or midwife is able to recognise treat and/or prevent them. It is critical for the nurse/midwife to detect and prevent complications arising. This is especially important for adults who may not be able to verbalise pain. Please see Table 3 and/or Appendix 4 (g) for more information on the management of potential complications.

Table 3: Potential Complications for the Venepuncture Procedure

Pain	**Pain is an unpleasant sensory and emotional experience associated or described with actual or potential tissue damage (Shrestha M. & Adhikari R.K. 2012)**
Cause	• tentative stop–start insertion (often associated with hesitant or new practitioners) • hitting an artery, nerve or valve • poor technique – inadequate anchoring causes skin to gather as the needle is inserted • alcohol is not allowed to dry adequately before insertion, resulting in stinging pain • using a frequently punctured, recently used or bruised vein • anxious patient, may have low pain threshold • use of large gauge device • use of veins in sensitive areas (Dougherty 2008).
Signs	• Body language, verbal expression, facial expression.
Prevention	• Pain can be prevented by using methods to relax and relieve anxiety, or the use of local anaesthetic creams.
Treatment	• If the patient complains of pain, depending on the cause (e.g. nerve or artery), it may be necessary to remove the device immediately • Reassure the patient.

Venous Spasm	**Venous spasm is a sudden involuntary contraction of the vein, resulting in temporary cessation of blood flow in the vein**
Cause	• Venous spasm is caused by fear and anxiety and is usually stimulated by cold infusates and mechanical or chemical irritation.
Signs	• Expressions of pain • Cramping • Numbness above the venepuncture site.
Prevention	• Explain the procedure to reduce fear and anxiety.
Treatment	• Gently massage or warm the limb and retry • Slow down the process of venepuncture (there is no need to remove the needle) • Wait for the vein to relax before proceeding.

Needle stick injury	A needle stick injury (percutaneous inoculation injury) is an inadvertent puncture of the skin with a potentially contaminated needle, see Appendix 3 (a). Management of BBV risk following exposure to needlestick/sharps in occupational or community setting. (Health Protection Surveillance Centre 2016) www.emitoolkit.ie
Cause	• Inadvertent puncture of the skin during the venepuncture procedure.
Signs	• Pain • Bleeding • A visible puncture of the skin of the nurse or midwife.
Prevention	• The application of Infection Prevention & Control and Health and Safety will support safe practice.
Treatment	• Encourage the wound to bleed freely • Wash the affected area with liquid soap under running water. Do not scrub (EMI Guidelines 2012) • Apply a waterproof dressing over the affected area • Report the incident to your line manager • Record the incident accordingly by completing the relevant incident form • Submit the incident form to your risk manager or line manger • For follow-up and advice, contact your Occupational Health Dept. and/or the Emergency Dept. as per local organisational guidelines.

Nerve Injury	If a nerve is accidentally hit on insertion of the needle into the vein, this will result in pain and can lead to injury and possibly permanent damage (McCall & Tankersley 2012)
Cause	• Inappropriate selection of the venepuncture site • Poor technique.
Signs	• Pain described as an 'electrical shock' or a 'pins and needles' sensation • Loss of mobility or reluctance to move the affected limb.
Prevention	• Appropriate clinical assessment • Appropriate site selection • Skilled technique.
Treatment	• Release the tourniquet, remove the needle and apply gentle pressure • Explain and reassure the patient about what has occurred • Advise that any symptoms of altered sensation may persist for a few hours • Arrange a medical review, if required • Monitor, treat as prescribed and document in the nursing care plan • Finally, report the occurrence of this complication, as per local organisational guidelines.

Haematoma	Haematoma is the leakage of blood into the tissues indicated by rapid swelling which occurs during the insertion procedure or after removal (Perucca 2010, McCall & Tankersley 2015)
Cause	• Leakage of blood at the site of the venepuncture, may collect as a haematoma • Inappropriate use of a small fragile vein, or too large a needle • Excessive probing to find the vein • Removing the needle prior to releasing the tourniquet • The needle going all the way through the vein • The needle only partially entering the vein, allowing leakage.
Signs	• Expressions of pain, loss of mobility or reluctance to move the affected limb • Swelling, discolouration or coolness of the area adjacent to the puncture site.
Prevention	• Selection of appropriate equipment for the size of the vein • Skilled technique.
Treatment	• Release the tourniquet, remove the needle and apply pressure until haemostasis has been achieved • Elevate the limb and apply a cool compress if necessary, avoiding an ice burn • Apply a pressure dressing if bleeding is persistent • Explain what has happened and request that staff are informed if the area becomes more painful as the haematoma may be pressing on a nerve • Do not reapply the tourniquet to the affected limb • Request a medical review, if required • Monitor, treat as prescribed and document in the nursing care plan • Report the occurrence of this complication, as per local organisational guidelines.

Arterial Puncture	The inadvertent puncture of the artery is another complication associated with venepuncture
Cause	• Inappropriate selection of venepuncture site • Poor technique.
Signs	• Presence of bright red blood • Expressions of pain.
Prevention	• Appropriate clinical assessment – palpate artery • Appropriate site selection • Skilled technique.
Treatment	• Release the tourniquet, removing the needle immediately and apply pressure until haemostasis has been achieved • Explain and reassure regarding what has happened • Request that a member of staff is informed if bleeding recurs from the puncture site, if pain continues or if there is increasing swelling or bruising • Arrange a medical review • Monitor, treat as prescribed and document in the nursing care plan • Report the occurrence of this complication per local organisational guidelines.

Phlebitis	Phlebitis is an acute inflammation of the intima of a vein (Dougherty 2008)
Cause	• Localised infection or irritation of the vein caused by the introduction of the venepuncture needle (mechanical/bacterial phlebitis).
Signs	• Expressions of pain (verbal or non-verbal) • Loss of mobility or reluctance to move the affected limb • Redness, inflammation, or purulent ooze at the venepuncture site.
Prevention	• Early detection is crucial, with regular monitoring required.
Treatment	• Observe and monitor the venepuncture site • Assess the degree of phlebitis • Take a swab of the site for culture and sensitivity • Clean and apply a dressing, to the affected area and administer analgesia as prescribed • Report the incident of this complication • Treat as prescribed and document the care given.

4.2.12 Documentation

The nurse or midwife must be familiar with the documentation required for the venepuncture procedure. A requisition form must accompany blood samples submitted to the laboratory. The requisition form must contain the proper information in order to process the specimen.

The essential elements of the requisition form include:

- Surname, first name, and middle initial
- Date of birth and gender
- Identification number
- Diagnosis or symptoms
- Complete name of healthcare professional requesting test
- Date of venepuncture procedure
- Indication of the blood test(s) requested
- Location (for example, ward, department, address).

4.2.13 Implementation Plan

The Director of Nursing/Midwifery is responsible for the dissemination, implementation, ongoing evaluation and audit of this national clinical procedural guideline for Venepuncture within the HSE/HSE Funded Agency.

4.2.14 Evaluation and Audit

Evaluation will include a:

- Mechanism for recording, reviewing and acting on adverse venepuncture incidents
- System for maintaining practitioner competence
- Method for identifying further training needs
- Care bundle audit.

4.3 Procedural Guideline for Peripheral Intravenous Cannulation (PIVC) - Adults

4.3.1 Indications for the PIVC procedure in adults:

- Maintain hydration
- Restore fluid and electrolyte balance
- Provide fluids for resuscitation
- Administer:
  - intravenous medication therapy e.g. antibiotics, opioids
  - intermittent, continuous infusions or bolus medications
  - blood and blood products
  - an opaque medication and/or a diagnostic reagent to assist with diagnosis.

4.3.2 Considerations When Undertaking PIVC procedure

PIVC is an invasive procedure, it can be traumatic. It should only be ordered when necessary. A clinical assessment should be undertaken prior to the procedure, with special awareness to the following:

- The PIVC procedure should not be ordered for routine phlebotomy
- A clinical assessment of the adult should be undertaken prior to the insertion of a PIVC
- PIVC should be carried out as close to the time of use to reduce the risk of accidental dislodgement and related complications
- Where peripheral intravenous access is poor and cannulation is difficult, alternative methods of access should be considered and discussed with the appropriate medical team
- Infusion of markedly irritant or vesicant substances (e.g. total parental nutrition or some cytotoxic drugs) are best administered via a midline catheter or peripherally inserted central catheters (PICC) (RCN 2010, Dougherty & Lister 2015)
- A PIVC should not be sited in close proximity to another cannula, however, if two cannulae are in close proximity they should be secured with separate dressings
- PIVC is regarded as a minor surgical procedure and is carried out with a high standard of hand hygiene, site preparation and maintenance.

4.3.3 Informed Consent

- Informed verbal consent should be obtained from the adult or legal guardian prior to the procedure and as per local organisational policy and must be documented in the healthcare records (for further information on consent please refer to the HSE National Consent Policy (2014))
- Where challenges may be encountered undertaking the procedures, they should be addressed in line with relevant national guidance and subsequent legislation (Government of Ireland 2015).

4.3.4 Psychological, Pharmacological and Non-Pharmacological Methods of Pain Relief

Pre-existing anxiety or phobia associated with PIVC may be reduced by good communication skills, diversion, distraction and relaxation techniques (Dougherty 2008). Adult's previous experiences with PIVC should also be taken into consideration and measures applied that previously relieved pain and anxiety (Dougherty 2011).

4.3.4.1 Topical Anaesthetic Agents

The need for topical anaesthetic agents prior to the procedure should be considered on an individual basis, must be prescribed and used in accordance with the manufacturer's instructions, especially for those individuals who have had previous bad experience or suffer from needle phobia, both of which may induce 'anticipatory' feelings of increased distress and anxiety before PIVC is carried out (Valdovinos et al. 2009, McGowan 2014).

4.3.5 Vein Selection in Adults

Choosing the correct vein is important. When selecting the appropriate site of vein for PIVC, it is best practice to begin in the most distal aspect of the vein. This allows for further attempts above the selected vein which will not have been impeded. When undertaking PIVC in adults, the specific advantages and disadvantages of potential venous sites must be considered. These are outlined in Table 1.

Table 1: Summary of possible veins that may be used for Peripheral Intravenous Cannulation in Adults

Veins	Therapeutic Uses	Comfort, convenience, safety for patient	Access for practitioner
Cephalic	Large vein, accommodates large gauge cannula – good haemodilution.	• If forearm site is used, bone acts as a splint • Care needed to avoid hitting the radial nerve	Visible, good access
Basilic	Large vein, accommodates large gauge cannula – good haemodilution.	• If forearm site is used, bone acts as a splint • Haematoma may occur if arm is flexed, and on removal	• Visible • Tends to roll easily (difficult to stabilise during cannulation) • Has many valves – may cause hindrance • Position may make vein difficult to access and observe
Antecubital (median cephalic, median basilic, median cubital)	Large vein, accommodates large gauge cannula – good haemodilution.	• Requires splinting – difficult over a joint and any movement can dislodge the cannula • Vessels, tissues and nerves easily damaged	Palpable and well supported by tissue
Median ante brachial	Allows for good haemodilution.	• Requires splinting – difficult • Discomfort on insertion • Infiltrates easily • Vessels, tissues and nerves easily damaged	• Tends to roll
Metacarpal	Small veins and only accommodate a small gauge cannula – for non-irritating fluids, sort term use.	• Bones act as splint • Impairs use of hand • Inflames easily • May be more painful • Are fragile and poorly supported in elderly • Thin walls	• Enables successive access above previous site • Visible, good access

Anatomy of upper extremity veins:

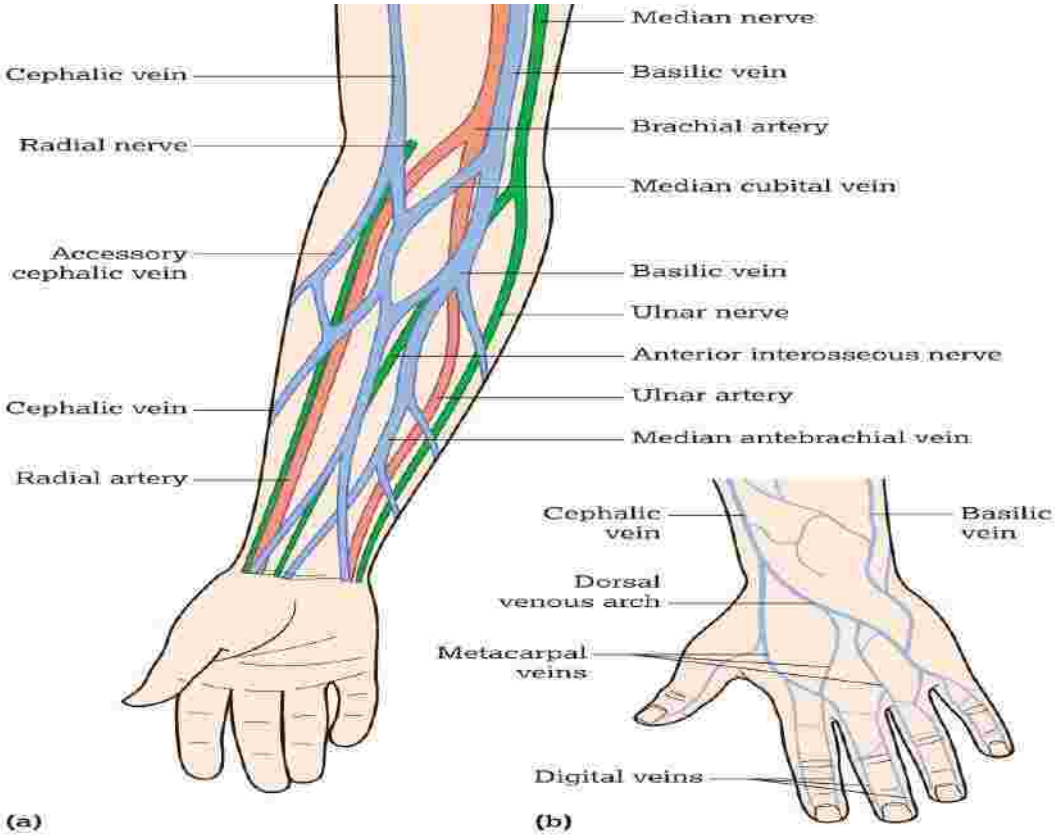

Figure i (a) Superficial veins of the forearm. (b) Superficial veins of dorsal aspect of the hand.

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Please note:

In some instances, vein viewing equipment may be available and must to be used in accordance with local Policies, Procedures, Protocols and Guidelines (PPPG's).

Please note:

Adults may also require PIVC in either the foot or in the leg. These are not very common sites and should only be carried out by suitably trained/experienced practitioners when all other sites are inaccessible. See 4.1.2 and Appendix 4 (c) for more details.

Veins of the lower limb extremities should not be routinely used in adults due to the risk of emboli and thrombophlebitis (RCN 2010, INS 2011).

4.3.6 Clinical Assessment

A clinical assessment should be carried out by the nurse/midwife prior to the PIVC procedure.

A Four Step approach to the clinical assessment is outlined as follows:

1. Check

- the indication for PIVC
- if intravenous medication or fluids could be given by any other route i.e.
  - is this the last dose of antibiotics?
  - is the patient on fluids or diet?
- purpose, duration and rate of the intravenous infusion
- the clinical condition (acute/chronic/emergency) of the patient
- type and volume of intravenous fluid or medication to be administered via the vein
- the location and length of the vein
- the condition of the vein (visual and palpation)
- area is warm prior to cannulation procedure (veins constrict if cold, making the procedure more difficult)
- allergies to medications, topical anaesthetic agents, dressings or plasters
- for needle phobia
- for previous history of difficult PIVC procedures
- for factors relating to individual patients, i.e.
  - obese
  - malnutrition
  - older patient's due to fragile veins
- patient's preference about the site, however vital to check both arms
- for history of blood borne viruses
- for history of bleeding disorders or if receiving anticoagulation therapy or long term steroids.

2. Choose

- a suitable vein for peripheral cannula insertion, avoiding arteries and nerves
- the most distal aspect of the vein
- the non-dominant hand
- appropriate equipment to undertake procedure
- appropriate topical anaesthetic agent, as prescribed.

3. Avoid

- hard, sclerosed, fibrosed, knotty, thrombosed veins or previous venepuncture sites/obvious scarring from previous intravenous drug use (track marks)
- sites where circulation is impaired
- areas with increased subcutaneous fat
- sites with existing intravenous infusions in situ
- sites that may require peripheral intravenous central catheter (PICC) insertion or arterial monitoring.

4. **Do Not Use Limb**
   - with obvious infection or bruising
   - with a fracture
   - with an arteriovenous (AV) fistula
   - affected by a stroke
   - affected by lymphoedema or where axillary node clearance has taken place, for example post mastectomy
   - affected with burns.

4.3.7 Assessment on Transfer of an Adult

An adult patient with a PIVC inserted by a transferring hospital will require further assessment of the cannula and the insertion site for inflammation, infiltration, extravasation, infection, leaking or pressure of the cannula on the surrounding tissues, signs of phlebitis as per Visual Infusion Phlebitis (VIP) score within Appendix 4 (f) and must be removed and re-sited as indicated.

4.3.8 Equipment

4.3.8.1 List of Equipment for PIVC in Adults

When undertaking the PIVC procedure, it is important that only the equipment required is brought to the bedside. This is to prevent cross contamination from occurring. The equipment required should be based on the assessment of the adult and the purpose of the PIVC as outlined in Table 2.

Table 2: List of Equipment for PIVC in Adults

• Alcohol hand rub (AHR) • A clean clinical tray • Appropriate clinical waste discard bag (yellow) • Sterile dressing pack (as per local guidelines) • Sharps container • Personal protective equipment (e.g. well-fitting non-sterile gloves, protective plastic apron, safety goggles/visor/mask with eye shield) • Skin disinfectant: 2% Chlorhexidine gluconate solution in 70% isopropyl alcohol product – as per local policy • Topical anaesthetic agent (if prescribed).	• Intravenous cannula (choose size appropriately) • Prescribed Flush (10ml syringe with sterile Sodium Chloride (NaCl 0.9%) • Extension set primed with sterile Sodium Chloride (NaCl 0.9%) - unless taking blood samples immediately after cannulation (Dougherty & Lister 2015) • Clean single use tourniquet • Sterile gauze swab • Sterile, transparent, semi permeable dressing • plaster/band aid (In case of unsuccessful attempt).
As per standard precautions the use of a plastic apron and/or face protection should be assessed by each healthcare worker based on the risk of blood splashing or spraying during the procedure.	

4.3.9 Types of Cannulae used for Adults

Cannulae range in type and size, depending on its purpose. The correct size of the cannula will help to prevent damage to the vessel and ensure adequate blood flow. Usually, the smallest size (gauge) for the prescribed therapy is chosen to facilitate better flow and minimise trauma (RCN 2010, Scales 2005). Small veins will not accommodate large volumes or irritant solutions, therefore the purpose of the cannula will determine the appropriate type and size. The nurse and midwife should be familiar with the types of cannulae used in their organisation.

4.3.10 PIVC Procedure - Adults

The PIVC procedure follows the aseptic non touch technique (ANTT®) as outlined within Section 3, see Appendix 4 (b).

Please note:

Two attempts ONLY should be made at the peripheral intravenous cannulation procedure. If unsuccessful refer to another practitioner as outlined in Appendix 4 (c) the decision to use an alternative site must be made in cognisance with the Decision Making Flowchart within the Scope of Nursing & Midwifery Practice Framework (NMBI 2015) see Appendix 4 (d).

Prior to Procedure: Preparation in designated clean utility area

1. Confirm indication for procedure
2. Perform hand hygiene as per local guidelines
3. Preparation should be carried out in designated clean area
4. Collect the appropriate equipment as per Table 2 and inspect its integrity including expiry dates
5. Disinfect a clean clinical tray, as per local guidelines. Allow to dry naturally.

At the bedside: Patient Zone

1. Perform hand hygiene using an alcohol hand rub (AHR) as per Moment 1 "Before Patient Contact" (WHO 2009)
2. Confirm the identity of the adult and check date of birth
3. Obtain informed verbal consent
4. Explain the procedure, to the patient and seek clarification of understanding
5. Check for allergies
6. Discuss pain relief (Pharmacological and non-pharmacological methods) as per local guidelines
7. If pain relief is required an anaesthetic agent must be prescribed and applied at least one hour before the procedure. The anaesthetic agent should be removed prior to the procedure according to manufactures instructions
8. Ensure the adult is in a comfortable position
9. Open equipment carefully by peeling back packaging and ensure that all Key-Parts remain uncontaminated and covered until use
10. Place disposable non-sterile sheet under the adult's arm (optional)
11. Palpate the site to check for rebound elasticity - press lightly with two fingers and release
12. Apply the tourniquet (5/6cms above chosen site) and tighten slowly (Do not leave on for longer than one minute to avoid restriction of arterial flow)

13. Ask the adult to open/close fist and keep fist closed or place arm below heart level to encourage venous filling
14. Palpate the site to check for rebound elasticity - press lightly with two fingers and release
15. Choose the appropriate vein
16. Release tourniquet and leave it in position, ready to re-use.

Please note:

(a) If at any time you think that a piece of equipment has been contaminated you must discard immediately and use a new piece.

(b) When applying a tourniquet to the upper arm on the chosen side, make sure it does not obstruct arterial flow. If the radial pulse cannot be palpated then the tourniquet is too tight (Weinstein and Plumer 2007). The position of the tourniquet may be varied; for example, if a vein in the hand is to be used it may be placed on the forearm. A sphygmomanometer cuff may be used as an alternative (Royal Marsden 2015).

Precautions When Using a Tourniquet: When applying a tourniquet to the upper arm on the chosen side, make sure it does not obstruct arterial flow. If the radial pulse cannot be palpated then the tourniquet is too tight (Weinstein and Plumer 2007). The position of the tourniquet may be varied; for example, if a vein in the hand is to be used it may be placed on the forearm. A sphygmomanometer cuff may be used as an alternative (Royal Marsden 2015). Do not allow the tourniquet to be applied for more than **1 minute**. Extended application of the tourniquet may result in local stasis and the possible haematoma formation. If a tourniquet must be applied for the preliminary vein selection, it should be released and **reapplied after a 2-minute rest period** (Clinical and Laboratory Standards Institute 2007).

Preparation

1. Perform hand hygiene using AHR, allow to dry as per Moment 2 "Before Aseptic/Clean Procedure" (WHO 2009)
2. Don non-sterile, appropriate size gloves. Additional personal protective equipment i.e. apron and/or goggles may be required following risk assessment of an increased exposure to blood
3. Disinfect the patient's skin and the selected vein for at least 30 seconds using 2% chlorhexidine gluconate in 70% isopropyl alcohol using back and forth strokes with friction on an area of 4 – 5 cms and allow to dry (Royal Marsden 2015)
4. Dispose of used skin disinfectant wipe appropriately by placing it in the clinical waste discard bag
5. Do not touch or re-palpate the site
6. If re-palpation is required, hand hygiene and skin disinfection must be performed again
7. Reapply the tourniquet (ensure a rest period of 2 minutes has elapsed)

PIVC procedure in Adults

1. Remove needle guard and inspect the device for any faults (Dougherty & Lister 2015)
2. Use your non-dominant hand to achieve skin traction
3. Hold the cannula between your thumb and index finger and use thumb to anchor the cannula hub
4. Position the cannula-facing bevel upwards
5. Insert the cannula directly above the vein, through the skin (angle 10-30 degrees, depending on the depth of the vein)

6. When the cannula punctures the vein, observe for flashback in the cannula chamber as appropriate
7. Lower the angle between the cannula and the skin
8. Advance the cannula a further 2 mm along the lumen of the vein
9. Withdraw the introducer slightly with the dominant hand and a second flashback of blood will be seen along the shaft of the cannula (Dougherty & Lister 2015)
10. Slowly advance the cannula fully into the lumen of the vein
11. Gently pull the introducer backwards, while holding the cannula in position
12. Loosen and release the tourniquet while supporting the device in situ
13. Hold the sterile gauze by one corner and place under the cannula hub to absorb blood spillage. Ensure only section of gauze that is sterile is in touch with hub
14. Apply digital pressure to the vein above the cannula tip and remove the stylet gently, activating the needle safety device
15. Dispose of all sharps in the sharps bin at the point of care
16. If blood collection is required at this stage, connect with appropriate safe blood collection system and adhere to ANTT® and venepuncture, as per local policy
17. Attach the needle-free bung/primed t-connector/primed short extension set to the cannula hub
18. Discard the blood contaminated gauze into the yellow waste bag
19. Secure and anchor the cannula with a sterile transparent semi permeable dressing (Loveday etal. 2014, HPSC 2009)
20. Aspirate to check for blood flashback
21. Flush cannula with prescribed sterile sodium chloride (NaCL 0.9%) using a push pause technique (pulsatile) ending with a positive pressure (Dougherty & Lister 2015) to confirm patency, as per local policy
22. Observe the site for signs of swelling or leakage and ask the patient if they are experiencing any discomfort or pain
23. If required loop the t-connector tubing and secure with tape
24. Remove disposable sheet, gloves and disposable eye protection (if applicable) and discard appropriately as per local policy
25. Perform hand hygiene using an AHR as per Moment 3 "After Body Fluid Exposure"
26. Document date and time of insertion, site and size of cannula, number of attempts and sign in healthcare notes or care plan (Dougherty & Lister 2015).

After Care:

1. Inform the adult of potential complications and advise to report same
2. Ensure the adult is in a comfortable position and reassure
3. If further contact with the adult or the patient's surroundings occurs hand hygiene must be performed using an AHR as per Moment 4 "After Patient Contact" and Moment 5 "After Contact with Patients Surroundings".

Post Procedure: Designated Decontamination

1. Bring used clinical tray and equipment to the designated utility area
2. Dispose of healthcare risk and non-risk waste appropriately
3. Decontaminate the clinical tray/dispose if single use
4. Decontaminate re-usable personal protective equipment e.g. re-usable eye shield as per manufacturer's instructions, if applicable

5. Remove gloves and apron and carry out appropriate Hand Hygiene using an AHR
6. Arrange for blood samples to be transported to the laboratory (where applicable).

4.3.11 Care and Maintenance of an Indwelling PIVC Site

- Ensure that cannula is in correct position and a sterile semi-permeable transparent dressing is intact
- Ensure that the PIVC entry site is visible through the dressing
- The site should be kept clean and dry at all times. The dressing should only be changed if it becomes loose, wet or soiled. ANTT® should be used for dressing changes (RCN 2010)
- Use Visual Infusion Phlebitis (VIP) Score Appendix 4 (f) to inspect the cannula site on each shift (preferably every eight hours) for signs of tenderness, swelling, inflammation, discharge or thrombosis (INS 2011)
- Ensure a single lumen primed extension set is applied to the cannula and clamped when not in use
- Clean the hub of extension set with 2% Chlorhexidine gluconate solution in 70% isopropyl alcohol product and air dry prior to flushing the cannula
- Flush the cannula with prescribed sterile 0.9% Sodium Chloride (0.9% NaCL) solution daily or before and after each drug administration or infusion and ensure positive pressure is maintained by clamping the extension set prior to flushing the final 1 ml of saline (RCN 2010). Document administration in drug prescription sheet
- The IV site must also be observed while:
  - Bolus injections are administered
  - IV flow rates are being checked or altered
  - IV infusion/transfusion bags are being changed
  - The patient is showering or washing
  - Advise the adult on protecting the PIVC while showering or washing
- Advise the adult to protect the PIVC before, during and after personal hygiene'
- Inspect the site on each shift for signs of tenderness, swelling, inflammation, discharge or thrombosis as per VIP score (INS 2011)
- Document inspection of PIVC site in PIVC care plan/care bundle. At the first signs of inflammation or infection:
  - Cannula should be removed
  - Take a swab from the PIVC insertion site and send the swab to laboratory for culture & sensitivity testing
  - Clean the insertion site with a 2% Chlorhexidine gluconate solution in 70% isopropyl alcohol product
  - Notify medical team
  - Document findings and action taken in the nursing progress notes
  - Continue to observe PIVC insertion site.

Please note:

PIVC must be re-sited only if clinically indicated and not routinely (Loveday et al. 2014).

4.3.12 Management of Potential Complications

Specific complications that can arise following the procedure include pain, infiltration, extravasation, venous spasm, phlebitis, thrombophlebitis, haematoma, nerve injury, arterial puncture, embolism and needle stick injury. It is critical for the nurse to detect and prevent complications arising and to treat as required. It is especially important for patients who may not be able to verbalise pain. Please refer to Table 3 and/or Appendix 4 (h) for more information on complications.

Table 3: Potential Complications of PIVC

Pain	**Pain is an unpleasant sensory and emotional experience associated or described with actual or potential tissue damage (Shrestha M. & Adhikari R.K. 2012)**
Cause	• tentative stop–start insertion (often associated with hesitant or new practitioners) • hitting an artery, nerve or valve • poor technique – inadequate anchoring causes skin to gather as the needle is inserted • alcohol is not allowed to dry adequately before insertion, resulting in stinging pain.
Signs	• using a frequently punctured, recently used or bruised vein • anxious patient, may have low pain threshold • use of large–gauge device • use of veins in sensitive areas (Dougherty 2008).
Prevention	• Body language, verbal expression, facial expression • Pain can be prevented by using methods to relax and relieve anxiety, or the use of local anaesthetic creams.
Treatment	• If the patient complains of pain, depending on the cause (e.g. nerve or artery), it may be necessary to remove the device immediately • Reassure the patient.

Venous Spasm	**Venous spasm is a sudden involuntary contraction of the vein, resulting in temporary cessation of blood flow in the vein**
Cause	• Venous spasm is caused by fear and anxiety and is usually stimulated by cold infusates and mechanical or chemical irritation.
Signs	• Expressions of pain (verbal or non-verbal) such as facial expressions or crying • Cramping • Numbness above the PIVC site.
Prevention	• Explain the procedure to reduce fear and anxiety • Give infusions at room temperature (commence infusions slowly).
Treatment	• Gently massage or warm the limb and retry • Slow down the process of PIVC (there is no need to remove the needle). • Wait for the vein to relax and wait for blood to return into the flash chamber before proceeding • During intravenous therapy, reduce the rate of infusion flow, especially in solutions known to be irritant.

Needle stick injury	A needle stick injury (percutaneous inoculation injury) is an inadvertent puncture of the skin with a potentially contaminated needle, see Appendix 3 (a). Management of BBV risk following exposure to needlestick/sharps in occupational or community setting. (Health Protection Surveillance Centre 2016) www.emitoolkit.ie
Cause	• Inadvertent puncture of the skin during the venepuncture procedure.
Signs	• Pain • Bleeding • A visible puncture of the skin of the nurse or midwife.
Prevention	• The application of Infection Prevention & Control and Health and Safety will support safe practice.
Treatment	• Encourage the wound to bleed freely • Wash the affected area with liquid soap under running water. Do not scrub (EMI Guidelines 2012) • Apply a waterproof dressing over the affected area • Report the incident to your line manager • Record the incident accordingly by completing the relevant incident form • Submit the incident form to your risk manager or line manger • For follow-up and advice, contact your Occupational Health Dept. and/or the Emergency Dept. as per local organisational guidelines.

Nerve Injury	If a nerve is accidentally hit on insertion of the needle into the vein, this will result in pain and can lead to injury and possibly permanent damage (McCall & Tankersley 2012
Cause	• Poor vein selection • Inserting the needle too deeply or quickly • blind probing.
Signs	• Described as severe shooting pain • Painful burning sensation (Moini 2013) • A sharp electric tingling sensation that radiates down the nerve (McCall and Tankersley 2012).
Prevention	• Appropriate clinical assessment • Appropriate site selection • Skilled technique.
Treatment	• In the event of touching a nerve, release the tourniquet and remove the needle immediately (Garza & Becan McBride 2013) • Reassure the patient and explain that the pain may last for a few hours and the area may feel numb • Explain that the pain can sometimes last for a few days and that, if it continues or gets worse, medical advice should be sought • Give the patient an information sheet with advice about when and who to contact and document the incident (Dougherty 2008, Garza & Becan McBride 2013).

Haematoma	Haematoma is the leakage of blood into the tissues indicated by rapid swelling which occurs during the insertion procedure or after removal (Perucca 2010, McCall & Tankersley 2015)
Cause	• 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 • failure to remove the tourniquet promptly or failure to release it before removing the needle • inadequate pressure on venepuncture site following removal of the cannula (Dougherty 2008, McCall & Tankersley 2012, Moini 2013).
Signs	• Pain, loss of mobility or reluctance to move the affected limb • Swelling, discolouration or coolness of the area adjacent to the cannula.
Prevention	• Good vein and device selection and using a careful technique • The practitioner should always be aware of patients with fragile veins or those on anticoagulant therapy and inexperienced individuals should not attempt cannulation in these individuals (Perucca 2010) • 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 (Perucca 2010).
Treatment	• In the event of a haematoma occurring, tourniquet is released, the cannula should be removed immediately and pressure applied to the site for a few minutes (McCall & Tankersley 2012, Garza & Becan McBride 2013) • 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 (Moini 2013).

Arterial Puncture	The inadvertent puncture of the artery is another complication associated with cannulation
Cause	• Inappropriate selection of the cannulation site • Poor technique.
Signs	• Presence of bright red blood • Expression of pain.
Prevention	• Appropriate clinical assessment – palpate artery • Appropriate site selection • Skilled technique.
Treatment	• Release the tourniquet, removing the cannula immediately and apply pressure until haemostasis has been achieved • Explain and reassure the adult regarding what has happened • Request that a member of staff is informed if bleeding recurs from the puncture site, if pain continues or if there is increasing swelling or bruising • Arrange a medical review • Monitor, treat as prescribed and document in healthcare records and the nursing care plan • Report the occurrence of this complication, as per local organisational policy.

Phlebitis	Phlebitis is an acute inflammation of the intima of a vein (Dougherty 2008)
Cause	Three types of phlebitis can occur in relation to PIVC • Mechanical phlebitis is related to irritation and damage to a vein by large–gauge cannulas, sited where there is movement, for example in the antecubital fossa, inadequate securing of PIVC or increased PIVC dwell time. • Chemical phlebitis is related to chemical irritation from drugs such as antibiotics and chemotherapy • Bacterial phlebitis is when the site becomes infected due to poor hand–washing or aseptic technique and has a potential to predispose a patient to septicaemia or catheter related blood stream infections (CRBSIs) (Lamb and Dougherty 2008 & Morris 2011).
Signs	• Characterized by pain and tenderness along the cannulated vein, erythema, warmth and streak formation with/without a palpable cord (Washington & Barrett 2012) • Loss of mobility or reluctance to move the affected limb • Redness, inflammation, or purulent ooze at the cannula site.
Prevention	• Regular monitoring using a VIP score • Observe for thrombophlebitis. Veins of the lower extremities should not be routinely used in adults due to the risk of embolism and thrombophlebitis (RCN 2010, INS 2011).
Treatment	• Remove PIVC if the patient develops signs of phlebitis (warmth, tenderness, erythema or palpable vascular cord), infection or a malfunctioning catheter (O' Grady et al. 2011). Refer to PIVC removal guidelines in 4.3.13.

Thrombophlebitis	Thrombophlebitis is the inflammation of a vein with a thrombus formation
Cause	• Traumatic cannulation by an unskilled practitioner or multiple attempts • Use of too large a cannula for the size of the vein • Infusion of high pH solution or poor circulation with venous stasis.
Signs	• Local redness, hard and torturous feel of the vein, heat, painful to touch or move • Expressions of pain (verbal or non-verbal) such as facial expressions or crying.
Prevention	• Early detection is crucial with at least one hourly monitoring of the cannulation site • Appropriate site selection • Appropriate selection of equipment for size of vein • Skilled technique.
Treatment	• Discontinue infusion, remove the cannula, and elevate the extremity • Report the incident of this complication as per local organisational • Treat as prescribed and document the care.

Infiltration	Infiltration is the "inadvertent administration of a non-vesicant (non-irritant) solution or medication into surrounding tissue instead of the intended vascular pathway" (RCN 2010, p.60; INS 2011)
Cause	• Cannula too large for the diameter of the vein • Puncture of distal wall of vein during cannulation • Poorly secured cannula • Over manipulation of cannula • Delivery of fluid at a high rate or pressure (Dougherty & Lister 2008).
Signs	• Swelling and oedema, pain, loss of mobility or reluctance to move the affected limb • Skin cool to touch • Skin blanching adjacent to cannula.
Prevention	• Monitoring of cannula as per local care bundle/care plan. Ensure the cannula is secured correctly.
Treatment	• Immediately remove the cannula and Refer to PIVC removal guidelines in 4.3.13 • Apply sterile dressing as per ANTT® • Administer analgesia as prescribed.

Embolism	An embolism is an air bubble, fat particle or blood clot which travels, causing a blockage in the vein
Cause	• Dislodged blood clot (thrombo embolism), fragment of catheter (cannula embolism), air (air embolism).
Signs	• Thromboembolism embolism – rapid onset of dyspnoea, discomfort or pain, tachycardia, leading to haemodynamic collapse (Gay 2010) • Air embolism – hypotension, dyspnoea, tachypnoea.
Prevention	• Embolism can be prevented by stopping air from entering the system • ensuring that all connections are secure • IV tubings/lines primed with infusates and prevent the infusion IV tubings from being allowed to run dry.
Treatment	• Treat as a medical emergency and implement the escalation protocol as per local.

Extravasation	"Extravasation is the inadvertent administration of a vesicant (irritant) solution or medication into surrounding tissue instead of the intended vascular pathway" (RCN 2010, p.60; INS 2011)
Cause	• Leakage of vesicant solutions into the tissues. Drugs capable of causing tissue damage and necrosis include but are not limited to cytotoxic drugs, potassium chloride, hypertonic solutions of sodium bicarbonate and drugs with a vaso constrictive action (Lamb & Dougherty 2008).
Signs	• Pain • Reluctance to move affected limb • blistering (typically occurs 1–2 weeks post extravasation) • peeling and sloughing of the skin (about 2 weeks post extravasation) • tissue necrosis (2–3 weeks post extravasation) with resulting pain • damage to tendons, nerves and joints • functional and sensory impairment of affected area such as limb disfigurement.
Prevention	• Early detection and immediate action is crucial, with at least hourly monitoring of the cannulation site • Ensure the cannula is secured correctly.
Treatment	• Stop the infusion and inform the patient and member of the medical team • Immediately remove the cannula if indicated and apply a sterile dressing • Administer analgesia as prescribed • Complete adverse incident form as per local protocol.

4.3.13 Removal of the PIVC

- When a PIVC is no longer required it should be removed
- Removal of the PIVC should be an ANTT® procedure. The device should be removed carefully using a slow, steady movement and pressure should be applied until haemostasis is achieved. This pressure should be firm and not involve any rubbing movement
- The site should be inspected to ensure bleeding has stopped and should then be covered with a sterile dressing (INS 2011)
- The cannula integrity should be checked to ensure the complete device has been removed (RCN 2010, INS 2011, Dougherty & Lister 2015)
- Discard all sharps as per local policy
- Monitor and observe the PIVC site for a further 48 hours after device removal for signs and symptoms of post-infusion phlebitis
- Document the date, time and reason for PIVC removal and care in the health care records and update/evaluate care plan (RCN 2010)
- If intravenous access is required following removal, an alternative site must be used.

4.3.14 Documentation

Documentation specific to peripheral intravenous cannulation should contain the following details (NMBI 2015, Dougherty & Lister 2015):

- Date, time, and site of cannula insertion
- Number of cannulation attempts
- Size of the inserted cannula
- Dressing type
- Monitoring of the PIVC site and patient by using local care bundle/care plan (HPSC 2014)
- Date, time and reason for cannula removal
- Any complications arising and management of same
- Name, signature, NMBI PIN of practitioner.

4.3.15 Implementation Plan

The Director of Nursing/Midwifery is responsible for the dissemination, implementation, ongoing evaluation and audit of this national clinical procedural guideline for PIVC within the HSE/HSE Funded Agency.

4.3.16 Evaluation and Audit

Evaluation will include a:

- Mechanism for recording, reviewing and acting on adverse PIVC incidents
- System for maintaining practitioner competence
- Method for identifying further training needs
- Care Bundle Audit.

Auditing of the insertion, use and maintenance of a PIVC should be in accordance with the Peripheral Vascular Catheter Care Bundle (HPSC 2014) see Appendix 3(a).

Appendix: 4 (a) Aseptic Non Touch Technique (adapted from www.antt.org)

Appendix:4 (b) Aseptic Non Touch Technique (adapted from www.antt.org)

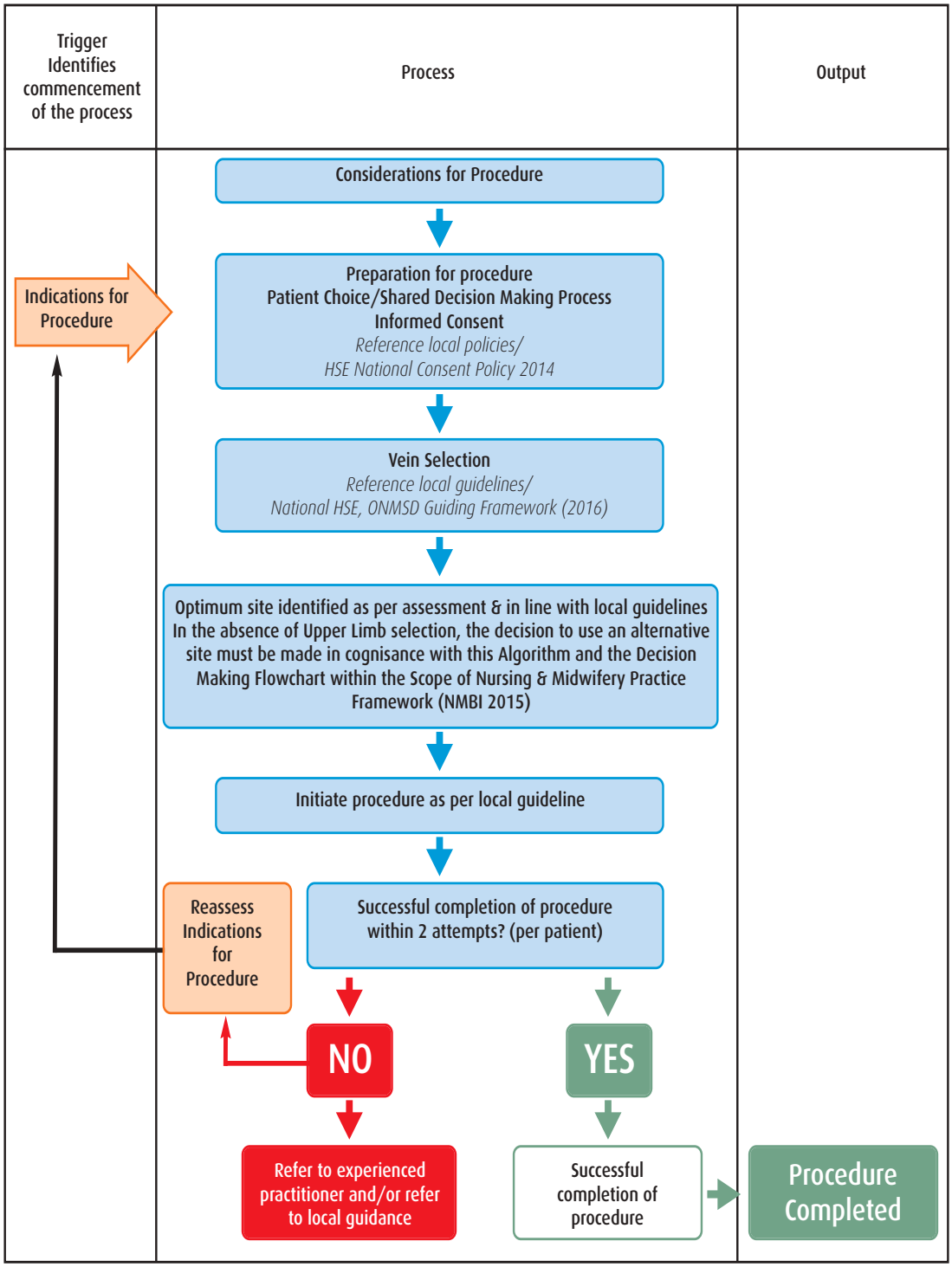
Appendix 4 (c) Algorithm when accessing Peripheral Venous Sites

Process to support staff when accessing peripheral venous sites for

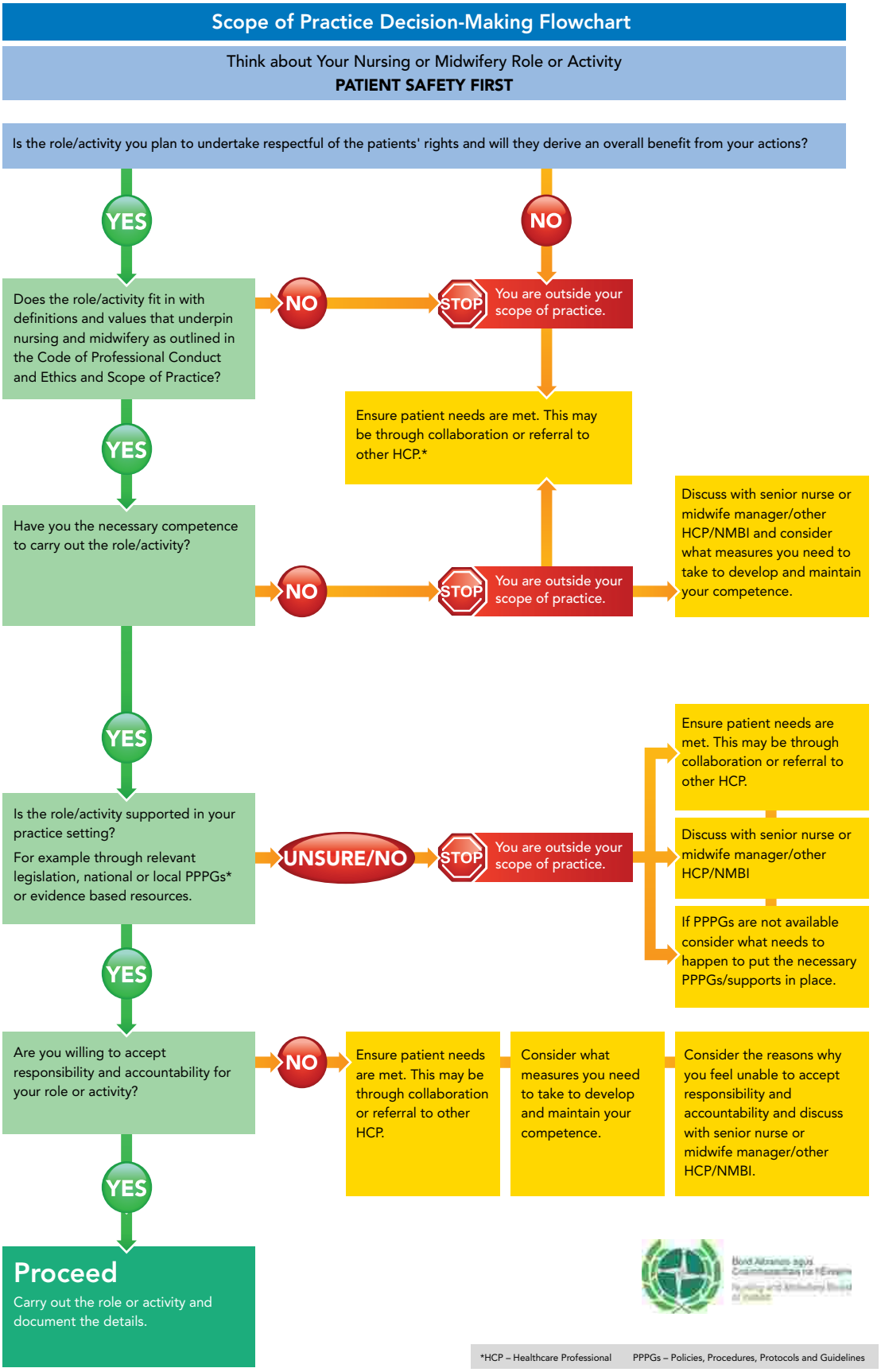
Venepuncture & Peripheral Intravenous Cannulation (PIVC)

This process is consistent with HSE National Guiding Framework for Education, Training and Competence Validation in Venepuncture and Peripheral Intravenous Cannulation – HSE, Office of Nursing & Midwifery Services Director (2017)

Also refer to Local Guidelines for Venepuncture & Peripheral Intravenous Cannulation (PIVC).



Appendix 4 (d) Scope of Practice Decision-Making Flowchart (NMBI 2015)



Appendix 4 (e) Recommended Order of Draw for Plastic Vacuum Tubes - WHO guidelines on drawing blood: best practices in phlebotomy (2010)

Order of use[a]	Type of tube/usual colour[b]	Additive[c]	Mode of action	Uses
1	Blood culture bottle (yellow-black striped tubes)	Broth mixture	Preserves viability of microorganisms	Microbiology – aerobes, anaerobes, fungi
2	Non-additive tube			
3	Coagulation tube[d] (light blue top)	Sodium citrate	Forms calcium salts to remove calcium	Coagulation tests (protime and prothrombin time), requires full draw
4	Clot activator (red top)	Clot activator	Blood clots, and the serum is separated by centrifugation	Chemistries, immunology and serology, blood bank (cross-match)
5	Serum separator tube (red-grey tiger top or gold)	None	Contains a gel at the bottom to separate blood from serum on centrifugation	Chemistries, immunology and serology
6	Sodium heparin (dark green top)	Sodium heparin or lithium heparin	Inactivates thrombin and thromboplastin	For lithium level use sodium heparin, for ammonia level use either
7	PST (light green top)	Lithium heparin anticoagulant and a gel separator	Anticoagulants with lithium, separates plasma with PST gel at bottom of tube	Chemistries
8	EDTA (purple top)	EDTA	Forms calcium salts to remove calcium	Haematology, Blood Bank (cross-match) requires full draw
9	Blood tube (pale yellow top)	Acid-citrate-dextrose (ACD, ACDA or ACDB)	Complement inactivation	HLA tissue typing, paternity testing, DNA studies
10	Oxalate/fluoride (light grey top)	Sodium fluoride and potassium oxalate	Antiglycolytic agent preserves glucose up to five days	Glucoses, requires full draw (may cause haemolysis if short draw)

Appendix 4 (f) Visual Infusion Phlebitis (VIP) Score: Jackson A. (1997)

Visual Infusion Phlebitis Score		
IV site appears healthy	0	No signs of phlebitis **OBSERVE CANNULA**
One of the following is evident: • Slight pain at IV site • Redness near IV site	1	Possible first sign of phlebitis **OBSERVE CANNULA**
Two of the following are evident: • Pain • Erythema • Swelling	2	Early stage of phlebitis **RESITE THE CANNULA**
All of the following signs are evident: • Pain along the path of the cannula • Erythema • Induration	3	Medium stage of phlebitis **RESITE THE CANNULA** **CONSIDER TREATMENT**
All of the following signs evident and extensive: • Pain along the path of the cannula • Erythema • Induration • Palpable venous cord	4	Advanced stage of phlebitis or start of thrombophlebitis **RESITE THE CANNULA** **CONSIDER TREATMENT**
All of the following signs are evident and extensive: • Pain along the path of the cannula • Erythema • Induration • Palpable venous cord • Pyrexia	5	Advanced stage of thrombophlebitis **INITIATE TREATMENT** **RESITE THE CANNULA**

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Appendix 4 (g) Venepuncture Problem Solving Prevention and Resolution (cited in Dougherty & Lister 2015)

Problem	Cause	Prevention	Action Suggested
Pain	Use of vein in sensitive area (e.g. wrist).	Avoid using veins in sensitive areas wherever possible. Use local anaesthetic cream.	Complete procedure as quickly as possible.
Anxiety	Previous trauma. Fear of needles.	Minimize the risk of a traumatic venepuncture. Use all methods available to ensure successful venepuncture.	Approach patient in a calm and confident manner. Listen to the patient's fears and explain what the procedure involves. Offer patient opportunity to lie down. Suggest use of local anaesthetic cream (Lavery and Ingram). All of the above and perhaps referral to a psychologist if fear is of phobic proportions.
Limited venous access	Repeated use of same veins. Peripheral shutdown. Dehydration. Hardened veins (due to scarring and thrombosis). Poor technique/choice of vein or device.	Use alternative sites if possible. Ensure the room is not cold. Ensure correct device and technique are used.	Do not attempt the procedure unless experienced. Put patient's arm in warm water. Apply glycerol trinitrate patch. May be necessary to rehydrate patient prior to venepuncture. Do not use these veins as venepuncture will be unsuccessful.
Needle inoculation of or contamination to practitioner	Unsafe practice. Incorrect disposal of sharps.	Maintain safe practice. Activate safety device. Ensure sharps are disposed of immediately and safely.	Follow accident procedure for sharps injury, for example make site bleed and apply a waterproof dressing. Report and document. An injection of hepatitis B immunoglobulin or triple therapy may be required.
Accidental blood spillage	Damaged/faulty equipment. Reverse vacuum.	Check equipment prior to use. Use vacuumed plastic blood collection system. Remove blood tube from plastic tube holder before removing needle.	Report within hospital and/or MHRA. Ensure blood is handled and transported correctly.

Problem	Cause	Prevention	Action Suggested
Missed vein	Inadequate anchoring. Poor vein selection. Wrong positioning. Lack of concentration. Poor lighting. Difficult venous access.	Ensure that only properly trained staff perform venepuncture or that those who are training are supervised. Ensure the environment is well lit.	Repalpate, withdraw the needle slightly and realign it, providing the patient is not feeling any discomfort. Ensure all learners are supervised. If the patient is feeling pain, then the needle should be removed immediately. Ask experienced colleague to perform the procedure.
Spurt of blood on entry	Bevel tip of needle enters the vein before entire bevel is under the skin; usually occurs when the vein is very superficial.		Reassure the patient. Wipe blood away on removal of needle.
Blood stops flowing	Needle inserted too far. Contact with valves. Venous spasm. Vein collapse. Small vein. Poor blood flow.	Correct angle. Palpate to locate. Results from mechanical irritation and cannot be prevented. Use veins with large lumen. Use a smaller device. Avoid use of small veins wherever possible. Use veins with large lumens.	Draw back the needle, but if bruising is evident, then remove the needle immediately and apply pressure. Withdraw needle slightly to move tip away from valve. Gently massage above the vein or apply heat. Release tourniquet, allow veins to refill and retighten tourniquet. May require another venepuncture. Apply heat above vein.

Appendix 4 (h) PIVC Problem Solving Prevention and Resolution (source taken from Dougherty & Lister 2015)

Problem	Cause	Prevention	Action Suggested
Anxious patient	Previous traumatic experiences. Fear of needles or blood. Ignorance about what the procedure involves.	Approach the patient in a calm and confident manner. Listen to the patient's previous experiences and involve them in site selection. Offer a local anaesthetic (by gel or injection). Explain what the procedure involves and show them the equipment if appropriate. Offer the patient the opportunity to lie down or recline during the procedure. Use all methods of improving venous dilation to ensure success on the first attempt.	Refer the patient for psychological support if anxiety and fear are of phobic proportions. It usually takes a few weeks to help a patient manage needle phobia.
Difficulty in locating a suitable vein	Excessive previous use. Shock or dehydration. Anxiety. Fragile, thready veins, for example in the elderly or in patients on anticoagulant therapy. Thrombosed veins as a result of treatment, for example cytotoxic therapy.	Alternate sites wherever possible to avoid overuse of certain veins. Use the methods described above to reduce anxiety.	Reassure the patient. Use all methods of improving venous access before attempting the procedure, for example use warm water/GTN to encourage venous dilation or vein illumination/ultrasound devices. Assess patient using an assessment tool to ascertain degree of difficulty and refer for CVAD if necessary. Do not attempt the procedure unless experienced.
Missing the vein on insertion of the cannula	Inadequate anchoring. Collapse of the vein. Incorrect position of practitioner or patient. Inadequate palpation. Poor vein choice. Lack of concentration. Failure to penetrate the vein properly due to incorrect insertion angle.	Ensure good position and lighting. Better preparation and concentration. Use correct technique and accurate vein selection.	Withdraw the needle and manoeuvre gently to realign it and correct the angle of insertion. Check during manoeuvring that the patient is not feeling any pain. If the patient complains of pain, remove the needle. If unsuccessful then remove the needle. Where necessary, pass to a colleague with more experience.

Problem	Cause	Prevention	Action Suggested
Blood flashback seen and then stops	Venospasm. Bevel of needle up against a valve. Penetration of the posterior vein wall by the device. Possible vein collapse.	Try to locate valves prior to insertion and insert the device just above the valve. Carefully level off once in the vein to prevent penetration of posterior wall. Use a good angle of approach to the vein to prevent through puncture.	Release and tighten the tourniquet. Gently stroke the vein above the needle to relieve venous spasm. Withdraw the needle slightly to move the bevel away from the valve. If the vein wall is penetrated, remove the device.
Difficulty in advancing the cannula	Releasing the tourniquet too soon, causing the vein to collapse. Removing the stylet too far and being unable to advance the cannula which is now no longer rigid enough to be advanced. Encountering a valve. Not releasing the cannula from the needle prior to insertion according to manufacturer's instructions. Poor anchoring or stretching of the skin.	Ensure the tourniquet remains sufficiently tight until insertion is completed. Ensure the cannula is released from the stylet prior to insertion, to allow for smooth advancement. Ensure that a sufficient length of the cannula is inserted into the vein before stylet withdrawal. Use good technique. Assess the vein accurately, observing for valves, and avoid them where possible.	In the event of early stylet removal or encountering a valve, connect a syringe of sodium chloride 0.9%, flush the cannula and advance at the same time in an effort to 'float' the device into the vein. Tighten the tourniquet and wait for vein to refill.
Difficulty in flushing once the cannula is in situ	Sometimes, the cannula has been successfully inserted, but on checking patency by flushing, the practitioner has difficulty because: • the cannula tip is up against the valve • the cannula has pierced the posterior wall of the vein • the cannula tip is resting on the wall of the vein • there is an occlusion.	Avoid areas along the vein where there may be valves. Ensure careful insertion to prevent puncturing the posterior wall of the vein.	Withdraw the cannula slightly to move it away from the vein wall or valve and attempt to flush. If the vein wall is pierced and any swelling is observed, remove the cannula. Attempt to withdraw the clot and clear the occlusion.

Section 5

National Clinical and Procedural Guideline for Nurses and Midwives undertaking Venepuncture and/or Peripheral Intravenous Cannulation in

Infants and Children

For local adaptation by the Health Service Provider

5.0 Introduction

Please refer to Sections 1 to 3 as appropriate in conjunction with the Infants & Children section.

Child refers to neonate, infant, child and adolescent's under 16 years of age unless otherwise stated.

Infants are defined from one month to twelve months.

5.1 Guideline Statement

It is the policy of the HSE/HSE funded agencies that nurses and midwives undertaking venepuncture and/or peripheral intravenous cannulation must have successfully achieved competence having completed an education programme that is compliant with the HSE's Guiding Framework for the Education, Training and Competence Validation in Venepuncture and Peripheral Intravenous Cannulation for Nurses and Midwives (2017). In addition, nurses and midwives undertaking venepuncture and/or peripheral intravenous cannulation will do so in accordance with the procedural elements as outlined in this guideline.

5.1.1 Purpose

The purpose of this guideline is to:

- Outline the roles and responsibilities of the clinical nurse/midwifery line manager and the nurse or midwife undertaking the skill of venepuncture and/or peripheral intravenous cannulation
- Set out procedures based on best evidence, aligned with the national HSE standardised approach, which safeguard the infant and child and guide the nurse or midwife in the performance of venepuncture and/or peripheral intravenous cannulation
- Aid in the preparation and support of the infant and child and their families while undergoing venepuncture and/or peripheral intravenous cannulation.

5.1.2 Scope

This guideline applies to all nurses and midwives working with infants and children, who have successfully completed the required education, training and competence assessment to carry out venepuncture and/or peripheral intravenous cannulation. Each nurse and midwife undertaking education and training in venepuncture and/or peripheral intravenous cannulation is accountable for his/her practice and decisions made to support practice. They must be prepared to make explicit the rationale for those decisions and justify them in the context of legislation, case law, professional standards and guidelines, evidence based practice, professional and ethical conduct (NMBI 2015).

Please note:

In absence of Upper Limb selection, the decision to use an alternative site must be made in cognisance with the Algorithm when accessing peripheral venous sites (Appendix 5 (c)). The aim of the algorithm is to provide guidance to further support nurses and midwives across all services, using a step by step decision making tool to ensure correct safe judgements and decisions are made in the process to safely and successfully perform venepuncture and/or peripheral intravenous cannulation procedures in the best interest of the patient. Nurses and midwives are also encouraged to refer to the Decision Making Flowchart within the Scope of Nursing & Midwifery Practice Framework (NMBI 2015), (Appendix 5 (d)).

5.1.3 Disclaimer

The information contained within this guideline document is the most accurate and up to date, at date of approval. The document contains a procedural guideline and it is the responsibility of the local organisation, to update this guideline, according to best practice.

5.1.4 Roles and Responsibilities

5.1.4.1 Role and Responsibility of the Clinical Nurse/Midwife Manager/ Director of Nursing/Midwifery

It is the responsibility of the Clinical Nurse/Midwife Manager/Director of Nursing/Midwifery to ensure that nurses and midwives working with infants and children who are undertaking venepuncture and/or peripheral intravenous cannulation fulfil the required criteria as per 1.8.

5.1.4.2 Role and Responsibility of the Nurse and Midwife

It is the responsibility of each nurse and midwife to:

- Work within their Scope of Practice – Scope of Nursing and Midwifery Practice Framework, (NMBI 2015)
- Comply with local organisational venepuncture and/or peripheral intravenous cannulation procedures therein, when undertaking these clinical skills
- Become competent in the clinical skill of venepuncture and/or peripheral intravenous cannulation and the equipment specific to the procedure
- Be familiar and comply with this organisation's infection prevention and control, health and safety procedures and risk management policies as they apply to venepuncture and/or peripheral intravenous cannulation
- Develop and maintain competence in venepuncture and/or peripheral intravenous cannulation specific to the needs of the service, its users and in line with their Scope of Practice.

  The HSE recommend that registered nurses who are working with infants and/or children develop their competencies within the following age groups:

  - 0-1 year old
  - 1-5 year old
  - 5 years and above.

5.1.4.3 Role and Responsibility of the Clinical Practice Supervisor/Assessor:

The Clinical Practice Supervisor/Assessor' should be a Registered Nurse/Midwife who is competent in venepuncture and/or peripheral intravenous cannulation and is approved by Nursing & Midwifery Practice Development/Director of Nursing/Midwifery to undertake the assessment.

- The Clinical Practice Supervisor/Assessor must be competent in the clinical skills to facilitate assessment and have knowledge of local policies and the assessment process required for venepuncture and/or peripheral intravenous cannulation procedure
- The Clinical Practice Supervisor/Assessor must assess the nurse/midwife undertaking each procedure and complete the Record of Supervised Practice and Competence Assessment as outlined within Section 2

- The Clinical Practice Supervisor/Assessor must have undertaken Teaching & Assessment and/or Preceptorship education programme and/or an equivalent qualification to support the nurse/midwife to undertake the required number of supervised clinical practice assessments, applicable to their area of clinical practice.

Please note:

In circumstances where there is no resource of venepuncture and/or peripheral intravenous cannulation competent Registered Nurses/Midwives available, then a competent practitioner in venepuncture and/or peripheral intravenous cannulation from another profession, can assess a nurse/midwife, provided he/she is approved by Nursing & Midwifery Practice Development/Director of Nursing/ Midwifery to undertake the assessment.

5.2 Procedural Guideline for Venepuncture – Infants/Children

5.2.1 Indications for the Venepuncture Procedure

Venepuncture is the procedure of entering a vein with a needle and is undertaken to:

- Obtain a blood sample for diagnostic purposes using haematological, biochemical and bacteriological analysis
- Monitor levels of blood components.

5.2.2 Considerations When Undertaking the Venepuncture Procedure

Venepuncture is one of the most common invasive procedures, it can be traumatic. It should only be ordered when necessary. A clinical environmental assessment should be undertaken prior to the procedure, with special awareness to the following:

- Minimise disruptions i.e. phone off the hook, sign on door (particularly in community settings)
- Assess the environment for the appropriateness of undertaking the procedure
- Allow adequate time for transportation of bloods to laboratory.

Please note:

Iatrogenic anaemia or iatrogenic blood loss is the regular removal of blood for testing purposes over a short period of time. It is especially important with infants and children as they have smaller blood volumes and may need to have blood transfusions to replace the blood removed.

Co-ordination is needed between physicians, nurses and midwives and laboratories to minimise duplication of blood orders and to ensure the collection of the minimum amount of blood specimens required for testing. Please refer to local organisational guidelines for the maximum amount of blood that can be drawn from infants/children.

5.2.3 Informed Consent

Informed verbal consent should be obtained from parent/legal guardian prior to the procedure and as per local organisational policy.

Informed consent is obtained from the parent/legal guardian in the following circumstances:

- If a child is under the age of consent (16 years)
- If the child does not have the cognitive ability to understand/or make an informed decision (for further information on consent, please refer to the HSE National Consent (2014)).

5.2.4 Clinical Holding

Minimal restraint and holding should be used for the venepuncture procedure. The holding used should be appropriate to age, cognitive ability and behaviour of the child. Please refer to local organisational policies on clinical holding and the restraining of children. For further information, please read "Restraining, Holding Still and Containing Young Children (RCN 2003) and Department of Health & Children Children First - National Guidelines for the Protection and Welfare of Children" (DOHC 2009).

5.2.5 Psychological, Pharmacological and Non-Pharmacological Methods of Pain Relief

Anxiety associated with cannulation can be reduced by good communication skills, diversion, distraction and relaxation techniques. Children's previous experiences with cannulation should also be taken into consideration and measures applied that previously relieved pain and anxiety (Lavery 2003). The need for local anaesthetic agents prior to venepuncture should be decided on an individual basis (Scales 2005). Please refer to local guidelines and policies on pain scales and distraction techniques, pharmacological and non-pharmacological methods of pain relief. Pain scales used when appropriate should be developmentally, physically, emotionally and cognitively suitably for the infant/child.

Sucrose is administered to all infants irrespective of gestation as per local policy.

5.2.5.1 Topical Anaesthetic Agents

The need for topical anaesthetic agents prior to the procedure should be considered on an individual basis, must be prescribed and used in accordance with the manufacturer's instructions.

Infants should be supervised when agents are applied in case of accidental ingestion.

5.2.6 Vein Selection in infants/children

Choosing the correct vein is important. When selecting the appropriate site of vein for venepuncture, it is best practice to begin in the most distal aspect of the vein. This allows for further attempts above the selected vein which will not have been impeded. When undertaking venepuncture in infants/children, the specific advantages and disadvantages of potential venepuncture sites must be considered. These are outlined in Table 1:

Table 1: Summary of possible veins that may be used for Venepuncture in Infants/Children

Median Cubital Vein in the Antecubital Fossa	**Advantages** • Deep veins with rich blood supply • Easy to palpate • Well supported by subcutaneous tissue (prevents vein rolling under the needle) • Accessible in thin people **Disadvantages** • Brachial artery and radial nerve in close proximity • Difficult to locate in child with increased subcutaneous fat.
Cephalic and Basilic Veins in the Forearm	**Advantages** • Larger veins **Disadvantages** • Cannot be used if site is used for arteriovenous fistula • Not well supported by subcutaneous tissue (vein can roll from needle) • Brachial artery close to both veins • Median nerve close to basilic vein • Radial nerve close to cephalic vein.
Metacarpal Veins in the Dorsal Venous Network	The metacarpal veins would be the first choice for infants and children and infants under 2 years as other veins may not be accessible due to higher levels of subcutaneous fat. **Advantages** • Easily accessible, easily visualised and palpable • Prominent in obese patients **Disadvantages** • Difficult to secure • Skin can be delicate and subcutaneous tissue is diminished (small veins may only offer small volumes of blood) • Only suitable for small blood collection set (23G Butterfly system).

Anatomy of upper extremity veins:

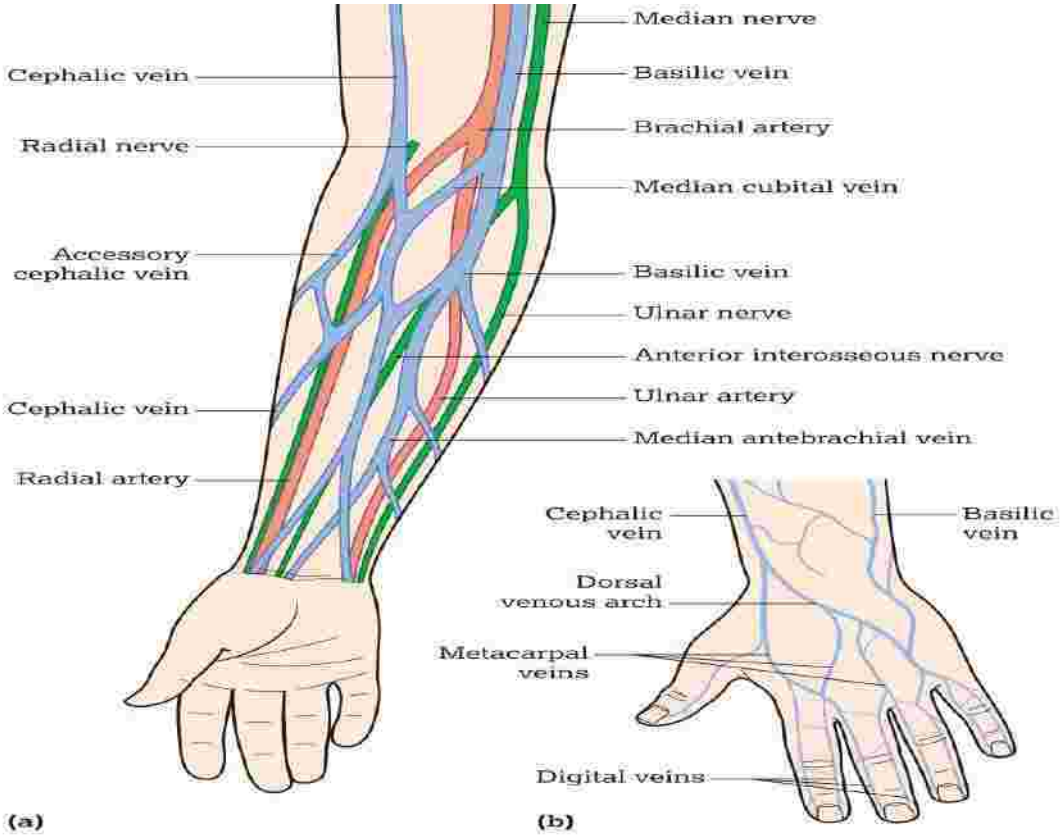

Figure i (a) Superficial veins of the forearm. (b) Superficial veins of dorsal aspect of the hand.

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Please note:

In some instances, vein viewing equipment may be available and need to be used in accordance with local Policies, Procedures, Protocols and Guidelines (PPPG's).

Please note:

Infants/children may also require venepuncture in either the foot or in the leg. These are not very common sites and should only be carried out by suitably trained/experienced practitioners when all other sites are inaccessible. Refer to section 5.1.2 and Appendix 5(c) for more details.

5.2.7 Clinical Assessment

A clinical assessment should be carried out by the nurse or midwife prior to the venepuncture procedure. Consideration must be given to the infants/child's developmental, cognitive and mobility needs when selecting a site. A Four Step Approach is outlined as follows:

Four Step Approach to Clinical Assessment

1. **Check**
   - the indication for venepuncture to determine equipment and specific bottles to use
   - if the child has fasted as required for specific tests
   - the clinical condition (acute/chronic/emergency) of the infants and children
   - the location and length of the vein
   - the condition of the vein (visual and palpation)
   - area is warm prior to the venepuncture procedure (veins constrict if cold, making the procedure more difficult)
   - for allergies
   - for needle phobia
   - previous history of difficult venepuncture procedures
   - increased amounts of subcutaneous fat
   - for history of bleeding disorders or if receiving anticoagulation therapy.

2. **Choose**
   - most distal aspect of the vein
   - non-dominant hand
   - correct location, avoiding arteries and nerves
   - appropriate equipment to undertake procedure
   - appropriate topical anaesthetic agent as prescribed.

3. **Avoid**
   - hard, sclerosed, fibrosed, knotty, thrombosed veins or previous venepuncture sites/obvious scarring
   - sites with intravenous infusions in situ
   - sites where circulation is impaired
   - sites that may require peripheral intravenous central catheter (PICC) insertion or arterial monitoring
   - valves in the vein (if visible or palpable)
   - veins in the upper arm in babies less than 28 weeks as this could impede long line insertion
   - duplication of blood orders, especially in infants and children due to smaller blood volumes
   - thumb sucking hand in infants/children
   - veins suitable for peripheral intravenous cannulation and treatment if an infant or child requires repeated treatments such as chemotherapy.

4. **Do Not Use limb**
   - with obvious infection or bruising
   - with a fracture
   - with an arteriovenous (AV) fistula
   - for affected by a stroke
   - for affected by lymphoedema
   - affected with burns.

5.2.8 Equipment

5.2.8.1 List of Equipment for Venepuncture in Infants/Children

When undertaking the venepuncture procedure, it is important that only the equipment required is brought to the bedside. This is to prevent cross contamination from occurring. The equipment required should be based on the assessment of the infant/child and the specific blood tests requested as outlined in Table 2.

Table 2: List of Equipment required for Venepuncture Procedure in the Infants/Children

• A clean clinical tray • Appropriate clinical waste discard bag (yellow) • Sharps container (large enough to accommodate the blood collection system). • Disposable non-sterile sheet-(optional in case of blood spillage) • Personal protective equipment (e.g., a pair of well-fitting non-sterile gloves, protective plastic apron, safety goggles/ visor/mask with eye shield) • Skin disinfectant infants/children as per local policy • Alcohol hand rub (AHR) • Clean single use tourniquet.	• Topical anaesthetic agent if prescribed • Required safety blood collection systems • Required blood specimen bottles • Blood requisition forms (fully completed with infant details) • A biohazard bag for transport of specimens • Sterile gauze-(to apply pressure and absorb blood spillages) • Sterile infant/child friendly plaster/band aid • Reward as agreed with infant/child and parent e.g. sticker, or certificate • Spill Kit.
As per standard precautions the use of a plastic apron and/or face protection should be assessed by each healthcare worker based on the risk of blood splashing or spraying during the procedure.	

5.2.9 Types of Safety Blood Collection Systems

The nurse/midwife should be familiar with the types of safety blood collection systems used in their organisation.

The blood collection bottles and tubes will vary depending on the safety blood collection system utilised.

5.2.10 Recommended Order of Draw

The order of blood draw is the sequence in which blood collection bottles should be filled. The needle which pierces the bottle can carry additives from one bottle into the next, and so the sequence of draw is standardised so that any cross-contamination of additives will not affect laboratory results.

The general principles applied to the order of blood draw are:

- 1st Sample - no additives
- 2nd Sample - anticoagulants
- 3rd Sample – additives

(WHO 2010) see Appendix 5 (e) and refer to local policy for further guidance.

5.2.11 Venepuncture Procedure – Infants/Children

The venepuncture procedure follows the aseptic non touch technique (ANTT®) as outlined within Section 3, see Appendix 5 (a).

Please note:

Two attempts ONLY should be made at the venepuncture procedure. If unsuccessful refer to another practitioner as outlined in Appendix 5 (c) and in accordance with the Decision Making Flowchart within the Scope of Nursing & Midwifery Practice Framework (NMBI 2015) see Appendix 5 (d).

Prior to Procedure

1. Confirm indication for the procedure, checking requisition forms for specific blood tests required
2. Perform hand hygiene as per local guidelines
3. Preparation should be carried out in a designated clean area
4. Collect the appropriate equipment (as per Table 2) and inspect its integrity, including expiry dates
5. Clean and disinfect clinical tray as per local guidelines.

At the Bedside: Patient Zone

1. Perform hand hygiene using an alcohol hand rub (AHR) as per Moment 1 "Before Patient Contact" (WHO 2009)
2. Confirm the identity of infant's/child's identification and check date of birth, confirming same with child/parent/legal guardian or family
3. Obtain informed verbal consent with parent or legal guardian
4. Check the child has received and followed any special instructions prior to taking bloods e.g. fasting, time of last medication dose ingested
5. Explain the procedure as appropriate to age and understanding
6. Check for allergies
7. Discuss pain relief (Pharmacological and non-pharmacological methods) as per local guidelines
8. Ensure the infant/child is comfortable, using minimal clinical holding or distraction therapies as required
9. Request assistance from other health care workers or family as required
10. Palpate the site to check for rebound elasticity - press lightly with two fingers and release
11. Choose the appropriate vein.

Please note:

(a) If at any time you think that a piece of equipment has been contaminated you must discard immediately and use a new piece.

(b) When applying a tourniquet to the upper arm on the chosen side, make sure it does not obstruct arterial flow. If the radial pulse cannot be palpated then the tourniquet is too tight (Weinstein and Plumer 2007). The position of the tourniquet may be varied; for example, if a vein in the hand is to be used it may be placed on the forearm. A sphygmomanometer cuff may be used as an alternative (Royal Marsden 2015).

Precautions When Using a Tourniquet: When applying a tourniquet to the upper arm on the chosen side, make sure it does not obstruct arterial flow. If the radial pulse cannot be palpated then the tourniquet is too tight (Weinstein and Plumer 2007). The position of the tourniquet may be varied; for example, if a vein in the hand is to be used it may be placed on the forearm. A sphygmomanometer cuff may be used as an alternative (Royal Marsden 2015). Do not allow the tourniquet to be applied for more than **1 minute**. Extended application of the tourniquet may result in local stasis and the possible haematoma formation. If a tourniquet must be applied for the preliminary vein selection, it should be released and **reapplied after a 2-minute rest period** (Clinical and Laboratory Standards Institute 2007).

Preparation

1. Perform hand hygiene using AHR, allow to dry
2. Open equipment carefully by peeling back packaging, ensuring all Key-Parts remain uncontaminated and covered until use
3. Place disposable non-sterile sheet under the infant's/child's arm
4. Apply the tourniquet (5/6cms above chosen site) and tighten slowly (Do not leave on for longer than one minute to avoid restriction of blood flow)
5. Ask the child to open/close their fist and keep fist closed
6. Place arm below heart level to encourage venous filling
7. Palpate the site to check for rebound elasticity - press lightly with one finger and release
8. Choose the appropriate vein
9. Release tourniquet. Leave it in position, ready to re-use
10. Decontaminate hands using AHR, allow to dry Moment 2 "Before Aseptic/Clean Procedure" (WHO 2009)
11. Don non-sterile appropriate size gloves. Additional personal protective equipment, i.e. apron and/or goggles may be required following risk assessment of an increased exposure to blood
12. Disinfect the patients skin as per local policy for at least 30 seconds and allow to dry
13. Dispose of used skin disinfectant wipe appropriately by placing it in the clinical waste discard bag
14. Do not touch or re-palpate the site
15. If re-palpating is required, hand hygiene and skin disinfection must be performed again
16. Reapply the tourniquet (ensure a rest period of 2 minutes has elapsed) (Clinical and Laboratory Standards Institute 2007).

Venepuncture Procedure

1. Use your non-dominant hand to achieve skin traction below the puncture site and to stabilise vein
2. Hold the blood collection set between your thumb and index finger
3. Position the needle-facing bevel upwards

4. Insert the needle, directly above the vein, through the skin (angle 10-30 degrees) depending on the depth of the vein
5. When the needle punctures the vein, observe for flashback as appropriate. The flashback may not be evident, this will depend on the procedure and the safety blood collection system being used
6. Lower the angle between the needle and the skin
7. When multiple blood tests are required, ensure the blood tests are taken in the proper order of draw
8. Loosen and release the tourniquet while supporting the device in situ
9. Invert bottles gently to mix appropriately, in accordance with order of draw
10. Do not shake bottles
11. Apply sterile gauze over the puncture site. Do not apply pressure before you remove the needle, activating the needle safety device
12. Remove the needle and place the place the blood collection system into the sharps box
13. Maintain gentle digital pressure on the puncture site to prevent blood leakage
14. Infants/child's arm can be elevated while applying pressure to prevent haematoma formation but do not bend the arm
15. Discard the blood contaminated gauze in the clinical tray
16. Apply sterile dressing or infant/child friendly plaster over the puncture site
17. Remove gloves and face protection, if applicable and discard in appropriate receptacle, as per local guidelines
18. Perform hand hygiene using an AHR as per Moment 3 "After Body Fluid Exposure".

After Care

1. Inform the child/parents/legal guardian of potential complications and advise to report same
2. Ensure the infant/child is in a comfortable position and reassure, offering an infant/child friendly reward as appropriate
3. If further contact with the infant/child or the infant/child's surroundings occurs, hand hygiene must be performed using an AHR as per Moment 4 "After Patient Contact" and Moment 5 " After Contact with Patients Surroundings"
4. Ensure blood collection bottles and requisition forms are correctly labelled at the patient's bed side
5. Place all blood collection bottles and forms into the biohazard bag and send to the laboratory as per local policy
6. Document the procedure in the healthcare records, communication, and inform relevant staff of outcome.

Post Procedure: Designated Decontamination

1. Bring used clinical tray and equipment to the designated utility area
2. Dispose of healthcare risk and non-risk waste appropriately
3. Decontaminate the clinical tray/dispose if single use
4. Decontaminate re-usable personal protective equipment e.g. re-usable eye shield as per manufacturer's instructions, if applicable
5. Remove gloves and apron and carry out appropriate Hand Hygiene using an AHR
6. Arrange for blood samples to be transported to the laboratory (where applicable).

5.2.12 Management of Potential Complications

Potential problems such as infant/child fear and anxiety, inability to draw blood and/or cessation of blood flow may arise and it is important to know how these may be overcome. Complications such as haematoma, phlebitis, nerve injury, arterial puncture, venous spasm and/or needle stick injury can occur and it is important that the nurse or midwife is able to recognise, treat and/or prevent them. It is critical for the nurse/midwife to detect and prevent complications arising. This is especially important for infants/children who may not be able to verbalise pain. Please see Table 3 and/or Appendix 5 (g) for more information on potential complications.

Table 3: Potential Complications for the Venepuncture Procedure in Infants/Children

Venous Spasm	**Venous spasm is a sudden involuntary contraction of the vein, resulting in temporary cessation of blood flow in the vein.**
Cause	• Venous spasm is caused by fear and anxiety and is usually stimulated by cold infusates and mechanical or chemical irritation.
Signs	• Expressions of pain (verbal or non-verbal) such as facial expressions or crying • Cramping • Numbness above the venepuncture site.
Prevention	• Explain the procedure to reduce fear and anxiety.
Treatment	• Gently massage or warm the limb and retry • Slow down the process of venepuncture (there is no need to remove the needle) • Wait for the vein to relax before proceeding.

Needle stick injury	**A needle stick injury (percutaneous inoculation injury) is an inadvertent puncture of the skin with a potentially contaminated needle, Appendix 3 (a) Refer to: Management of BBV risk following exposure to needlestick/sharps in occupational or community setting. (Health Protection Surveillance Centre 2016) www.emitoolkit.ie**
Cause	• Inadvertent puncture of the skin during the venepuncture procedure.
Signs	• Pain • Bleeding • A visible puncture of the skin of the nurse or midwife.
Prevention	• The application of Infection Prevention & Control and Health and Safety will support safe practice.
Treatment	• Encourage the wound to bleed freely • Wash the affected area with liquid soap under running water. Do not scrub (EMI Guidelines 2012) • Apply a waterproof dressing over the affected area • Report the incident to your line manager • Record the incident accordingly by completing the relevant incident form • Submit the incident form to your risk manager or line manger • For follow-up and advice, contact your Occupational Health Dept. and/or the Emergency Dept. as per local organisational guidelines.

Nerve Injury	If a nerve is accidentally hit on insertion of the needle into the vein, this will result in pain and can lead to injury and possibly permanent damage (McCall & Tankersley 2012)
Cause	• Inappropriate selection of the cannulation site • Poor technique.
Signs	• Pain described as an 'electrical shock' or a 'pins and needles' sensation • Crying • Loss of mobility or reluctance to move the affected limb.
Prevention	• Appropriate clinical assessment • Appropriate site selection • Skilled technique.
Treatment	• Release the tourniquet, remove the cannula and apply gentle pressure • Explain and reassure the child about what has occurred • Advise that any symptoms of altered sensation may persist for a few hours • Arrange a medical review, if required • Monitor, treat as prescribed and document in the nursing care plan • Finally, report the occurrence of this complication, as per local organization.

Haematoma	Haematoma is the leakage of blood into the tissues indicated by rapid swelling which occurs during the insertion procedure or after removal (Perucca 2010, McCall & Tankersley 2015)
Cause	• Leakage of blood at the site of the venepuncture, may collect as a haematoma • Inappropriate use of a small fragile vein, or too large a needle • Excessive probing to find the vein • Removing the needle prior to releasing the tourniquet • The needle going all the way through the vein • The needle only partially entering the vein, allowing leakage.
Signs	• Expressions of pain (verbal or non-verbal) such as facial expressions or crying, loss of mobility or reluctance to move the affected limb • Swelling, discolouration or coolness of the area adjacent to the puncture site.
Prevention	• Selection of appropriate equipment for the size of the vein • Skilled technique.
Treatment	• Release the tourniquet, remove the needle and apply pressure until haemostasis has been achieved • Elevate the limb and apply a cool compress if necessary, avoiding an ice burn • Apply a pressure dressing if bleeding is persistent • Explain what has happened and request that staff are informed if the area becomes more painful as the haematoma may be pressing on a nerve • Do not reapply the tourniquet to the affected limb • Request a medical review, if required • Monitor, treat as prescribed and document in the nursing care plan • Report the occurrence of this complication, as per local organisation.

Arterial Puncture	The inadvertent puncture of the artery is another complication associated with venepuncture
Cause	• Inappropriate selection of the venepuncture site • Poor technique.
Signs	• Presence of bright red blood • Expressions of pain (verbal or non-verbal) such as facial expressions or crying.
Prevention	• Explain the procedure to reduce fear and anxiety • Appropriate clinical assessment – palpate artery • Appropriate site selection • Skilled technique.
Treatment	• Release the tourniquet, removing the needle immediately and apply pressure until haemostasis has been achieved • Explain and reassure regarding what has happened • Request that a member of staff is informed if bleeding recurs from the puncture site, if pain continues or if there is increasing swelling or bruising.

Phlebitis	Phlebitis is an acute inflammation of the intima of a vein (Dougherty 2008)
Cause	• Localised infection or irritation of the vein caused by the introduction of the venepuncture needle (mechanical/bacterial phlebitis).
Signs	• Expressions of pain (verbal or non-verbal) such as facial expressions or crying • Loss of mobility or reluctance to move the affected limb • Redness, inflammation, or purulent ooze at the venepuncture site.
Prevention	• Early detection is crucial, with regular monitoring required • In children, the site should be monitored more frequently as they are at increased risk due to their small vessels.
Treatment	• Observe and monitor the venepuncture site • Assess the degree of phlebitis • Take a swab of the site for culture and sensitivity • Clean and apply a dressing, to the affected area and administer analgesia as prescribed • Report the incident of this complication • Treat as prescribed and document the care given.

5.2.13 Documentation

The nurse or midwife must be familiar with the documentation required for the venepuncture procedure. A requisition form must accompany blood samples submitted to the laboratory. The requisition form must contain the proper information in order to process the specimen.

The essential elements of the requisition form include the:

- Surname, first name, and middle initial
- Date of birth and gender
- Identification number
- Diagnosis or symptoms
- Complete name of healthcare professional requesting test
- Date of venepuncture procedure
- Indication of the blood test(s) requested
- Location (for example, ward, department, address).

5.2.14 Implementation Plan

The Director of Nursing/Midwifery is responsible for the dissemination, implementation, ongoing evaluation and audit of this national clinical procedural guideline for Venepuncture within the HSE/HSE Funded Agency.

5.2.15 Evaluation and Audit

Evaluation will include a:

- Mechanism for recording, reviewing and acting on adverse venepuncture incidents
- System for maintaining practitioner competence
- Method for identifying further training needs
- Care bundle audit.

5.3 Procedural Guideline for Peripheral Intravenous Cannulation (PIVC) - Infants/Children

5.3.1 The indications for PIVC Procedure are to:

- Maintain hydration
- Restoring fluid and electrolyte balance
- Providing fluids for resuscitation
- Administer:
  - intravenous medication therapy, e.g. antibiotics, opoids
  - intermittent, continuous infusion or bolus medications
  - blood and blood products
  - an opaque medication and/or a diagnostic re-agent to assist with diagnosis.

5.3.2 Considerations When Undertaking the PIVC procedure

PIVC is an invasive procedure, it can be traumatic. It should only be ordered when necessary. The "Children First - National Guidelines for the Protection and Welfare of Children" (DOHC 2009) should be adhered to. A clinical assessment should be undertaken prior to the procedure, with special awareness to the following:

- The PIVC procedure should not be ordered for routine phlebotomy
- A clinical assessment of the infant/child should be undertaken prior to the insertion of a PIVC
- PIVC should be carried out as close to the time of use to reduce the risk of accidental dislodgement and related complications
- Where peripheral intravenous access is poor and cannulation is difficult, alternative methods of access should be considered and discussed with the appropriate medical team
- Infusion of markedly irritant or vesicant substances (e.g. total parental nutrition or some cytotoxic drugs) are best administered via a midline catheter or peripherally inserted central catheters (PICC) (RCN 2010, Dougherty & Lister 2015)
- A PIVC should not be sited in close proximity to another cannula, however, if two cannulae are in close proximity they should be secured with separate dressings
- PIVC is regarded as a minor surgical procedure and is carried out with a high standard of hand hygiene, site preparation and maintenance.

5.3.3 Informed Consent

Informed verbal consent should be obtained from parent/legal guardian prior to the procedure and as per local organisational policy.

Informed consent is obtained from the parent/legal guardian in the following circumstances:

- if a child is under the age of consent (16 years)
- if the child does not have the cognitive ability to understand/or make an informed decision (for further information on consent, please refer to the HSE National Consent policy (2014)).

5.3.4 Clinical Holding

Minimal holding should be used for the PIVC procedure. The holding should be appropriate to age, cognitive ability and behavior of the child. Please refer to local organisational policies on clinical holding and the restraining of children. For further information, please read "Restraining, Holding Still and Containing Children and Young People - Guidance for Nursing Staff" (Royal College of Nursing 2003) and "Children First - National Guidelines for the Protection and Welfare of Children" (DOHC 2009).

5.3.5 Psychological, Pharmacological and Non-Pharmacological Methods of Pain Relief

Anxiety associated with cannulation can be reduced by good communication skills, diversion, distraction and relaxation techniques. Children's previous experiences with cannulation should also be taken into consideration and measures applied that previously relieved pain and anxiety (Lavery 2003). The need for local anaesthetic agents prior to peripheral intravenous cannulation should be decided on an individual basis (Scales 2005). Please refer to local guidelines and policies on pain scales and distraction techniques, pharmacological and non-pharmacological methods of pain relief. Pain scales used when appropriate should be developmentally, physically, emotionally and cognitively suitably for the infant/child. Sucrose is administered to all infants irrespective of gestation as per local policy.

5.3.5.1 Topical Anaesthetic Agents

The need for topical anaesthetic agents prior to the procedure should be considered on an individual basis, must be prescribed and used in accordance with the manufacturer's instructions.

Infants should be supervised when agents are applied in case of accidental ingestion.

5.3.6 Vein Selection in Infants/Children

Choosing the correct vein is important. When selecting the appropriate site for PIVC it is best practice to begin in the most distal aspect of the vein. This allows for further attempts above the selected vein which will not have been impeded. When undertaking PIVC in infants/children, the specific advantages and disadvantages of potential venous sites must be considered.

These are outlined in Table 1.

Table 1: Summary of possible veins that may be used for PIVC in Infants/Children

Veins	Location	Advantages and Disadvantages
The Cephalic and Basilic Vein in the Forearm	Cephalic Vein – runs under the skin on the radial side of the forearm. Basilic Vein – runs up the ulnar side of the forearm.	**Advantages-** larger veins, more rapid infusion hand can be freely used. Easily located. The first choice of vein for a neonate is a vein on the dorsal surface of the hand. **Disadvantage** of Basilic vein-It is situated closest to nerves and arteries and caution should be exercised if chosen.
Metacarpel Veins in the Dorsal Venous Network	on the dorsum of the hand	**Advantages** • First choice of vein for neonates • Ideal for long term therapy • Splinted by metacarpal bones **Disadvantages** • Difficult to secure • Flow affected by wrist movement.
Median Cubital Vein in the Antecubital Fossa	situated in the antecubital fossa in the elbow.	**Advantages** • Well supported by subcutaneous tissue (prevents vein rolling under needle) • Deeper and more tolerant to irritant substances **Disadvantages** • Difficult to locate in children with increased subcutaneous fat • Restricted movement, flexion of the arm can interfere with flow of infusion.

Anatomy of upper extremity veins:

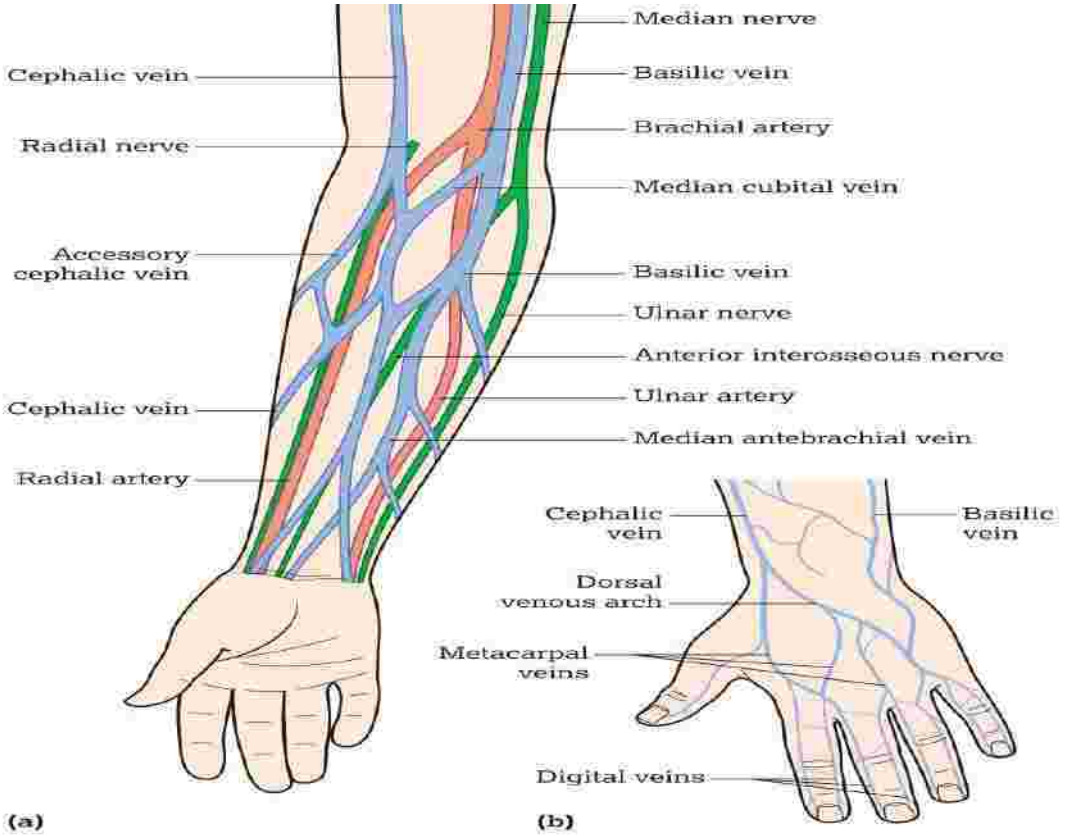

Figure i (a) Superficial veins of the forearm. b) Superficial veins of dorsal aspect of the hand

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Please note:

In some instances, vein viewing equipment may be available and need to be used in accordance with local Policies, Procedures, Protocols and Guidelines (PPPG's).

Please note:

Infants/children may also require venepuncture in either the foot or in the leg. These are not very common sites and should only be carried out by suitably trained/experienced practitioners when all other sites are inaccessible. Refer to section 5.1.2 and Appendix 5(c) for more details.

5.3.7 Clinical Assessment

A clinical assessment should be carried out by the nurse/midwife prior to the PIVC procedure. Consideration must be given to the infant's/child's developmental, cognitive and mobility needs when selecting a site. A Four Step Approach to the clinical assessment is outlined as follows:

Four Step Approach to Clinical Assessment

1. Check

- the indication for PIVC
- if intravenous medication or fluids could be given by any other route, i.e.
  - is this the last dose of antibiotics?
  - is the infant almost on full feeds?
  - is the infant/child on fluids or diet?
- purpose, duration and rate of the intravenous infusion
- the clinical condition (acute/chronic/emergency) of the infant/child
- type and volume of intravenous fluid or medication to be administered via the vein
- the location and length of the vein
- the condition of the vein (visual and palpation)
- area is warm prior to cannulation procedure (veins constrict if cold, making the procedure more difficult)
- allergies to medications, topical anaesthetic agents, dressings or plasters
- for needle phobia
- for previous history of difficult PIVC procedures
- for factors relating to individual patients, i.e.
  - obese
  - malnutrition
  - fragile veins
- child's preference about the site, however vital to check both arms
- for history of blood borne viruses
- for history of bleeding disorders or if receiving anticoagulation therapy or long term steroids.

2. Choose

- a suitable vein for peripheral cannula insertion, avoiding arteries and nerves
- most distal aspect of the vein
- non-dominant hand
- appropriate equipment to undertake procedure
- appropriate topical anaesthetic agent, as prescribed.

3. Avoid

- hard, sclerosed, fibrosed, knotty, thrombosed veins or previous cannulation sites
- areas with increased subcutaneous fat
- sites with existing intravenous infusions in situ
- sites where circulation is impaired
- sites that may require peripheral intravenous central catheter (PICC) insertion or arterial monitoring
- valves in the vein (if visible or palpable)
- veins in the upper arm in babies less than 28 weeks as this could impede long line insertion
- thumb sucking hand in infants/children
- lower extremities sites especially when infants/children have just started walking.

4. **Do Not Use Limb**
   - with obvious infection or bruising
   - with a fracture
   - with an arteriovenous (AV) fistula
   - affected by a stroke/lymphoedema/burn.

5.3.8 Assessment on Transfer of Infants/Children

An infant/child with a PIVC inserted by a transferring hospital will require assessment of the cannula and the insertion site for inflammation, infiltration, extravasation, infection and leaking or pressure of the cannula on the surrounding tissues signs of phlebitis as per Visual Infusion Phlebitis (VIP) score within Appendix 5 (f) and must be removed and re-sited as indicated.

5.3.9 Equipment

5.3.9.1 List of Equipment for PIVC in Infants/Children

When undertaking the PIVC procedure, it is important that only the equipment required is brought to the bedside. This is to prevent cross contamination from occurring. The equipment required should be based on the assessment of the infants/children and the purpose of the PIVC as outlined in Table 2.

Table 2 List of Equipment for PIVC in Infants/Children

• Alcohol hand rub (AHR) • A clean & disinfected dressing trolley • Appropriate clinical waste discard bag (yellow) • Sterile dressing pack • Sharps container • Disposable non-sterile Sheet (optional-in case of blood spillage) • Personal protective equipment (e.g. a pair of well-fitting non-sterile gloves, protective plastic apron, safety goggles/ visor/mask with eye shield) • Skin disinfectant: as per local policy • Clean single use tourniquet • Topical anaesthetic agent (if prescribed).	• Intravenous cannula (Choose size appropriately) • Sterile Steri-Strips™ and sterile scissors • T - Connector • Ampoule of prescribed Sodium Chloride (NaCl 0.9%) flush, as per local policy • Sterile gauze (To absorb blood spillage) • Sterile, semi-permeable transparent dressing • Sterile infant/child friendly plaster/band aid (In case of unsuccessful attempt) • Reward (as agreed with child/parent, e.g. sticker or certificate • Spill Kit.
As per standard precautions the use of a plastic apron and/or face protection should be assessed by each healthcare worker based on the risk of blood splashing or spraying during the procedure.	

5.3.10 Types of Cannulae used for Infants/Children

Cannulae range in type and size, depending on purpose. The correct size of the cannula will help to prevent damage to the vessel and ensure adequate blood flow. Usually, the smallest size (gauge) for the prescribed therapy is chosen to facilitate better flow and minimise trauma (RCN 2010 and Scales 2005). Small veins will not accommodate large volumes or irritant solutions, therefore the purpose of the cannula will determine the appropriate type and size. The nurse and midwife should be familiar with the types of cannulae used in their organisation.

5.3.11 PIVC Procedure - Infants/Children

The PIVC procedure follows the aseptic non touch technique as outlined within Section 3, Appendix 5 (b).

Please note:

Two attempts ONLY should be made at the peripheral intravenous cannulation procedure. If unsuccessful refer to another practitioner as outlined in Appendix 5 (c), the decision to use an alternative site must be made in cognisance with the Decision Making Flowchart within the Scope of Nursing & Midwifery Practice document (NMBI 2015) see Appendix 5 (d).

Prior to Procedure: Preparation in designated clean area

1. Confirm indication for the procedure
2. Perform hand hygiene as per local guidelines
3. Disinfect a clean trolley, as per local guidelines
4. Collect the necessary equipment and inspect packaging for damage and expiry dates.

At the Bedside: Patient Zone

1. Perform hand hygiene using an alcohol hand rub (AHR) as per Moment 1 "Before Patient Contact" (WHO, 2009)
2. Confirm the identity of the infant's/child's and date of birth, confirming same with child/parent/legal guardian or family
3. Obtain informed verbal consent with parent or legal guardian and clarify understanding
4. Explain the procedure as appropriate to age and understanding and check for allergies
5. Discuss pain relief (Pharmacological and non-pharmacological methods) as per local guidelines
6. If pain relief is required an anaesthetic agent must be prescribed and applied at least one hour before the procedure. The anaesthetic agent should be removed prior to the procedure according to manufactures instructions
7. Ensure the infant/child is comfortable, using minimal clinical holding or distraction therapies as required
8. Request assistance from other health care workers or family as required
9. Choose the appropriate vein
10. Open equipment carefully by peeling back packaging, ensuring all Key-Parts remain uncontaminated and covered until use
11. Decontaminate hands using AHR, allow to dry
12. Don non-sterile gloves, (apron and face protection if required)

13. Place disposable non-sterile sheet under the infant's/child's arm
14. Apply the tourniquet (5/6cms above chosen site) and tighten slowly (Do not leave on for longer than one minute)
15. Ask the child to open/close fist and keep fist closed
16. Place arm below heart level to encourage venous filling
17. Palpate the site to check for rebound elasticity - press lightly with one finger and release
18. Choose the appropriate vein
19. Release tourniquet. Leave it in position, ready to re-use
20. Open the sterile dressing pack and add the sterile dressing, appropriate cannula for selected vein and other sterile items onto the sterile field using a non touch technique. Attach yellow waste bag to trolley
21. If prefilled syringes not available draw up NACL 0.9% flush into syringe using needle or straw & prime T-connector. Place syringe on the sterile field but not touching any sterile items
22. Reapply the tourniquet (Do not leave on for longer than two minutes).

Please note:

(a) If at any time you think that a piece of equipment has been contaminated you must discard immediately and use a new piece.

(b) When applying a tourniquet to the upper arm on the chosen side, make sure it does not obstruct arterial flow. If the radial pulse cannot be palpated then the tourniquet is too tight (Weinstein and Plumer 2007). The position of the tourniquet may be varied; for example, if a vein in the hand is to be used it may be placed on the forearm. A sphygmomanometer cuff may be used as an alternative (Royal Marsden 2015).
Precautions When Using a Tourniquet: When applying a tourniquet to the upper arm on the chosen side, make sure it does not obstruct arterial flow. If the radial pulse cannot be palpated then the tourniquet is too tight (Weinstein and Plumer 2007). The position of the tourniquet may be varied; for example, if a vein in the hand is to be used it may be placed on the forearm. A sphygmomanometer cuff may be used as an alternative (Royal Marsden 2015). Do not allow the tourniquet to be applied for more than **1 minute**. Extended application of the tourniquet may result in local stasis and the possible haematoma formation. If a tourniquet must be applied for the preliminary vein selection, it should be released and **reapplied after a 2-minute rest period** (Clinical and Laboratory Standards Institute 2007).

Preparation

1. Perform hand hygiene using AHR, as per Moment 2 "Before Aseptic/Clean Procedure" (WHO 2009)
2. Don non-sterile, appropriate size gloves. Additional personal protective equipment i.e. apron and/or goggles may be required following risk assessment of an increased exposure to blood
3. Disinfect the patient's skin and the selected vein for at least 30 seconds usng 2% chlorhexidine gluconate in 70% isopropyl alcohol using back and forth strokes with friction on an area of 4 – 5 cms and allow to dry (Royal Marsden 2015)
4. Dispose of used skin disinfectant wipe appropriately by placing it in the clinical waste discard bag
5. Do not touch or re-palpate the site
6. If re-palpation is required, hand hygiene and skin disinfection must be performed again
7. After reapply the tourniquet, please include (ensure a rest period of 2 minutes has elapsed) (Clinical and Laboratory Standards Institute 2007)

PIVC Procedure in infants/Children

1. Remove needle guard and inspect the device for any faults (Dougherty & Lister 2015)
2. Use your non-dominant hand to achieve skin traction
3. Hold the cannula between your thumb and index finger and use thumb to anchor the cannula hub
4. Position the cannula-facing bevel upwards
5. Insert the cannula directly above the vein, through the skin (angle 10-30 degrees, depending on the depth of the vein)
6. When the cannula punctures the vein, observe for flashback in the cannula chamber as appropriate
7. Lower the angle between the cannula and the skin
8. Advance the cannula a further 2 mm along the lumen of the vein
9. Withdraw the introducer slightly with the dominant hand and a second flashback of blood will be seen along the shaft of the cannula (Dougherty & Lister 2015)
10. Slowly advance the cannula fully into the lumen of the vein
11. Gently pull the introducer backwards, while holding the cannula in position
12. Loosen and release the tourniquet while supporting the device in situ
13. Hold the sterile gauze by one corner and place under the cannula hub to absorb blood spillage. Ensure only section of gauze that is sterile is in touch with hub
14. Apply digital pressure to the vein above the cannula tip and remove the stylet gently, activating the needle safety device
15. Dispose of all sharps in the sharps bin at the point of care
16. If blood collection is required at this stage, connect with appropriate safe blood collection system and adhere to ANTT® and venepuncture, as per local policy
17. Attach the needle-free bung/primed t-connector/primed short extension set to the cannula hub
18. Discard the blood contaminated gauze into the yellow waste bag
19. Secure and anchor the cannula with a sterile transparent semi permeable dressing (Loveday et al. 2014, HPSC 2009)
20. Aspirate to check for blood flashback
21. Flush cannula with prescribed sterile sodium chloride (NaCL 0.9%) using a push pause technique (pulsatile) ending with a positive pressure (Dougherty & Lister 2015) to confirm patency, as per local policy
22. Observe the site for signs of swelling or leakage and ask the patient if they are experiencing any discomfort or pain
23. If required loop the t-connector tubing and secure with tape
24. Remove disposable sheet, gloves and disposable eye protection (if applicable) and discard appropriately as per local policy
25. Perform hand hygiene using an AHR as per Moment 3 "After Body Fluid Exposure"
26. Document date and time of insertion, site and size of cannula, number of attempts and sign in healthcare notes or care plan (Dougherty & Lister 2015).

After Care

1. Inform the child/parents/legal guardian of potential complications and advise to report same
2. Ensure the infant/child is in a comfortable position and reassure, offering an infant/child friendly reward as appropriate
3. If further contact with the infant/child or the patient's surroundings occurs, hand hygiene must be performed using an AHR as per Moment 4 "After Patient Contact" and Moment 5 " After Contact with Patients Surroundings"
4. Document the procedure healthcare records, communicate and inform relevant staff of the outcome.

Post Procedure: Designated Decontamination

1. Bring used clinical tray and equipment to the designated utility area
2. Dispose of healthcare risk and non-risk waste appropriately
3. Decontaminate the clinical tray/dispose if single use
4. Decontaminate re-usable personal protective equipment e.g. re-usable eye shield as per manufacturer's instructions, if applicable
5. Remove gloves and apron and carry out appropriate Hand Hygiene using an AHR
6. Arrange for blood samples to be transported to the laboratory (where applicable).

5.3.12 Care and Maintenance of an Indwelling PIVC

- Ensure that cannula is in correct position and a sterile semi-permeable transparent dressing is intact
- Ensure that the PIVC entry site is visible through the dressing
- The site should be kept clean and dry at all times. The dressing should only be changed if it becomes loose, wet or soiled. ANTT® should be used for dressing changes (RCN 2010)
- Use Visual Infusion Phlebitis (VIP) Score Appendix 5 (f) to inspect the cannula site on each shift (preferably every eight hours) for signs of tenderness, swelling, inflammation, discharge or thrombosis (INS 2011)
- Ensure a single lumen primed extension set is applied to the cannula and clamped when not in use
- Clean the hub of extension set with 2% Chlorhexidine gluconate solution in 70% isopropyl alcohol product and air dry prior to flushing the cannula
- Flush the cannula with prescribed sterile 0.9% Sodium Chloride (0.9% NaCL) solution daily or before and after each drug administration or infusion and ensure positive pressure is maintained by clamping the extension set prior to flushing the final 1 ml of saline (RCN 2010). Document administration in drug prescription sheet
- The IV site must also be observed while:
  - Bolus injections are administered
  - IV flow rates are being checked or altered
  - IV infusion/transfusion bags are being changed
  - The patient is showering or washing
- Advise the child to protect the PIVC before, during and after personal hygiene.
- Inspect the site on each shift for signs of tenderness, swelling, inflammation, discharge or thrombosis as per VIP score (INS 2011).

- Document inspection of PIVC site in PIVC care plan/care bundle. At the first signs of inflammation or infection:
  - Cannula should be removed.
  - Take a swab from the PIVC insertion site and send the swab to laboratory for culture & sensitivity testing.
  - Clean the insertion site with a 2% Chlorhexidine gluconate solution in 70% isopropyl alcohol product.
  - Notify medical team.
  - Document findings and action taken in the nursing progress notes.
  - Continue to observe PIVC insertion site.

Please note:

PIVC's must be re-sited only if clinically indicated and not routinely (Loveday et al. 2014).

5.3.13 Management of Potential Complications

Specific complications that can arise following the procedure include infiltration, extravasation, venous spasm, phlebitis, thrombophlebitis, haematoma, nerve injury, arterial puncture, embolism and needle stick injury. Infants/children are at greater risk of complications due to the smaller size of their veins and reduced blood flow around the cannula tip (Bravery 1999). It is critical for the nurse/midwife to detect and prevent complications arising and to treat as required. Infants/children who cannot verbalise pain, depend on the nurse/midwife to detect and prevent complications related to PIVC, as outlined in Table 3 and/or Appendix 5 (h).

Table 3: Potential Complications for PIVC Procedure in Infants/Children

Pain	**Pain is an unpleasant sensory and emotional experience associated or described with actual or potential tissue damage (Shrestha M & Adhikari R K 2012)**
Cause	• tentative stop–start insertion (often associated with hesitant or new practitioners) • hitting an artery, nerve or valve • poor technique – inadequate anchoring causes skin to gather as the needle is inserted • alcohol is not allowed to dry adequately before insertion, resulting in stinging pain • using a frequently punctured, recently used or bruised vein • anxious patient, may have low pain threshold • use of large–gauge device • use of veins in sensitive areas (Dougherty 2008).
Signs	• Body language, verbal expression, facial expression.
Prevention	• Pain can be prevented by using methods to relax and relieve anxiety, or the use of local anaesthetic creams.
Treatment	• If the patient complains of pain, depending on the cause (e.g. nerve or artery), it may be necessary to remove the device immediately • Reassure the patient.

Venous Spasm	Venous spasm is a sudden involuntary contraction of the vein, resulting in temporary cessation of blood flow in the vein.
Cause	• Venous spasm is caused by fear and anxiety and is usually stimulated by cold infusates and mechanical or chemical irritation.
Signs	• Expressions of pain (verbal or non-verbal) such as facial expressions or crying • Cramping • Numbness above the venepuncture site.
Prevention	• Explain the procedure to reduce fear and anxiety • Give infusions at room temperature (commence infusions slowly).
Treatment	• Gently massage or warm the limb and retry • Slow down the process of venepuncture (there is no need to remove the needle) • Wait for the vein to relax and wait for blood to return into the flash chamber before proceeding • During intravenous therapy, reduce the rate of infusion flow, especially in solutions known to be irritant.

Needle stick injury	A needle stick injury (percutaneous inoculation injury) is an inadvertent puncture of the skin with a potentially contaminated needle Appendix 3 (a) Refer to: Management of BBV risk following exposure to needlestick/sharps in occupational or community setting. (Health Protection Surveillance Centre 2016) www.emitoolkit.ie
Cause	• Inadvertent puncture of the skin during the cannulation procedure.
Signs	• Pain • Bleeding • A visible puncture of the skin of the nurse or midwife.
Prevention	• The application of Infection Prevention & Control and Health and Safety will support safe practice.
Treatment	• Encourage the wound to bleed freely • Wash the affected area with liquid soap under running water. Do not scrub (EMI Guidelines 2012) • Apply a waterproof dressing over the affected area • Report the incident to your line manager • Record the incident accordingly by completing the relevant incident form • Submit the incident form to your risk manager or line manger • For follow-up and advice, contact your Occupational Health Dept. and/or the Emergency Dept. as per local organisational guidelines.

Nerve Injury	If a nerve is accidentally hit on insertion of the needle into the vein, this will result in pain and can lead to injury and possibly permanent damage (McCall & Tankersley 2012)
Cause	• Inappropriate selection of the cannulation site • Poor technique.
Signs	• Pain described as an 'electrical shock' or a 'pins and needles' sensation • Crying • Loss of mobility or reluctance to move the affected limb.
Prevention	• Appropriate clinical assessment • Appropriate site selection • Skilled technique.
Treatment	• Release the tourniquet, remove the cannula and apply gentle pressure • Explain and reassure the child about what has occurred • Advise that any symptoms of altered sensation may persist for a few hours • Arrange a medical review, if required • Monitor, treat as prescribed and document in the nursing care plan • Finally, report the occurrence of this complication, as per local organisation.

Haematoma	Haematoma is the leakage of blood into the tissues indicated by rapid swelling which occurs during the insertion procedure or after removal (Perucca 2010, McCall & Tankersley 2015)
Cause	• 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 • failure to remove the tourniquet promptly or failure to release it before removing the needle • inadequate pressure on venepuncture site following removal of the cannula (Dougherty 2008, McCall & Tankersley 2012 & Moini 2013).
Signs	• Pain, loss of mobility or reluctance to move the affected limb • Swelling, discolouration or coolness of the area adjacent to the cannula.
Prevention	• Good vein and device selection and using a careful technique • The practitioner should always be aware of patients with fragile veins or those on anticoagulant therapy and inexperienced individuals should not attempt cannulation in these individuals (Perucca 2010) • 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 (Perucca 2010).
Treatment	• In the event of a haematoma occurring, tourniquet is released, the cannula should be removed immediately and pressure applied to the site for a few minutes (McCall & Tankersley 2012, Garza & Becan McBride 2013) • 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 (Moini 2013).

Arterial Puncture	The inadvertent puncture of the artery is another complication associated with cannulation
Cause	• Inappropriate selection of the cannulation site • Poor technique.
Signs	• Presence of bright red blood • Expressions of pain (verbal or non-verbal) such as facial expressions or crying.
Prevention	• Explain the procedure to reduce fear and anxiety • Appropriate clinical assessment – palpate artery • Appropriate site selection • Skilled technique.
Treatment	• Release the tourniquet, removing the cannula immediately and apply pressure until haemostasis has been achieved • Explain and reassure the child and their family regarding what has happened. • Request that a member of staff is informed if bleeding recurs from the puncture site, if pain continues or if there is increasing swelling or bruising • Arrange a medical review • Monitor, treat as prescribed and document in the nursing care plan • Report the occurrence of this complication, as per local policy.

Phlebitis	Phlebitis is an acute inflammation of the intima of a vein (Dougherty 2008)
Cause	Three types of phlebitis can occur in relation to PIVC: • Mechanical phlebitis is related to irritation and damage to a vein by large–gauge cannulas, sited where there is movement, for example in the antecubital fossa, inadequate securing of PIVC or increased PIVC dwell time. • Chemical phlebitis is related to chemical irritation from drugs such as antibiotics and chemotherapy • Bacterial phlebitis is when the site becomes infected due to poor hand–washing or aseptic technique and has a potential to predispose a patient to septicaemia or catheter related blood stream infections (CRBSIs) (Lamb and Dougherty 2008, Morris 2011).
Signs	• Characterized by pain and tenderness along the cannulated vein, erythema, warmth and streak formation with/without a palpable cord (Washington G.T. & Barrett R. 2012) • Loss of mobility or reluctance to move the affected limb • Redness, inflammation, or purulent ooze at the cannula site.
Prevention	• Regular monitoring using a VIP score • Observe for thrombophlebitis. Veins of the lower extremities should not be routinely used in adults due to the risk of embolism and thrombophlebitis (RCN 2010, INS 2011).
Treatment	• Remove peripheral vascular catheters if the patient develops signs of phlebitis (warmth, tenderness, erythema or palpable vascular cord), infection or a malfunctioning catheter (O' Grady et al. 2011). Refer to peripheral intravenous cannulation removal guidelines in 4.3.13.

Thrombophlebitis	Thrombophlebitis is the inflammation of a vein with a thrombus formation
Cause	• Traumatic cannulation by an unskilled practitioner or multiple attempts • Use of too large a cannula for the size of the vein • Infusion of high pH solution or poor circulation with venous stasis.
Signs	• Local redness, hard and torturous feel of the vein, heat, painful to touch or move • Expressions of pain (verbal or non-verbal) such as facial expressions or crying.
Prevention	• Early detection is crucial with at least one hourly monitoring of the cannulation site • Appropriate site selection • Appropriate selection of equipment for size of vein • Skilled technique.
Treatment	• Discontinue infusion, remove the cannula, and elevate the extremity • Report the incident of this complication as per local organisation • Treat as prescribed and document the care.

Infiltration	Infiltration is the "inadvertent administration of a non-vesicant (non-irritant) solution or medication into surrounding tissue instead of the intended vascular pathway" (RCN 2010, p.60; INS 2011)
Cause	• Cannula too large for the diameter of the vein • Puncture of distal wall of vein during cannulation • Poorly secured cannula • Over manipulation of cannula • Delivery of fluid at a high rate or pressure (Dougherty & Lister 2008).
Signs	• Swelling and oedema, pain, loss of mobility or reluctance to move the affected limb • Skin cool to touch • Skin blanching adjacent to cannula.
Prevention	• Monitoring of cannula as per local care bundle/care plan. Ensure the cannula is secured correctly.
Treatment	• Immediately remove the cannula and Refer to PIVC removal guidelines in 5.3.12 • Apply sterile dressing as per ANTT® • Administer analgesia as prescribed.

Embolism	An embolism is an air bubble, fat particle or blood clot which travels, causing a blockage in the vein
Cause	• An embolism occurs when an air bubble, fat particle, or blood clot becomes detached and is carried by the venous flow to the heart and potentially into the pulmonary circulation.
Signs	• Pain • Shortness of breath • Collapse • Shock.
Prevention	• Embolism can be prevented by stopping air from entering the system, ensuring that all connections are secure, careful flushing and by securing the cannula adequately.
Treatment	• Call for urgent medical attention and treat as prescribed.

Extravasation	Extravasation is the inadvertent administration of a vesicant (irritant) solution or medication into surrounding tissue instead of the intended vascular pathway" (RCN 2010, p.60; INS 2011)
Cause	• Leakage of vesicant solutions into the tissues. Drugs capable of causing tissue damage and necrosis include but are not limited to cytotoxic drugs, potassium chloride, hypertonic solutions of sodium bicarbonate and drugs with a vaso constrictive action (Lamb & Dougherty 2008).
Signs	• Pain • Reluctance to move affected limb • Blistering (typically occurs 1–2 weeks post extravasation) • Peeling and sloughing of the skin (about 2 weeks post extravasation) • Tissue necrosis (2–3 weeks post extravasation) with resulting pain • Damage to tendons, nerves and joints • Functional and sensory impairment of affected area such as limb disfigurement.
Prevention	• Early detection and immediate action is crucial, with at least hourly monitoring of the cannulation site • Ensure the cannula is secured correctly.
Treatment	• Stop the infusion and inform the patient and member of the medical team • Immediately remove the cannula if indicated and apply a sterile dressing • Administer analgesia as prescribed • Complete adverse incident form as per local protocol.

5.3.14 Removal of the PIVC

- When a PIVC is no longer required it should be removed as per care bundle guidelines
- Removal of the PIVC should be an ANTT® procedure. The device should be removed carefully using a slow, steady movement and pressure should be applied until haemostasis is achieved. This pressure should be firm and not involve any rubbing movement
- The site should be inspected to ensure bleeding has stopped and should then be covered with a sterile dressing (INS 2011)
- The cannula integrity should be checked to ensure the complete device has been removed (RCN 2010, INS 2011, Dougherty & Lister 2015)
- Discard all sharps as per local policy
- Monitor and observe the PIVC site for a further 48 hours after device removal for signs and symptoms of post-infusion phlebitis
- Document the date, time and reason for PIVC removal and care in the health care records and update/evaluate care plan (RCN 2010)
- If intravenous access is required following removal, an alternative site must be used.

5.3.15 Documentation

The nurse or midwife must be familiar with the documentation required for the Cannulation procedure.

Documentation specific to PIVC should contain the following details:

- Date, time, and site of cannula insertion
- Name of person performing procedure and that of the assistant
- Name of vein cannulated and exact site e.g right cephalic vein
- Reason for cannulation procedure
- Number of cannulation attempts
- Size of the inserted cannula
- Dressing type
- Tolerance of the procedure
- Monitoring of the PIVC site and patient by using local care bundle/care plan
- Date, time and reason for cannula removal
- Any complications arising and management of same
- Care Bundle completed.

5.3.16 Implementation Plan

The Director of Nursing/Midwifery is responsible for the dissemination, implementation, ongoing evaluation and audit of this national clinical procedural guideline for PIVC within the HSE/HSE Funded Agency.

5.3.17 Evaluation and Audit

Evaluation will include a:

- Mechanism for recording, reviewing and acting on adverse PIVC incidents
- System for maintaining practitioner competence
- Method for identifying further training needs
- Care Bundle Audit.

Auditing of the insertion, use and maintenance of a PIVC should be in accordance with the Peripheral Vascular Catheter Care Bundle (HPSC 2014) see Appendix 3(a).

Appendix 5 (a) Aseptic Non Touch Technique (adapted from www.antt.org)

Appendix 5 (b) Aseptic Non Touch Technique (adapted from www.antt.org)

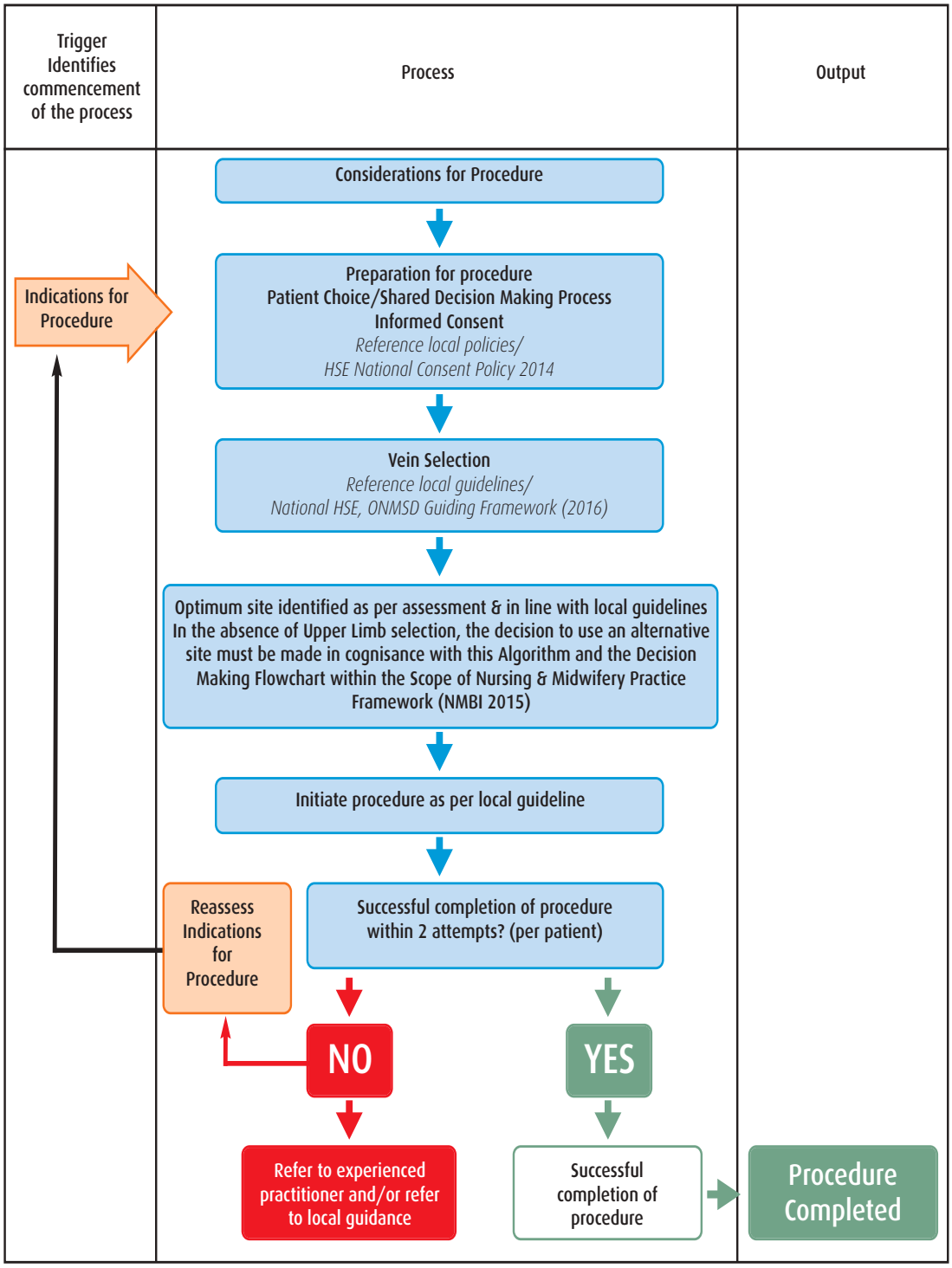
Appendix 5 (c) Algorithm when accessing Peripheral Venous Sites

Process to support staff when accessing peripheral venous sites for

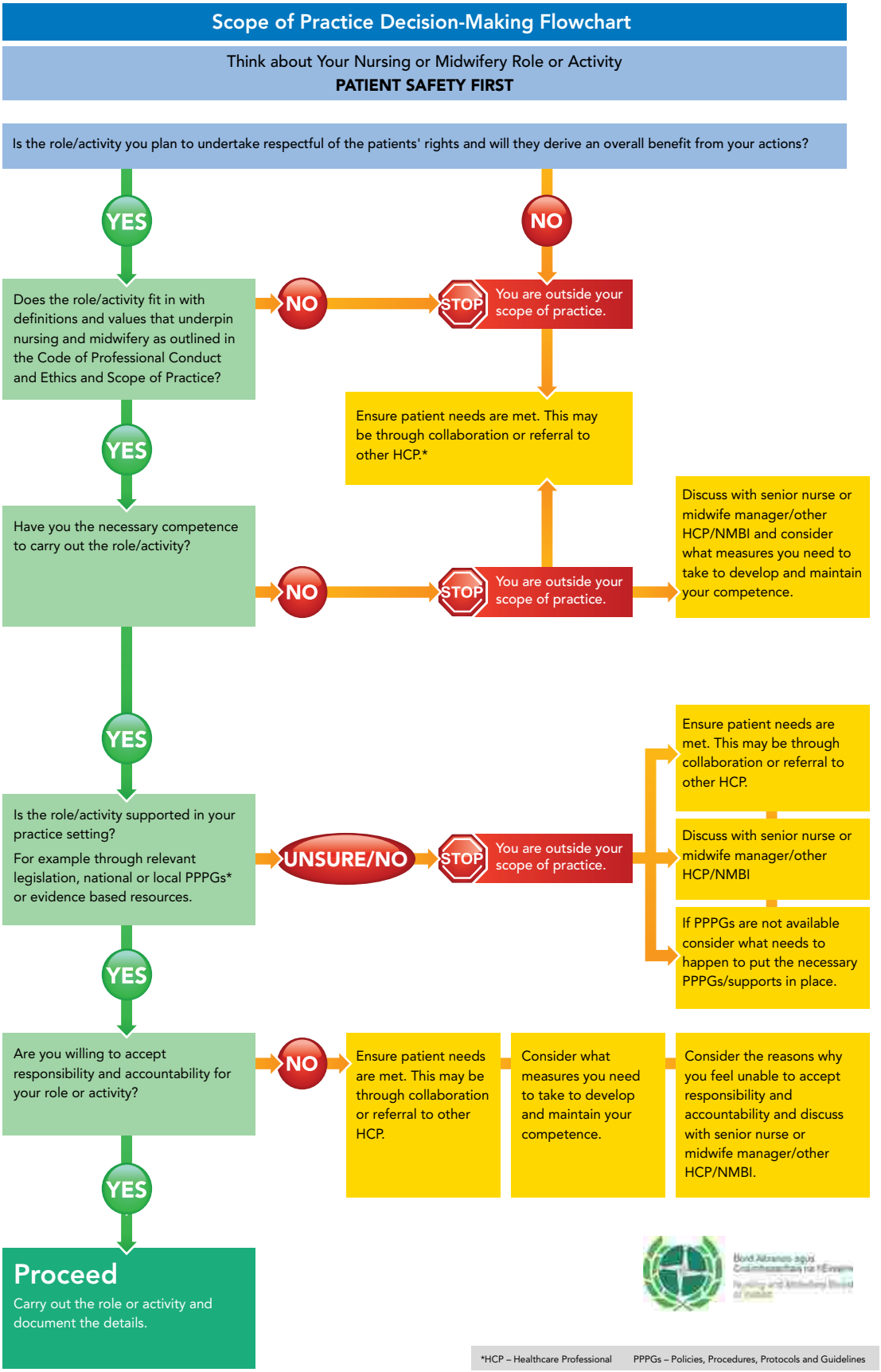
Venepuncture & Peripheral Intravenous Cannulation (PIVC)

This process is consistent with HSE National Guiding Framework for Education, Training and Competence Validation in Venepuncture and Peripheral Intravenous Cannulation – HSE, Office of Nursing & Midwifery Services Director (2017)

Also refer to Local Guidelines for Venepuncture & Peripheral Intravenous Cannulation (PIVC).



Appendix 5 (d) Scope of Practice Decision-Making Flowchart (NMBI 2015 p. 32, 33)



Appendix 5 (e) Recommended Order of Draw for Plastic Vacuum Tubes - WHO guidelines on drawing blood: best practices in phlebotomy (2010)

Order of use[a]	Type of tube/usual colour[b]	Additive[c]	Mode of action	Uses
1	Blood culture bottle (yellow-black striped tubes)	Broth mixture	Preserves viability of microorganisms	Microbiology – aerobes, anaerobes, fungi
2	Non-additive tube			
3	Coagulation tube[d] (light blue top)	Sodium citrate	Forms calcium salts to remove calcium	Coagulation tests (protime and prothrombin time), requires full draw
4	Clot activator (red top)	Clot activator	Blood clots, and the serum is separated by centrifugation	Chemistries, immunology and serology, blood bank (cross-match)
5	Serum separator tube (red-grey tiger top or gold)	None	Contains a gel at the bottom to separate blood from serum on centrifugation	Chemistries, immunology and serology
6	Sodium heparin (dark green top)	Sodium heparin or lithium heparin	Inactivates thrombin and thromboplastin	For lithium level use sodium heparin, for ammonia level use either
7	PST (light green top)	Lithium heparin anticoagulant and a gel separator	Anticoagulants with lithium, separates plasma with PST gel at bottom of tube	Chemistries
8	EDTA (purple top)	EDTA	Forms calcium salts to remove calcium	Haematology, Blood Bank (cross-match) requires full draw
9	Blood tube (pale yellow top)	Acid-citrate-dextrose (ACD, ACDA or ACDB)	Complement inactivation	HLA tissue typing, paternity testing, DNA studies
10	Oxalate/fluoride (light grey top)	Sodium fluoride and potassium oxalate	Antiglycolytic agent preserves glucose up to five days	Glucoses, requires full draw (may cause haemolysis if short draw)

Appendix 5 (f) Visual Infusion Phlebitis (VIP) Score: Jackson A. (1997)

Visual Infusion Phlebitis Score		
IV site appears healthy	0	No signs of phlebitis **OBSERVE CANNULA**
One of the following is evident: • Slight pain at IV site • Redness near IV site	1	Possible first sign of phlebitis **OBSERVE CANNULA**
Two of the following are evident: • Pain • Erythema • Swelling	2	Early stage of phlebitis **RESITE THE CANNULA**
All of the following signs are evident: • Pain along the path of the cannula • Erythema • Induration	3	Medium stage of phlebitis **RESITE THE CANNULA** **CONSIDER TREATMENT**
All of the following signs evident and extensive: • Pain along the path of the cannula • Erythema • Induration • Palpable venous cord	4	Advanced stage of phlebitis or start of thrombophlebitis **RESITE THE CANNULA** **CONSIDER TREATMENT**
All of the following signs are evident and extensive: • Pain along the path of the cannula • Erythema • Induration • Palpable venous cord • Pyrexia © Andrew Jackson 1997 Rotherham General Hospitals NHS Trust	5	Advanced stage of thrombophlebitis **INITIATE TREATMENT** **RESITE THE CANNULA**

Appendix 5 (g) Venepuncture Problem Solving Prevention and Resolution (source taken from Dougherty & Lister 2015)

Problem	Cause	Prevention	Action Suggested
Pain	Use of vein in sensitive area (e.g. wrist).	Avoid using veins in sensitive areas wherever possible. Use local anaesthetic cream.	Complete procedure as quickly as possible.
Anxiety	Previous trauma. Fear of needles.	Minimize the risk of a traumatic venepuncture. Use all methods available to ensure successful venepuncture.	Approach patient in a calm and confident manner. Listen to the patient's fears and explain what the procedure involves. Offer patient opportunity to lie down. Suggest use of local anaesthetic cream (Lavery and Ingram). All of the above and perhaps referral to a psychologist if fear is of phobic proportions.
Limited venous access	Repeated use of same veins. Peripheral shutdown. Dehydration. Hardened veins (due to scaring and thrombosis). Poor technique/choice of vein or device.	Use alternative sites if possible. Ensure the room is not cold. Ensure correct device and technique are used.	Do not attempt the procedure unless experienced. Put patient's arm in warm water. Apply glycerol trinitrate patch. May be necessary to rehydrate patient prior to venepuncture. Do not use these veins as venepuncture will be unsuccessful.
Needle inoculation of or contamination to practitioner	Unsafe practice. Incorrect disposal of sharps.	Maintain safe practice. Activate safety device. Ensure sharps are disposed of immediately and safely.	Follow accident procedure for sharps injury, for example make site bleed and apply a waterproof dressing. Report and document. An injection of hepatitis B immunoglobulin or triple therapy may be required.
Accidental blood spillage	Damaged/faulty equipment. Reverse vacuum.	Check equipment prior to use. Use vacuumed plastic blood collection system. Remove blood tube from plastic tube holder before removing needle.	Report within hospital and/or MHRA. Ensure blood is handled and transported correctly.

Problem	Cause	Prevention	Action Suggested
Missed vein	Inadequate anchoring. Poor vein selection. Wrong positioning. Lack of concentration. Poor lighting. Difficult venous access	Ensure that only properly trained staff perform venepuncture or that those who are training are supervised. Ensure the environment is well lit.	Repalpate, withdraw the needle slightly and realign it, providing the patient is not feeling any discomfort. Ensure all learners are supervised. If the patient is feeling pain, then the needle should be removed immediately. Ask experienced colleague to perform the procedure.
Spurt of blood on entry	Bevel tip of needle enters the vein before entire bevel is under the skin; usually occurs when the vein is very superficial.		Reassure the patient. Wipe blood away on removal of needle.
Blood stops flowing	Through puncture: needle inserted too far. Contact with valves. Venous spasm. Vein collapse. Small vein. Poor blood flow.	Correct angle. Palpate to locate. Results from mechanical irritation and cannot be prevented. Use veins with large lumen. Use a smaller device. Avoid use of small veins wherever possible. Use veins with large lumens.	Draw back the needle, but if bruising is evident, then remove the needle immediately and apply pressure. Withdraw needle slightly to move tip away from valve. Gently massage above the vein or apply heat. Release tourniquet, allow veins to refill and retighten tourniquet. May require another venepuncture. Apply heat above vein.

Appendix 5 (h): PIVC Problem Solving Prevention and Resolution (source taken from Dougherty & Lister 2015)

Problem	Cause	Prevention	Action Suggested
Anxious patient	Previous traumatic experiences. Fear of needles or blood. Ignorance about what the procedure involves.	Approach the patient in a calm and confident manner. Listen to the patient's previous experiences and involve them in site selection. Offer a local anaesthetic (by gel or injection). Explain what the procedure involves and show them the equipment if appropriate. Offer the patient the opportunity to lie down or recline during the procedure. Use all methods of improving venous dilation to ensure success on the first attempt.	Refer the patient for psychological support if anxiety and fear are of phobic proportions. It usually takes a few weeks to help a patient manage needle phobia.
Difficulty in locating a suitable vein	Excessive previous use. Shock or dehydration. Anxiety. Fragile, thready veins, for example in the elderly or in patients on anticoagulant therapy. Thrombosed veins as a result of treatment, for example cytotoxic therapy.	Alternate sites wherever possible to avoid overuse of certain veins. Use the methods described above to reduce anxiety.	Reassure the patient. Use all methods of improving venous access before attempting the procedure, for example use warm water/GTN to encourage venous dilation or vein illumination/ultrasound devices. Assess patient using an assessment tool to ascertain degree of difficulty and refer for CVAD if necessary. Do not attempt the procedure unless experienced.
Missing the vein on insertion of the cannula	Inadequate anchoring. Collapse of the vein. Incorrect position of practitioner or patient. Inadequate palpation. Poor vein choice. Lack of concentration. Failure to penetrate the vein properly due to incorrect insertion angle.	Ensure good position and lighting. Better preparation and concentration. Use correct technique and accurate vein selection.	Withdraw the needle and manoeuvre gently to realign it and correct the angle of insertion. Check during manoeuvring that the patient is not feeling any pain. If the patient complains of pain, remove the needle. If unsuccessful then remove the needle. Where necessary, pass to a colleague with more experience.

Problem	Cause	Prevention	Action Suggested
Blood flashback seen and then stops	Venospasm. Bevel of needle up against a valve. Penetration of the posterior vein wall by the device. Possible vein collapse.	Try to locate valves prior to insertion and insert the device just above the valve. Carefully level off once in the vein to prevent penetration of posterior wall. Use a good angle of approach to the vein to prevent through puncture.	Release and tighten the tourniquet. Gently stroke the vein above the needle to relieve venous spasm. Withdraw the needle slightly to move the bevel away from the valve. If the vein wall is penetrated, remove the device.
Difficulty in advancing the cannula	Releasing the tourniquet too soon, causing the vein to collapse. Removing the stylet too far and being unable to advance the cannula which is now no longer rigid enough to be advanced. Encountering a valve. Not releasing the cannula from the needle prior to insertion according to manufacturer's instructions. Poor anchoring or stretching of the skin.	Ensure the tourniquet remains sufficiently tight until insertion is completed. Ensure the cannula is released from the stylet prior to insertion, to allow for smooth advancement. Ensure that a sufficient length of the cannula is inserted into the vein before stylet withdrawal. Use good technique. Assess the vein accurately, observing for valves, and avoid them where possible.	In the event of early stylet removal or encountering a valve, connect a syringe of sodium chloride 0.9%, flush the cannula and advance at the same time in an effort to 'float' the device into the vein. Tighten the tourniquet and wait for vein to refill.
Difficulty in flushing once the cannula is in situ	Sometimes, the cannula has been successfully inserted, but on checking patency by flushing, the practitioner has difficulty because: • the cannula tip is up against the valve • the cannula has pierced the posterior wall of the vein • the cannula tip is resting on the wall of the vein • there is an occlusion.	Avoid areas along the vein where there may be valves. Ensure careful insertion to prevent puncturing the posterior wall of the vein.	Withdraw the cannula slightly to move it away from the vein wall or valve and attempt to flush. If the vein wall is pierced and any swelling is observed, remove the cannula. Attempt to withdraw the clot and clear the occlusion.

Section 6

National Clinical Procedural Guideline for Nurses and Midwives undertaking Venepuncture and/or Peripheral Intravenous Cannulation in

Neonates

For local adaptation by the Health Service Provider

6.0 Introduction

Please refer to Sections 1 to 3 as appropriate in conjunction with this section.

Neonate includes all preterm infants and term infants (birth - 28days) post delivery in the Neonatal Unit.

6.1 Guideline Statement

It is the policy of the HSE/HSE funded agencies that nurses and midwives undertaking venepuncture and/or peripheral intravenous cannulation must have successfully achieved competence having completed an education programme that is compliant with the HSE's Guiding Framework for the Education, Training and Competence Validation in Venepuncture and Peripheral Intravenous Cannulation for Nurses and Midwives (2017). In addition, nurses and midwives undertaking venepuncture and/or peripheral intravenous cannulation will do so in accordance with the procedural elements as outlined in this guideline.

6.1.1 Purpose

The purpose of this guideline is to:

- Outline the roles and responsibilities of the clinical nurse/midwifery line manager and the nurse or midwife undertaking the skill of venepuncture and/or peripheral intravenous cannulation
- Set out procedures based on best evidence, aligned with the national HSE standardised approach, which safeguard the neonate and guide the nurse or midwife in the performance of venepuncture and/or peripheral intravenous cannulation
- Aid in the preparation and support of the neonate and their families as appropriate while undergoing venepuncture and/or peripheral intravenous cannulation.

6.1.2 Scope

This guideline applies to all nurses and midwives working with neonates, who have successfully completed the required education, training and competence assessment to carry out venepuncture and/or peripheral intravenous cannulation. Each nurse and midwife undertaking education and training in venepuncture and/or peripheral intravenous cannulation is accountable for his/her practice and decisions made to support practice. They must be prepared to make explicit the rationale for those decisions and justify them in the context of legislation, case law, professional standards and guidelines, evidence based practice, professional and ethical conduct" (NMBI 2015).

Please note:

In absence of Upper Limb selection, the decision to use an alternative site must be made in cognisance with the Algorithm when accessing peripheral venous sites (Appendix 6 (c)). The aim of the algorithm is to provide guidance to further support nurses and midwives across all services, using a step by step decision making tool to ensure correct safe judgements and decisions are made in the process to safely and successfully perform venepuncture and/or peripheral intravenous cannulation procedures in the best interest of the patient. Nurses and midwives are also encouraged to refer to the Decision Making Flowchart within the Scope of Nursing & Midwifery Practice Framework (NMBI 2015), (Appendix 6 (d)).

6.1.3 Disclaimer

The information contained within this document is the most accurate and up to date, at date of approval. The document contains a procedural guideline and it is the responsibility of the local organisation, to update this guideline, according to best practice.

6.1.4 Roles and Responsibilities

6.1.4.1 Role and Responsibility of the Clinical Nurse/Midwife Manager/Director of Nursing/Midwifery

It is the responsibility of the Clinical Nurse/Midwife Manager/Director of Nursing/Midwifery to ensure that nurses and midwives working with neonates who are undertaking venepuncture and/or peripheral intravenous cannulation fulfil the required criteria as per 1.8.

6.1.4.2 Role and Responsibility of the Nurse and Midwife

It is the responsibility of each nurse and midwife to:

- Work within their Scope of Practice –Scope of Nursing and Midwifery Practice Framework, (NMBI 2015)
- Comply with local organisational venepuncture and/or peripheral intravenous cannulation procedures therein, when undertaking these clinical skills
- Become competent in the clinical skill of venepuncture and/or peripheral intravenous cannulation and the equipment specific to the procedure
- Be familiar and comply with the healthcare organisation's infection prevention and control, health and safety procedures and risk management policies as they apply to venepuncture and/or peripheral intravenous cannulation
- Develop and maintain competence in venepuncture and/or peripheral intravenous cannulation specific to the needs of the service, its users and in line with their Scope of Practice.

6.1.4.3 Role and Responsibility of the Clinical Practice Supervisor/Assessor

The Clinical Practice Supervisor/Assessor' should be a Registered Nurse/Midwife who is competent in venepuncture and/or peripheral intravenous cannulation and is approved by Nursing & Midwifery Practice Development/ Director of Nursing/Midwifery to undertake the assessment.

- The Clinical Practice Supervisor/Assessor must be competent in the clinical skills to facilitate assessment and have knowledge of local policies and the assessment process required for venepuncture and/or peripheral intravenous cannulation procedure
- The Clinical Practice Supervisor/Assessor must assess the nurse/midwife undertaking each procedure and complete the Record of Supervised Practice and Competence Assessment as outlined within Section 2
- The Clinical Practice Supervisor/Assessor must have undertaken Teaching & Assessment and/or Preceptorship education programme and/or an equivalent qualification to support the nurse/midwife to undertake the required number of supervised clinical practice assessments, applicable to their area of clinical practice.

Please note:

In circumstances where there is no resource of venepuncture and/or peripheral intravenous Cannulation competent Registered Nurses/Midwives available, then a competent practitioner in Venepuncture and/or Peripheral Intravenous Cannulation from another profession, can assess a nurse/midwife, provided he/she is approved by Nursing & Midwifery Practice Development/Director of Nursing/ Midwifery to undertake the assessment.

6.2 Procedural Guideline for Venepuncture – Neonates

6.2.1 Indications for the Venepuncture Procedure

Venepuncture is the procedure of entering a vein with a needle and is undertaken to:

- Obtain a blood sample for diagnostic purposes using haematological, biochemical and bacteriological analysis
- Monitor levels of blood components.

6.2.2 Considerations When Undertaking the Venepuncture Procedure

Venepuncture is one of the most common invasive procedures, it can be traumatic. It should only be ordered when necessary. A clinical environmental assessment should be undertaken prior to the procedure, with especial awareness to the following:

- Attend to environment prior to undertaking procedure, ie. heat source if required; adequate lighting
- Minimise disruptions
- Allow adequate time for transportation of bloods to laboratory.

Please note:

Iatrogenic anaemia or iatrogenic blood loss is the regular removal of blood for testing purposes over a short period of time. It is especially important with neonates as they have smaller blood volumes and may need to have blood transfusions to replace the blood removed. Coordination is needed between physicians, nurses and midwives and laboratories to minimise duplication of blood orders and to ensure the collection of the minimum amount of blood specimens required for testing. Please refer to local organisational policy for the maximum amount of blood that can be drawn from neonates.

6.2.3 Informed Consent

In relation to the neonate, please refer to local guidelines on consent policies and for further information on consent please refer to the HSE National Consent (2014).

6.2.4 Clinical Holding

In neonates, appropriate pain management techniques should be utilized, swaddling and the administration of sucrose as deemed clinically appropriate.

6.2.5 Pharmacological and Non-Pharmacological Methods of Pain Relief

Sucrose is the preferred method of non-pharmacological pain relief in neonates. Sucrose is administered to all neonates irrespective of gestation (Harrison, Beggs & Stevens 2012). Current practice does not advocate the application of any anaesthetic agents for neonates, however, local policy may permit the use of topical anaesthetic in some neonatal centres, in this case refer to local pharmaceutical guidelines.

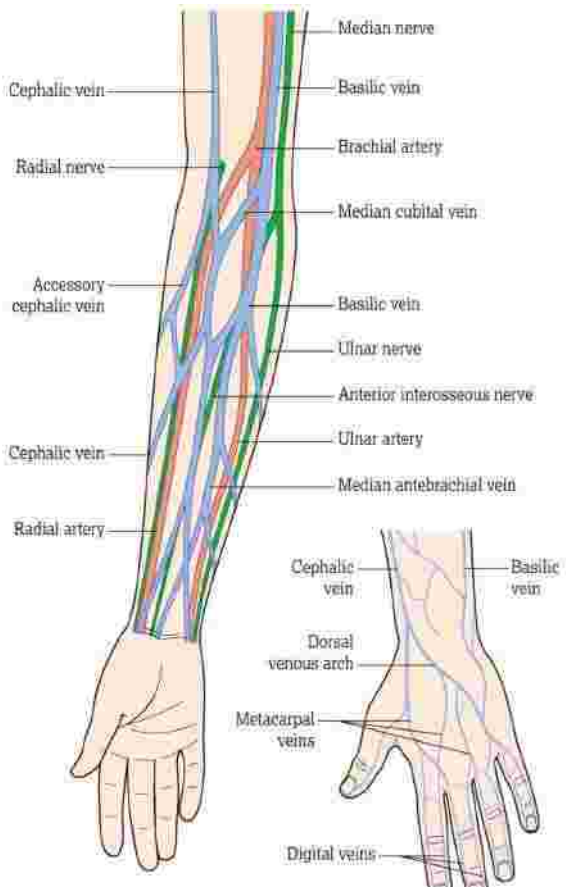
6.2.6 Vein Selection in Neonates

Choosing the correct vein is important. When selecting the appropriate site of vein for venepuncture, it is best practice to begin in the most distal aspect of the vein. This allows for further attempts above the selected vein which will not have been impeded. When cannulating neonates, the specific advantages and disadvantages of potential venepuncture sites must be considered. These are outlined below in Table 1:

Table 1: Summary of possible veins that may be used for Venepuncture in Neonates

Metacarpal Veins in the Dorsal Venous Network	The metacarpal veins would be the first choice for neonates as other veins may not be accessible due to higher levels of subcutaneous fat. **Advantages** • Easily accessible, easily visualised and palpable **Disadvantages** • Skin can be delicate and subcutaneous tissue is diminished.
Cephalic and Basilic Veins in the Forearm	**Advantages** • Larger veins **Disadvantages** • Brachial artery close to both veins • Median nerve close to basilic vein • Radial nerve close to cephalic vein.

Anatomy of upper and lower extremity veins



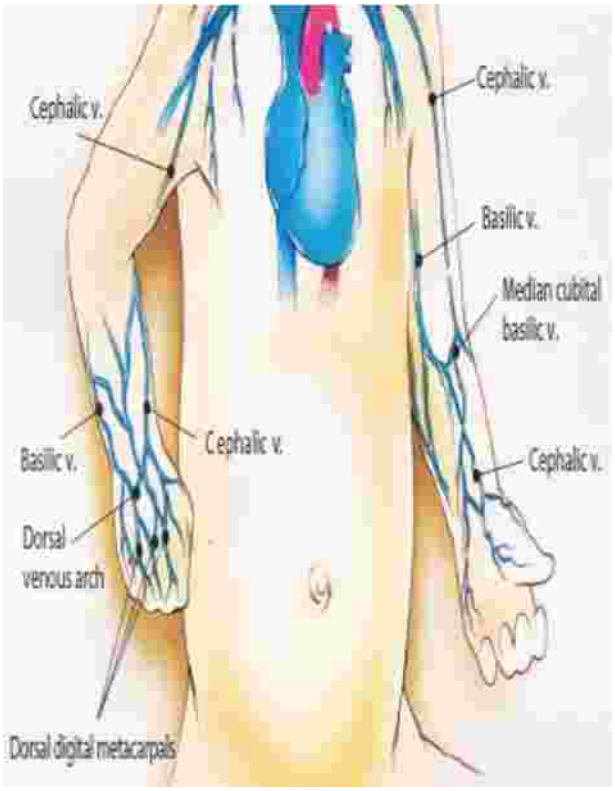


Figure i (a) Superficial veins of the forearm (b) Superficial veins in the upper limbs

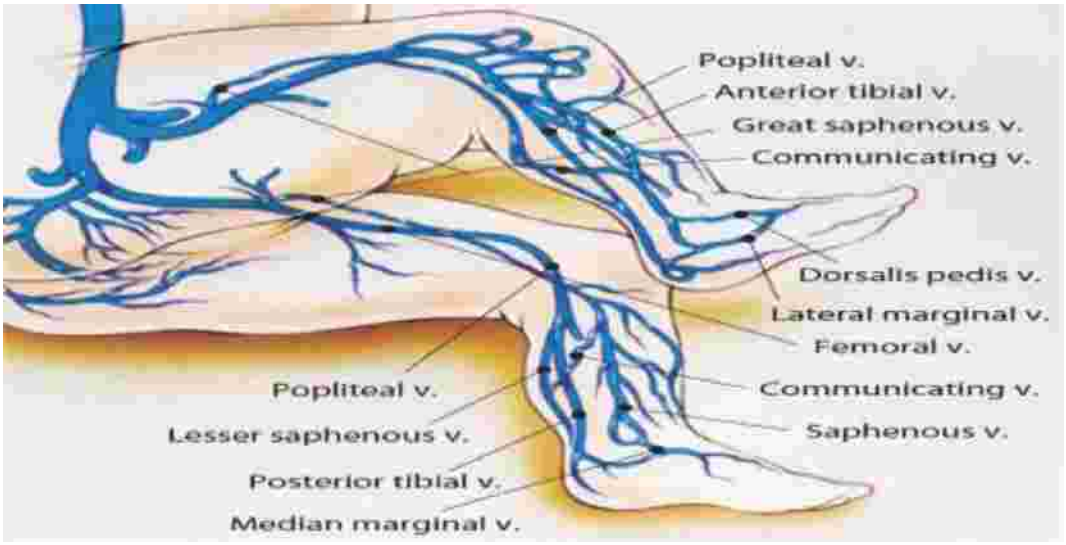


Figure ii Superficial veins in the lower limbs of the neonate

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Please note:

In some instances, vein viewing equipment may be available and must to be used in accordance with local PPPG.

Please note:

That the preferred venepuncture site in neonates are the Metacarpal veins in the Dorsal Venous Network.

Caution must be exercised when considering the Median Cubital, Basilic and Cephalic veins as they may be required for Peripheral Central Access, if Intravenous therapy is required over a prolonged period.

6.2.7 Clinical Assessment

A clinical assessment should be carried out by the nurse or midwife prior to the venepuncture procedure.

A Four Step Approach is outlined as follows:

Four Step Approach to Clinical Assessment

1. **Check**
    - the indication for venepuncture to determine equipment and specific bottles to use
    - if the neonate has fasted as required for specific tests
    - the clinical condition (acute/chronic/emergency) of the neonate
    - the location and length of the vein
    - the condition of the vein (visual and palpation)
    - the area is warm prior to the venepuncture procedure (veins constrict if cold, making the procedure more difficult)
    - for previous history of difficult venepuncture procedures
    - increased amounts of subcutaneous fat.

2. **Choose**
    - most distal aspect of the vein
    - correct location, avoiding arteries and nerves
    - appropriate equipment to undertake procedure.

3. **Avoid**
    - hard, sclerosed, fibrosed, knotty, thrombosed veins or previous venepuncture sites
    - sites with intravenous infusions in situ
    - sites that may require peripherally inserted central catheter (PICC) insertion or arterial monitoring e.g. in the upper arm in babies less than 28 weeks as this could impede long line insertion
    - duplication of blood orders, especially in neonates due to smaller blood volumes.

4. **Do Not Use limb**
    - with obvious infection or bruising
    - with a fracture
    - affected by lymphoedema.

Points to note in relation to neonatal care

- Topical Anaesthetic agents are not used in neonates
- Tourniquets are not used in neonates
- Vacuette blood - letting systems are not used in neonates
- Sterile gloves are used in both venepuncture and Peripheral Intravenous cannulation.

6.2.8 Equipment

6.2.8.1 List of Equipment for Venepuncture in Neonates

When undertaking the venepuncture procedure, it is important that only the equipment required is brought to the bedside. This is to prevent cross contamination from occurring. The equipment required should be based on the assessment of the neonate and the specific blood tests requested as outlined in Table 2.

Table 2: List of Equipment required for Venepuncture Procedure in Neonates

• A sterile pack/sterile drape • Sharps container (large enough to accommodate the blood collection system) • Appropriate clinical waste discard bag (yellow) • Personal protective equipment e.g., well fitting sterile gloves, plastic apron, safety goggles/visor/mask with eye shield used if stipulated by local policy • Alcohol hand rub (AHR).	• Skin disinfectant • as specified by local organisational procedural guideline and maturation/ keratinisation of the skin • Required blood specimen bottles • Blood requisition forms (fully completed with neonate details) • Sterile gauze-(to apply pressure and absorb blood spillages).
As per standard precautions the use of a plastic apron and/or face protection should be assessed by each healthcare worker based on the risk of blood splashing or spraying during the procedure.	

6.2.9 Types of Safety Blood Collection Systems

The nurse and midwife should be familiar with the types of safety blood collection systems used for venepuncture in neonates as recommended by the local organisation (European Union (Prevention of Sharps injuries in Healthcare Sector Regulations) (2014).

6.2.10 Recommended Order of Draw

The order of blood draw is the sequence in which blood collection bottles should be filled. The needle which pierces the bottle can carry additives from one bottle into the next, and so the sequence of draw is standardised so that any cross-contamination of additives will not affect laboratory results. The general principles applied to the order of blood draw are:

- 1st Sample - no anticoagulant or additives
- 2nd Sample – additives: contain lithium heparin
- 3rd Sample – contains EDTA as the anticoagulant

(WHO 2010) see Appendix 6 (e) and refer to local policy for further guidance.

6.2.11 Venepuncture Procedure - Neonates

The venepuncture procedure follows the aseptic non touch technique (ANTT®) as outlined within Section 3, see Appendix 6 (a).

Please note:

Two attempts ONLY should be made at the venepuncture procedure. If unsuccessful refer to another practitioner as outlined in Appendix 6 (c) and in accordance with the Decision Making Flowchart within the Scope of Nursing & Midwifery Practice Framework (NMBI 2015) see Appendix 6 (d).

Single use closed safety blood collection systems (sanctioned for use locally) are recommended for use in accordance with manufacturer's instructions.

Prior to Procedure

- Preparation should be carried out in designated clean area
- Confirm indication for procedure, checking requisition forms for specific blood tests required
- Perform hand hygiene as per local guidelines
- Disinfect a clean clinical trolley, as per local guidelines. Allow to dry naturally
- Collect the appropriate equipment as per Table 2 and inspect its integrity including expiry dates.

Please note:

If at any time you think that a piece of equipment has been contaminated, you must discard immediately and use a new piece.

At the Bedside: Patient Zone

- Request assistance from other Health Care Professional, if required
- Perform hand hygiene using an alcohol hand rub (AHR) as per Moment 1 "Before Patient Contact" (WHO 2009)
- Open sterile dressing pack and equipment appropriately, ensuring all Key-Parts remain uncontaminated and covered until use
- Check the neonates identification
- Ensure the neonate is comfortable, using minimal clinical holding
- Request assistance from other health care professional, if required
- Encourage venous filling of the limb
- Palpate the site -press lightly with one finger and release
- Choose the appropriate vein
- Administer appropriate pain relief.

Preparation

1. Perform hand hygiene, Moment 2 "Before Aseptic/Clean Procedure" (WHO 2009)
2. Apply sterile gloves. Apply Personal Protective Equipment (PPE) if required
3. Place sterile gauze from pack between skin surface and non-dominant gloved hand (as demonstrated in-learning video), to avoid contamination of sterile glove, when achieving skin traction
4. Disinfect the site, using appropriate skin disinfectant - according to skin maturation/local policy, for 30 seconds contact time (Loveday et. al. 2014)
5. Dispose of used skin disinfectant wipe appropriately by placing it in the clinical waste discard bag
6. Allow site to air dry for 30 seconds
7. Do not touch or repalpate the site
8. If re-palpation is required, hand hygiene and skin disinfection must be performed again.

Venepuncture Procedure

1. Hold the blood collection set between your thumb and index finger
2. Position the needle-facing bevel upwards
3. Insert the needle of the blood collection system, directly above the vein, through the skin (angle 10-30 degrees)
4. When the needle punctures the vein, observe for flashback as appropriate.
5. Decrease the angle between the needle and the skin
6. Invert bottles gently to mix appropriately, in accordance with order of draw
7. Do not shake bottles
8. Apply sterile gauze over the puncture site
9. Place the blood collection system into the sharps box
10. Maintain pressure on the puncture site to prevent blood leakage
11. Apply pressure to prevent haematoma formation but do not bend the arm
12. Apply sterile dressing over the puncture site
13. Remove gloves, and PPE if applicable, and discard into clinical tray
14. Perform hand hygiene using an AHR as per Moment 3 "After Body Fluid Exposure".

After Care

1. Ensure the neonate is in a comfortable position
2. Ensure blood collection bottles and requisition forms are correctly labelled
3. If further contact with the neonate's surroundings occurs hand hygiene must be performed using an AHR as per Moment 4 "After Patient Contact'
4. Document the procedure as outlined in 6.2.15, communication, and inform relevant staff of outcome
5. Hand hygiene must then be performed as per Moment 5 'After Contact with Patient's Surroundings'.

Post Procedure: Designated Decontamination

1. Bring clinical tray with used equipment to the dirty utility room
2. Dispose of healthcare risk and non-risk waste, as per local guidelines
3. Clean and disinfect the clinical tray as per local guideline. Dispose of tray, if single use only
4. Remove gloves and apron and perform appropriate Hand Hygiene using an AHR
5. Arrange for blood samples to be transported to the laboratory.

6.2.12 Management of Potential Complications

Complications such as haematoma, phlebitis, nerve injury, arterial puncture, or needle stick injury can occur and it is important that the nurse or midwife is able to recognise treat and/or prevent them. Please see Table 3 below and/or Appendix 6 (h) for more information on potential complications.

Please refer to local guidelines and policies on pain scales, pharmacological and non-pharmacological methods of pain relief.

The Premature Infant Pain Profile (PIPP) pain scale is the one that has been the most researched for use in neonates, (Gibbins et al. 2014).

Table 3 Potential Complications for the Venepuncture Procedure in Neonates

Needle stick injury	**A needle stick injury (percutaneous inoculation injury) is an inadvertent puncture of the skin with a potentially contaminated needle Appendix 3 (a) Refer to: Management of BBV risk following exposure to needlestick/sharps in occupational or community setting. (Health Protection Surveillance Centre 2016) www.emitoolkit.ie**
Cause	• Inadvertent puncture of the skin during the venepuncture procedure.
Signs	• Pain • Bleeding • A visible puncture of the skin of the nurse or midwife.
Prevention	• The application of Infection Prevention & Control and Health and Safety Policy will support safe practice.
Treatment	• Encourage the wound to bleed freely • Wash the affected area with liquid soap under running water. Do not scrub (EMI Guidelines 2012) • Apply a waterproof dressing over the affected area • Report the incident to your line manager • Record the incident accordingly by completing the relevant incident form • Submit the incident form to your risk manager or line manger • For follow-up and advice, contact your Occupational Health Dept. and/or the Emergency Dept. as per local organisational guidelines.

Nerve Injury	If a nerve is accidentally hit on insertion of the needle into the vein, this will result in pain and can lead to injury and possibly permanent damage (McCall & Tankersley 2012)
Cause	• Inappropriate selection of the venepuncture site • Poor technique.
Signs	• Facial Expressions of Pain/crying • Loss of mobility or reluctance to move the affected limb.
Prevention	• Appropriate clinical assessment • Appropriate site selection • Skilled technique.
Treatment	• Arrange a medical review • Monitor, treat as prescribed and document in the nursing care plan • Finally, report the occurrence of this complication, as per local organisational policy.

Haematoma	Haematoma is the leakage of blood into the tissues indicated by rapid swelling which occurs during the insertion procedure or after removal (Perucca 2010, McCall & Tankersley 2015)
Cause	• Leakage of blood at the site of the venepuncture, may collect as a haematoma • Inappropriate use of a small fragile vein, or too large a needle • Excessive probing to find the vein • The needle going all the way through the vein • The needle only partially entering the vein, allowing leakage.
Signs	• Expressions of pain such as facial expressions or crying, loss of mobility or reluctance to move the affected limb • Swelling, discolouration or coolness of the area adjacent to the puncture site.
Prevention	• Selection of appropriate equipment for the size of the vein • Skilled technique.
Treatment	• Remove the needle and apply pressure until haemostasis has been achieved • Apply a pressure dressing if bleeding is persistent • Request a medical review, if required • Monitor, treat as prescribed and document in the nursing care notes and care bundle • Report the occurrence of this complication, as per local organisational policy.

Arterial Puncture	The inadvertent puncture of the artery is another complication associated with venepuncture
Cause	• In appropriate selection of the venepuncture • Poor technique.
Signs	• Presence of bright red blood • Expressions of pain such as facial expressions or crying.
Prevention	• Appropriate clinical assessment – palpate artery • Appropriate site selection • Skilled technique.
Treatment	• Remove the needle immediately and apply pressure, until haemostasis is achieved • Monitor, treat as prescribed and document in healthcare record • Report the occurrence of this complication • Complete relevant incident form.

Phlebitis	Phlebitis is an acute inflammation of the intima of a vein (Dougherty 2008)
Cause	• Localised infection or irritation of the vein caused by the introduction of the venepuncture needle (mechanical/bacterial phlebitis).
Signs	• Expressions of pain such as facial expressions or crying • Loss of mobility or reluctance to move the affected limb • Redness, inflammation, or purulent ooze at the venepuncture site.
Prevention	• Early detection is crucial, with regular monitoring required • In Neonates, the site should be monitored frequently as they are at increased risk due to their small vessels.
Treatment	• Observe and monitor the venepuncture site • Assess the degree of phlebitis • Take a swab of the site for culture and sensitivity testing • Clean and apply a dressing, to the affected area and administer analgesia as prescribed • If severe, an incident form must be completed • Treat as prescribed and document the care given.

6.2.13 Documentation

The nurse or midwife must be familiar with the documentation required for the venepuncture procedure. A requisition form must accompany blood samples submitted to the laboratory. The requisition form must contain the proper information in order to process the specimen.

The essential elements of the requisition form include the:

- Surname, first name
- Date of birth and gender
- Identification number
- Diagnosis or symptoms
- Complete name of healthcare professional requesting test
- Date of venepuncture procedure
- Indication of the blood test(s) requested
- Location (for example, ward, department, address).

6.2.14 Implementation Plan

The Director of Nursing/Midwifery is responsible for the dissemination, implementation, ongoing evaluation and audit of this national clinical procedural guideline for Venepuncture within the HSE/HSE Funded Agency.

6.2.15 Evaluation and Audit

Evaluation will include a:

- Mechanism for recording, reviewing and acting on adverse venepuncture incidents
- System for maintaining practitioner competence
- Method for identifying further training needs
- Care bundle audit.

6.3 Procedural Guideline for Peripheral Intravenous Cannulation (PIVC) – Neonates

6.3.1 Indications for the PIVC Procedure in Neonates are to:

- Provide intravenous hydration and/or correction of pre-existing dehydration or electrolyte imbalance
- Administer:
  - intravenous drug therapy
  - intermittent, continuous infusions or bolus medications
  - blood components and blood products
  - emergency medications.

6.3.2 Considerations When Undertaking the PIVC Procedure

PIVC is one of the most common invasive procedures and can be traumatic for the neonate It should only be ordered when necessary. A clinical assessment should be undertaken prior to the procedure. The "Children First -National Guidelines for the Protection and Welfare of Children" (DOHC 2009) should be adhered to.

- The PIVC procedure should not be ordered for routine phlebotomy
- A clinical assessment of the neonate should be undertaken prior to the insertion of a peripheral intravenous cannula
- PIVC should be carried out as close to the time of use to reduce the risk of accidental dislodgement and related complications
- Where peripheral intravenous access is poor and cannulation is difficult, alternative methods of access should be considered and discussed with the appropriate medical team
- PIVC is regarded as a minor surgical procedure and is carried out with a high standard of hand hygiene, site preparation and maintenance
- Ideally, a peripheral intravenous cannula should not be sited in close proximity to another cannula, however, if two cannulae are in close proximity they should be secured with separate dressings.

6.3.3 Informed Consent

In relation to the neonate, please refer to local guidelines on consent policies and for further information on consent please refer to HSE National Consent (2014).

6.3.4 Clinical Holding

In neonates, appropriate pain management techniques should be utilized, swaddling and the administration of sucrose as deemed clinically appropriate.

6.3.5 Pharmacological and Non-Pharmacological Methods of Pain Relief

Nurse/Midwife performing procedure must be familiar with the neonatal Pain Scale used in their Neonatal centre, e.g. Premature Infant Pain Profile – Revised (PIPP-R).

Sucrose is considered for all neonates irrespective of gestation.

Current practice does not advocate the application of any anaesthetic agents for neonates, however, local policy may permit the use of topical anaesthetic in some neonatal centres, in this case refer to local pharmaceutical guidelines.

Please refer to local guidelines and policies on pain scales, pharmacological and non-pharmacological methods of pain relief.

6.3.6 Vein Selection in Neonates

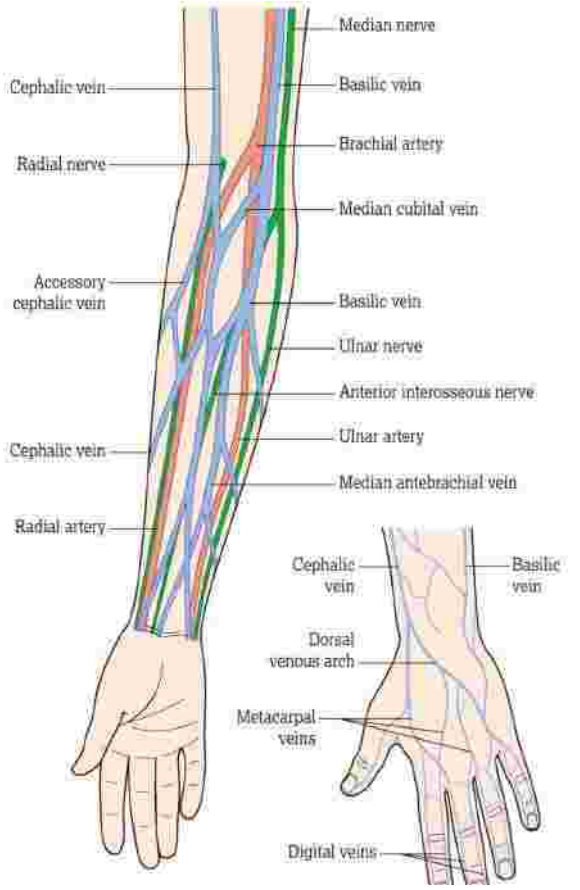
Choosing the correct vein is important. When selecting the appropriate site for PIVC, it is best practice to begin in the most distal aspect of the vein. This allows for further attempts above the selected vein which will not have been impeded. When cannulating neonates, the specific advantages and disadvantages of potential venous sites must be considered.

These are outlined below in Table 1:

Table 1: Summary of possible veins that may be used for Peripheral Intravenous Cannulation in Neonates

Veins	Location	Advantages and Disadvantages
The Cephalic and Basilic Vein in the Forearm	Cephalic Vein – runs under the skin on the radial side of the forearm. Basilic Vein – runs up the ulnar side of the forearm.	**Advantages-** Advantages- larger veins, more rapid infusion hand can be freely used. Easily located. The first choice of vein for a neonate is a vein on the dorsal surface of the hand. **Disadvantage** of Basilic vein-It is situated closest to nerves and arteries and caution should be exercised if chosen.
Metacarpel Veins in the Dorsal Venous Network	• on the dorsum of the hand	**Advantages** • First choice of vein for PIVC in neonates • Ideal for long term therapy • Splinted by metacarpal bones **Disadvantages** • Flow affected by wrist movement.
Median Cubital Vein in the Antecubital Fossa	• situated in the antecubital fossa in the elbow.	**Advantages** • Well supported by subcutaneous tissue (prevents vein rolling under needle) • Deeper and more tolerant to irritant substances **Disadvantages** • Difficult to locate in neonate with increased subcutaneous fat • Restricted movement, flexion of the arm can interfere with flow of infusion.
Dorsal venous arch and venous plexus of the foot: **Great saphenous vein*** **Small saphenous vein** **Lateral and medial marginal veins**	Veins situated in the lower leg and dorsum of the foot *Greater saphenous should be reserved for Peripheral Intravenous Central Catheter(PICC) Insertion if required	Used if upper limb veins are not available **Advantages** • Highly visible • Readily accessible **Disadvantages** • More difficult to advance cannula • Close to ankle joint.

Anatomy of upper and lower extremity veins



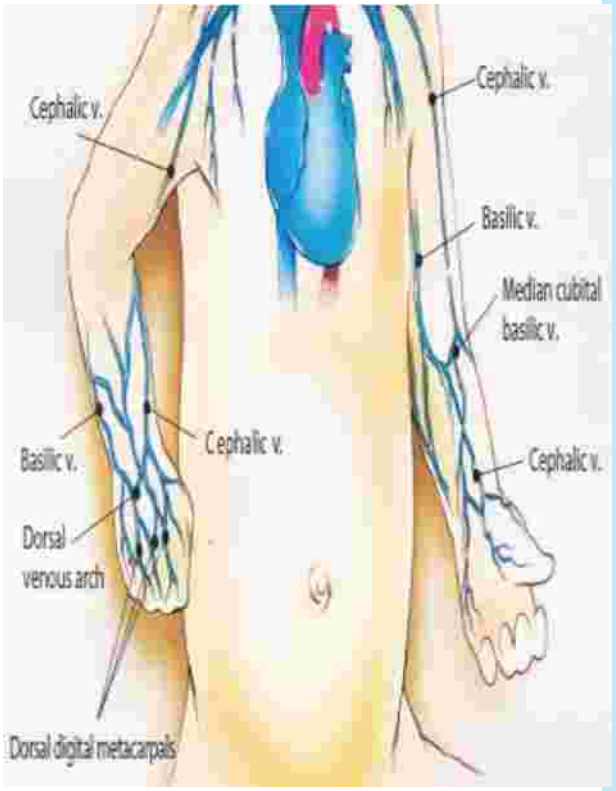


Figure i (a) Superficial veins of the forearm **(b) Superficial veins in the upper limbs of the neonate**

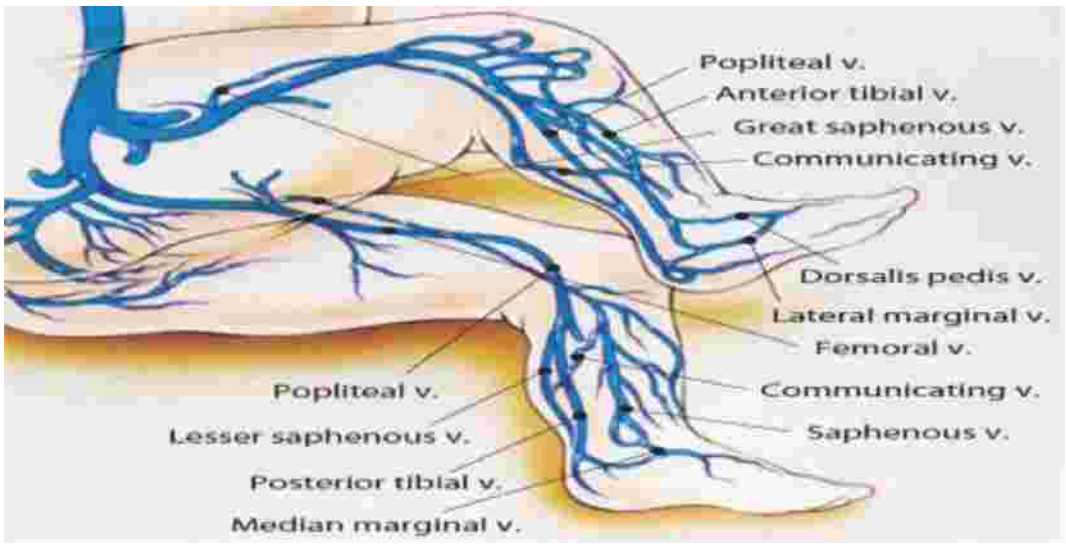


Figure ii Superficial veins of the lower limbs of the neonate

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Please note:

In some instances, vein viewing equipment may be available and need to be used in accordance with local Policies, Procedures, Protocols and Guidelines (PPPG's).

Please note:

In extreme circumstances, neonates may also require intravenous cannulation of the scalp, however, before proceeding to cannulate a scalp vein, the Senior Paediatrician or Senior Registrar must be consulted.

6.3.7 Clinical Assessment

A clinical assessment should be carried out by the nurse or midwife prior to the PIVC procedure. Preservation of the veins is essential, therefore if prolonged therapy is anticipated, a peripherally inserted central catheter (PICC) should be considered.

Four Step Approach to Clinical Assessment

1. Check

- the indication for PIVC
- if intravenous medication or fluids could be given by any other route i.e.
  - is this the last dose of antibiotics?
  - is the neonate almost on full feeds?
- the purpose, duration and rate of the intravenous infusion
- the clinical condition (acute/chronic/emergency) of the neonate
- the type of intravenous fluid or medication to be administered via the vein
- the location and length of the vein
- the condition of the vein (visual and palpation)
- the area is warm prior to cannulation procedure (veins constrict if cold, making the procedure more difficult)
- for previous history of difficult peripheral intravenous cannulation procedures
- for bleeding disorders or if receiving anticoagulation therapy.

2 Choose

- most appropriate and most distal vein first
- most appropriate and largest vessel to accommodate the infusion If the medication/solution has high potential for vein irritation
- correct location, avoiding arteries and nerves
- appropriate equipment to undertake procedure
- pain relief with appropriate Sucrose dose.

3. Avoid

- hard, sclerosed, fibrosed, knotty, thrombosed veins or previous cannulation sites
- areas with increased subcutaneous fat
- sites with existing intravenous infusions in situ
- Sites with impaired circulation
- sites that may require PICC insertion or arterial monitoring e.g veins in the upper arm in babies less than 28 weeks as this could impede PICC insertion.

4. Do Not Use limb

- with obvious infection or bruising
- with a fracture
- with restricted movement e.g as in Erb's Palsy.

6.3.8 Assessment on Transfer of a Neonate

A neonate with a peripheral intravenous cannula inserted by a transferring hospital will require assessment of the cannula and the insertion site for inflammation, infiltration, extravasation, infection and leaking or pressure of the cannula on the surrounding tissues. The peripheral intravenous cannula should be flushed on arrival to the hospital with prescribed Sodium Chloride 0.9% flush. If the cannula is not patent, it should be removed.

6.3.9 Equipment

6.3.9.1 List of Equipment for PIVC in Neonates

When undertaking the PIVC procedure, it is important that only the equipment required is brought to the bedside. This is to prevent cross contamination from occurring. The equipment required should be based on the assessment of the neonate and the purpose of the PIVC as outlined in Table 2.

Table 2: List of Equipment required for PIVC Procedure in Neonates

• A clean & disinfected dressing trolley • Appropriate clinical waste discard bag (yellow) • Sterile dressing pack • Well-fitting sterile gloves • Sharps container • Disposable sterile Sheet (optional-in case of blood spillage) • Personal Protective Equipment (e.g. protective plastic apron, safety goggles/ visor/mask with eye shield) • Skin disinfectant: As per local organizational policy/guideline and infants skin maturation/keratinisation.	• Intravenous cannula (choose size appropriately in line with local policy) • Sterile Steri-Strips™ and sterile scissors • T-Extension set with bung • Sterile prescribed Sodium Chloride (NaCl 0.9%) flush : Neonates-1 to 2ml syringe flush • Sterile gauze-(To absorb blood spillage) • Sterile, semi-permeable transparent dressing • Sterile dressing to cover puncture site if attempt unsuccessful.
As per standard precautions the use of a plastic apron and/or face protection should be assessed by each healthcare worker based on the risk of blood splashing or spraying during the procedure.	

6.3.10 Types of Cannulae used for Neonates

The correct size of the cannulae will help to prevent damage to the vessel and ensure adequate blood flow. Usually, the smallest size (24 gauge cannulas are used for all neonates) for the prescribed therapy is chosen to facilitate better flow and minimise trauma.The nurse and midwife should be familiar with the types of cannulae used in their organisation.

6.3.11 PIVC Procedure - Neonates

This is a two person procedure. Assistance must be sought from another Health Care Professional to maintain an aseptic non touch technique (ANTT®), as outlined within Section 3, see Appendix 6 (b).

Please note:

Two attempts ONLY should be made at the peripheral intravenous cannulation procedure. If unsuccessful refer to another practitioner as outlined in Appendix 6 (c) the decision to use an alternative site must be made in cognisance with the Decision Making Flowchart within the Scope of Nursing & Midwifery Practice document (NMBI 2015) see Appendix 6 (d).

Confirm indication for procedure, checking requisition forms for specific blood tests if required.

- Perform hand hygiene as per local guidelines
- Collect all necessary equipment and inspect packaging for integrity and expiry dates.

Preparation of sterile field:

1. Perform hand hygiene
2. Open the sterile dressing pack and add the appropriate cannula for selected vein and other sterile items onto the sterile field using a non touch technique. Attach yellow waste bag to trolley
3. Using sterile gloves, if prefilled syringes are not available draw up NACL 0.9% flush into syringe using needle or straw having cleaned the neck of the vial with a sterile wipe and prime the T extension set, facilitated by an assistant
4. Place syringe on the sterile field but not touching any sterile items
5. Cut sterile Steri-Strips™ with sterile scissors
6. Place disposable sterile sheet under the selected site for cannulation.

Please note:

If at any time you think that a piece of equipment has been contaminated, you must discard immediately and use a new piece.

At the Bedside: Patient Zone

1. Perform hand hygiene as per Moment 1 "Before Patient Contact "(WHO 2009)
2. Check the neonate's identification, confirming same with parent; legal guardian or Health Care Professional
3. Lower cot sides or incubator for easier access
4. Consider if radiant heat source is required

5. Explain the procedure to parents, if present
6. Ensure the neonate is comfortable (use minimal clinical holding as required)
7. Parent may wish to be involved to provide comfort care
8. Tourniquets are not recommended
9. Encourage venous filling
10. Palpate the site to check for rebound elasticity -press lightly with one finger and release
11. Choose the appropriate vein
12. Assistant should prepare sucrose and administer as healthcare organisation policy.

Procedure

1. Perform Hand Hygiene as per Moment 2, ' Before Aseptic or Clean Procedure'
2. Apply sterile gloves. Apply Personal Protective Equipment (PPE) if required
3. Place sterile gauze from pack between skin surface and non-dominant gloved hand to avoid contamination of sterile glove, when achieving skin traction
4. Disinfect the site, using appropriate skin disinfectant - according to skin maturation/local policy, for 30 seconds contact time (EPIC 3, 2014; NCEC 2014)
5. Dispose of used skin disinfectant wipe appropriately by placing it in the clinical waste discard bag
6. Allow site to air dry
7. Do not re palpate the site
8. Place disposable sterile sheet under the selected site for cannulation
9. Hold the cannula between your thumb and index finger
10. Apply gentle pressure with your finger just above the site of insertion
11. Position the introducer facing bevel up
12. Insert the cannula directly above the vein, through the skin (angle 10-30 degrees)
13. Observe for flashback in the cannula chamber, when the introducer punctures the vein
14. Decrease the angle between the introducer and the skin
15. Advance the cannula a further 2mm along the vein
16. Withdraw the introducer slightly and advance the cannula fully into vein
17. Gently pull the introducer backwards while holding the cannula in position
18. Release the pressure (Please note if a blood sample is also required, an ANTT® must be observed)
19. Hold the sterile gauze by one corner and place under the cannula hub (to absorb blood spillage). Ensure only section of gauze that is sterile is in touch with hub
20. Apply pressure over the cannula tip and remove the introducer
21. Place the introducer into the sharps bin
22. Connect the primed t-connector to the cannula hub, do not touch Key-Part
23. Discard the blood contaminated gauze into the yellow waste bag
24. Flush with prescribed NACL 0.9% to confirm patency

25. Secure and anchor the cannula with sterile Steri-Strips™, facilitated by the assistant using the chevron technique (place a full 12 mm Steri-Strip™, adhesive side up under the hub of the cannula, fold one end of the strip diagonally over the cannula, fold the other end of the strip diagonally over the other side of the cannula, place another short strip across the length of the cannula)
26. Cover with a sterile semi permeable adhesive dressing
27. Loop the t-connector tubing and secure with tape
28. Remove waste and dispose of per hospital policy
29. Carry out hand hygiene as per Moment 3, 'After Body Fluid and Exposure'.

After Care

1. Ensure the neonate is in a comfortable position
2. Document the procedure, as outlined below. Communicate and inform relevant staff
3. Carry out Hand Hygiene as per Moment 4, 'After Patient Contact'.

Post Procedure: Designated Decontamination

1. Dispose of healthcare risk and non-risk waste as per hospital policy
2. Clean and disinfect the clinical tray/dispose if single use
3. Carry out Hand Hygiene as per Moment 5, after contact with patient's surroundings'.

6.3.12 Documentation

The nurse or midwife must be familiar with the documentation required for the Cannulation procedure.

Documentation specific to PIVC should contain the following details:

1. Date, time, and site of cannula insertion
2. Name of person performing procedure and that of the assistant
3. Name of vein cannulated and exact site e.g right cephalic vein
4. Reason for cannulation procedure
5. Number of cannulation attempts
6. Size of the inserted cannula
7. Dressing type
8. Tolerance of the procedure
9. Monitoring of the PIVC site and patient by using local care bundle/care plan
10. Date, time and reason for cannula removal
11. Any complications arising and management of same
12. Care Bundle completed.

6.3.13 Care and Maintenance of an Indwelling Peripheral Venous Cannula Site

- Ensure that the PIVC cannula is in correct position and a sterile transparent dressing is intact
- Ensure that the PIVC entry site is visible through the dressing
- The site should be kept clean and dry at all times. The dressing should only be changed if it becomes loose, wet or soiled. ANTT® (aseptic technique – RCN 2010) should be used for dressing changes
- The Visual Infusion Phlebitis (VIP) score see Appendix 6 (f) and the Extravasation score, see Appendix 6 (g) should be used to monitor the IV site for swelling, inflammation, discharge and extravasation. Both scoring tools are internationally acknowledged as proven standardised tools for the monitoring of peripheral intravenous cannulae
- An infiltrated cannula must be removed immediately. Those that are no longer required must be promptly removed
- Ensure a single lumen extension set is applied to the PIVC and clamped when not in use
- Clean the hub of extension set with 2% chlorhexidine and 70% Alcohol wipe and air dry prior to flushing the PIVC
- Flush the PIVC with the prescribed sterile 0.9% Sodium Chloride solution before and after each drug administration or infusion (if on regular IV medication) and ensure positive pressure is maintained by clamping the extension set prior to flushing the final 1 ml of saline (RCN 2010)
- Document same in medication and administration record
- The IV site must also be observed and monitored:
    - Hourly, and the condition of the site documented
    - when bolus injections are administered
    - when IV infusions are changed
- Document inspection of PIVC site in PIVC care plan/ care bundle, as outlined in Section 3. At the first signs of inflammation or clinical evidence of infection:
    - PIVC should be removed
    - Clean the insertion site, as per local policy
    - Notify medical team
    - Document findings and action taken in healthcare record
    - Continue to observe insertion site
- The PIVC's must be re-sited only if clinically indicated and not routinely (Loveday et al. 2014).

6.3.14 Management of Potential Complications

As the neonate cannot verbalise pain, they depend on the nurse/midwife to detect and prevent complications related to PIVC.

Complications such as haematoma, phlebitis, nerve injury, arterial puncture, or needle stick injury can occur and it is important that the nurse or midwife is able to recognise treat and/or prevent them. Please see Table 3 below and/or Appendix 6 (i) for more information on potential complications.

Please refer to local guidelines and policies on pain scales, pharmacological and non-pharmacological methods of pain relief.

The Premature Infant Pain Profile (PIPP) pain scale is the one that has been the most researched for use in neonates, (Gibbins et al. 2014).

Table 3 Potential Complications for PIVC Procedure in Neonates

Needle stick injury	**A needle stick injury (percutaneous inoculation injury) is an inadvertent puncture of the skin with a potentially contaminated needle Appendix 3 (a) Refer to: Management of BBV risk following exposure to needlestick/sharps in occupational or community setting. (Health Protection Surveillance Centre 2016) www.emitoolkit.ie**
Cause	• Inadvertent puncture of the skin during the cannulation procedure.
Signs	• Pain • Bleeding • A visible puncture of the skin of the nurse or midwife.
Prevention	• The application of Infection Prevention & Control and Health and Safety Policy will support safe practice.
Treatment	• Encourage the wound to bleed freely • Wash the affected area with liquid soap under running water. Do not scrub (EMI Guidelines 2012) • Apply a waterproof dressing over the affected area • Report the incident to your line manager • Record the incident accordingly by completing the relevant incident form • Submit the incident form to your risk manager or line manger • For follow-up and advice, contact your Occupational Health Dept. and/or the Emergency Dept. as per local organisational guidelines.

Haematoma	Haematoma is the leakage of blood into the tissues indicated by rapid swelling which occurs during the insertion procedure or after removal (Perucca 2010, McCall & Tankersley 2015)
Cause	• Infiltration of fluid into the tissue at the site of the cannula, resulting in the formation of a painful and hard swelling • Inappropriate use of a small fragile vein, or too large a needle • Excessive probing to find the vein • The needle going all the way through the vein • The needle only partially entering the vein, allowing leakage.
Signs	• Expressions of pain such as facial expressions or crying, loss of mobility or reluctance to move the affected limb • Swelling, discolouration or coolness of the area adjacent to the cannula.
Prevention	• Selection of appropriate equipment for the size of the vein • Skilled technique.
Treatment	• Remove the cannula and apply pressure until haemostasis has been achieved • Elevate the limb • Apply a pressure dressing if bleeding is persistent • Request a medical review, if required • Monitor, treat as prescribed and document accordingly • Report the occurrence of this complication, as per local organisational policy.

Arterial Puncture	The inadvertent puncture of the artery is another complication associated with cannulation
Cause	• Inappropriate selection of the cannulation site • Poor technique.
Signs	• Presence of bright red blood • Expressions of pain such as facial expressions or crying.
Prevention	• Appropriate clinical assessment – palpate artery • Appropriate site selection • Skilled technique.
Treatment	• Removing the cannula immediately and apply pressure until haemostasis has been achieved • Request that a member of staff is informed if bleeding recurs from the puncture site, or if there is increasing swelling or bruising • Monitor, treat as prescribed and document accordingly • Report the occurrence of this complication, as per local organisational policy.

Phlebitis	Phlebitis is an acute inflammation of the intima of a vein
Cause	• Mechanical phlebitis: vein irritation caused by too large a cannula, excessive bending of the arm or manipulation of the cannula • Chemical phlebitis: can be caused by medications or solutions (acid or alkaline) • Bacterial/Septic phlebitis: introduction of an infectious agent at the cannula site; migration of common skin organisms through the cannula.
Signs	• Expressions of pain such as facial expressions or crying • Loss of mobility or reluctance to move the affected limb • Redness, inflammation at the cannula site.
Prevention	• Early detection is crucial, with hourly monitoring of the cannulation site.
Treatment	• Stop the infusion and remove the cannula • Assess the degree of phlebitis, as previously outlined • Treat, and administer analgesia as prescribed • Clean and apply a dressing to the affected area using an ANTT® • Document the care given.

Thrombophlebitis	Thrombophlebitis is the inflammation of a vein with a thrombus formation
Cause	• Traumatic cannulation by an unskilled practitioner or multiple attempts • Use of too large a cannula for the size of the vein.
Signs	• Local redness, hard and torturous feel of the vein, heat, painful to touch or move • Expressions of pain such as facial expressions or crying • Reluctance to move affected part/loss of mobility.
Prevention	• Early detection is crucial with hourly monitoring of the cannulation site. • Appropriate site selection • Appropriate selection of equipment for size of vein • Skilled technique.
Treatment	• Discontinue infusion, remove the cannula • Report the incident of this complication as per local organisational policy. • Treat as prescribed and document the care.

Infiltration	Infiltration is the inadvertent administration of a non-vesicant (non-Irritant) solution or medication into the surrounding tissue. This is the most common complication in neonates
Cause	• Peripheral intravenous cannula occlusion or misplacement causing fluid to infiltrate the tissues. This is the most common complication in neonates • Trauma to the vessel wall, increasing the probability of infiltration from leakage.
Signs	• Swelling and oedema, expressions of pain such as facila expressions or crying, loss of mobility or reluctance to move the affected limb • Discolouration and coolness of site adjacent to the cannula. It can be measured according to the Visual Infusion Phlebitis Scale Appendix 6 (c).
Prevention	• Hourly monitoring of site aids in the prevention of infiltration in neonates • Ensure the cannula is secured correctly.
Treatment	• Immediately stop the infusion and remove the cannula and apply an appropriate dressing, using an ANTT® • Document same in Neonate's healthcare record • Resite same in non-affected limb and complete care bundle accordingly.

Embolism	An embolism is an air bubble, fat particle or blood clot which travels, causing a blockage in the vein
Cause	• An embolism occurs when an air bubble, fat particle, or blood clot becomes detached and is carried by the venous flow to the heart and potentially into the pulmonary circulation.
Signs	• Pain • Shortness of breath • Collapse • Shock.
Prevention	• Embolism can be prevented by stopping air from entering the system, ensuring that all connections are secure, careful flushing and by securing the cannula adequately.
Treatment	• Call for urgent medical attention and treat as prescribed.

Extravasation	Extravasation is the inadvertent administration of a vesicant (irritant) solution or medication into surrounding tissue - Appendix 6 (g)
Cause	• Leakage of vesicant solutions into the tissues. Examples of vesicant solutions are Dextrose 10%, Total Parenteral Nutrition, Calcium, Potassium Chloride (KCL high doses) and chemotherapy.
Signs	• Expressions of pain such as facial expressions or crying • Reluctance to move affected limb and loss of mobility • Blistering is the hallmark sign of extravasation.
Prevention	• Early detection and immediate action is crucial, with hourly monitoring of the cannulation site • In neonates, the site should be monitored more frequently as they are at increased risk due their small vessels and increased levels of activity • Ensure the cannula is secured correctly.
Treatment	• Immediately remove the cannula and apply an appropriate dressing • Administer analgesia as prescribed • Consult with medical personnel about specific solutions and their treatment.

6.3.15 Removal of a Peripheral Intravenous Cannula in Neonates

- When a PIVC is no longer required, it should be removed
- An ANTT® must be used during the removal procedure. The device must be removed carefully, using slow, steady movements and pressure should be applied until haemostasis is achieved. Pressure should be firm and not involve any rubbing movement
- The site should be inspected to ensure bleeding has stopped and then covered with a sterile dressing
- The cannula integrity should be checked to ensure the complete device has been removed (Dougherty and Lister 2015)
- Discard all sharps as per local policy
- Monitor and observe the PIVC site for a further 48 hours after removal for signs of post infusion phlebitis
- Document the date, time and reason for PIVC removal in the health care records and maintenance care bundle
- If intravenous access is required following removal, an alternative site must be used.

6.3.16 Implementation Plan

The Director of Nursing / Midwifery is responsible for the dissemination, implementation, ongoing evaluation and audit of this national clinical procedural guideline for PIVC within the HSE/HSE Funded Agency.

6.3.17 Evaluation and Audit

Evaluation will include a:

- Mechanism for recording, reviewing and acting on adverse PIVC incidents
- System for maintaining practitioner competence
- Method for identifying further training needs
- Care Bundle Audit.

Auditing of the insertion, use and maintenance of a PIVC should be in accordance with the Peripheral Vascular Catheter Care Bundle (HPSC 2014) see Appendix 3(a).

Appendix 6 (a) Aseptic Non Touch Technique (adapted from www.antt.org)

Appendix 6 (b) - Aseptic Non Touch Technique (adapted from www.antt.org)

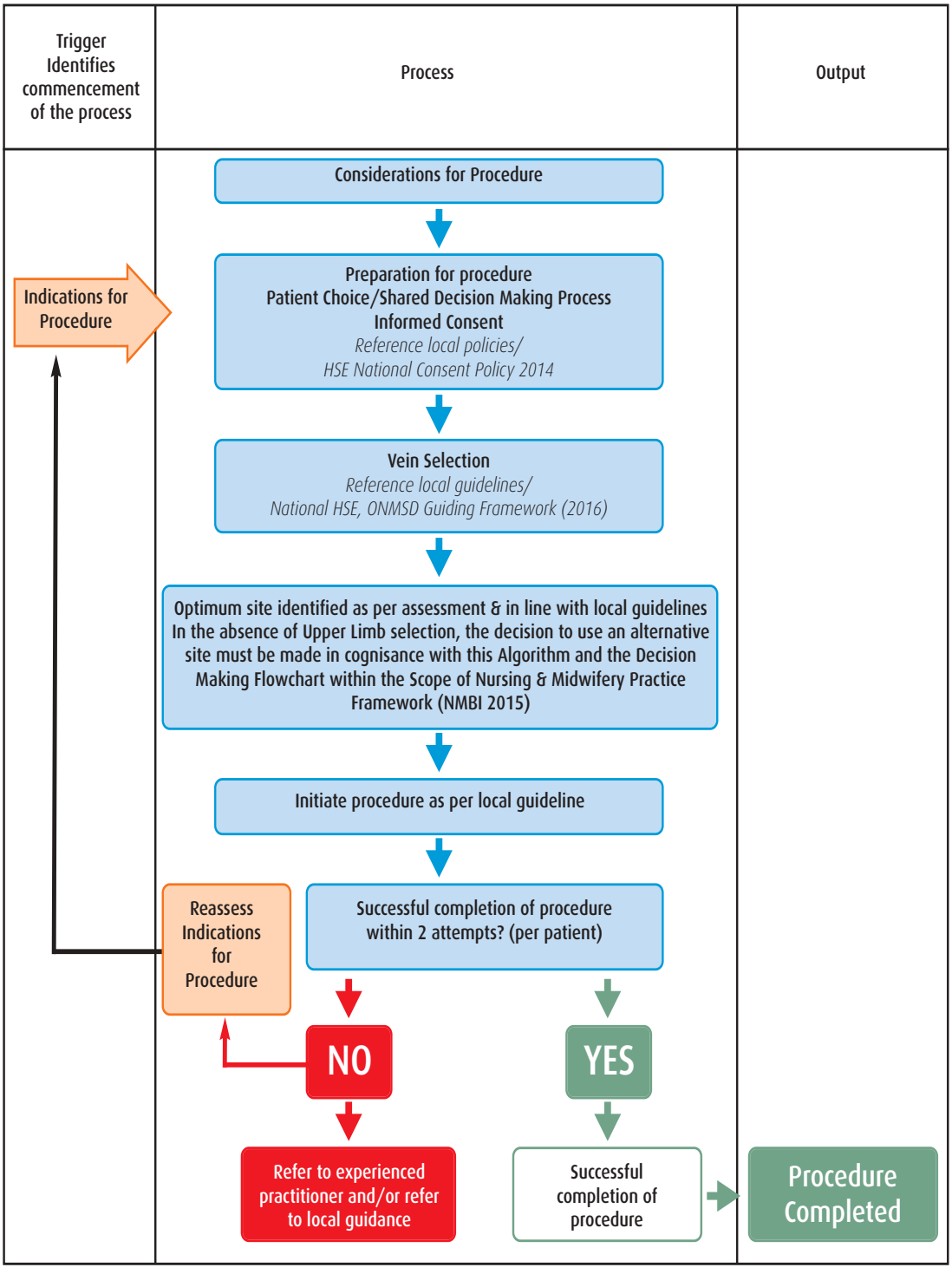
Appendix 6 (c) Algorithm when accessing Peripheral Venous Sites

Process to support staff when accessing peripheral venous sites for

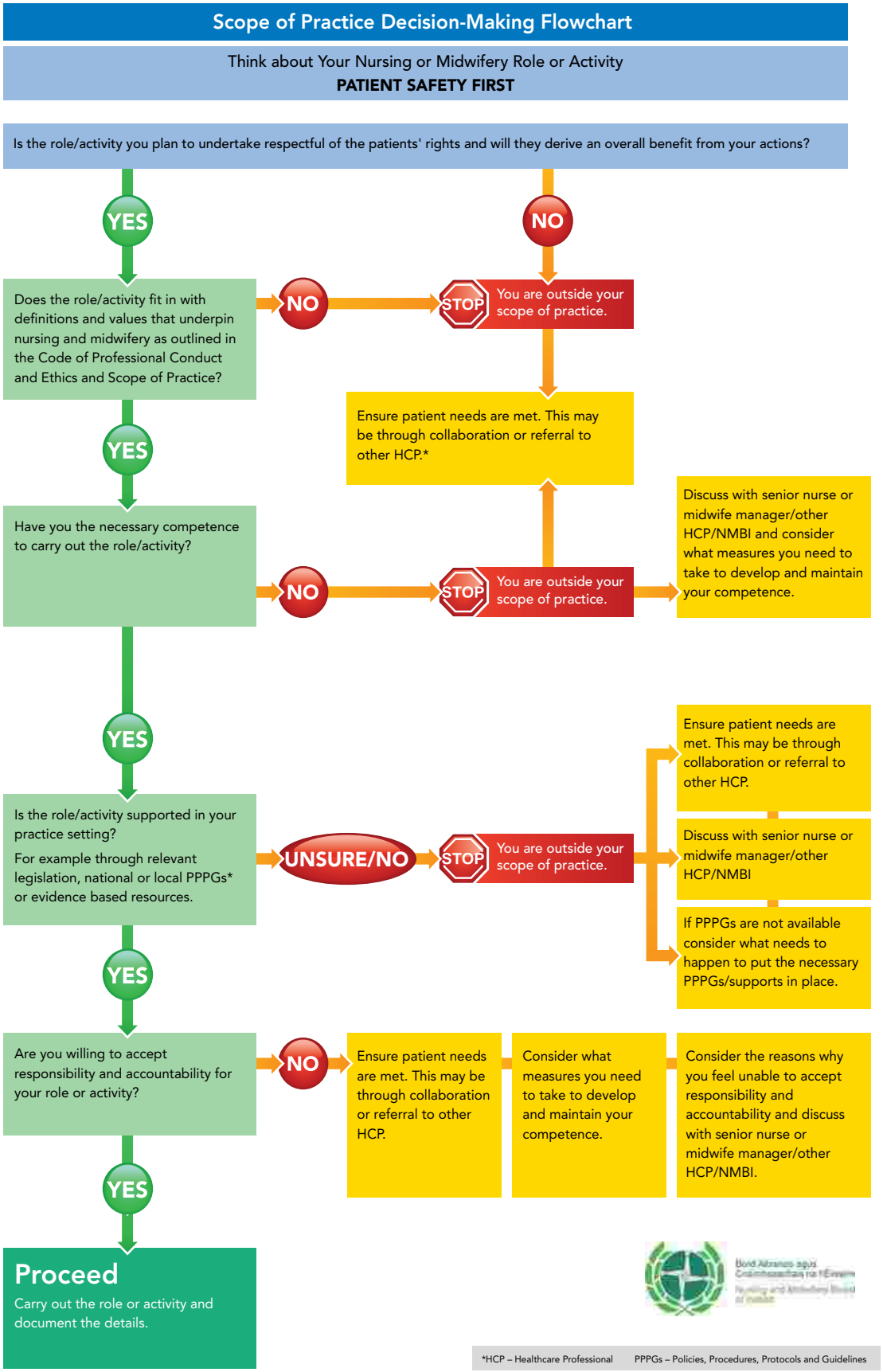
Venepuncture & Peripheral Intravenous Cannulation (PIVC)

This process is consistent with HSE National Guiding Framework for Education, Training and Competence Validation in Venepuncture and Peripheral Intravenous Cannulation – HSE, Office of Nursing & Midwifery Services Director (2017)

Also refer to Local Guidelines for Venepuncture & Peripheral Intravenous Cannulation (PIVC).



Appendix 6 (d) Scope of Practice Decision-Making Flowchart (NMBI 2015)



Appendix 6 (e) Recommended Order of Draw for Plastic Vacuum Tubes - WHO guidelines on drawing blood: best practices in phlebotomy (2010)

Order of use[a]	Type of tube/usual colour[b]	Additive[c]	Mode of action	Uses
1	Blood culture bottle (yellow-black striped tubes)	Broth mixture	Preserves viability of microorganisms	Microbiology – aerobes, anaerobes, fungi
2	Non-additive tube			
3	Coagulation tube[d] (light blue top)	Sodium citrate	Forms calcium salts to remove calcium	Coagulation tests (protime and prothrombin time), requires full draw
4	Clot activator (red top)	Clot activator	Blood clots, and the serum is separated by centrifugation	Chemistries, immunology and serology, blood bank (cross-match)
5	Serum separator tube (red-grey tiger top or gold)	None	Contains a gel at the bottom to separate blood from serum on centrifugation	Chemistries, immunology and serology
6	Sodium heparin (dark green top)	Sodium heparin or lithium heparin	Inactivates thrombin and thromboplastin	For lithium level use sodium heparin, for ammonia level use either
7	PST (light green top)	Lithium heparin anticoagulant and a gel separator	Anticoagulants with lithium, separates plasma with PST gel at bottom of tube	Chemistries
8	EDTA (purple top)	EDTA	Forms calcium salts to remove calcium	Haematology, Blood Bank (cross-match) requires full draw
9	Blood tube (pale yellow top)	Acid-citrate-dextrose (ACD, ACDA or ACDB)	Complement inactivation	HLA tissue typing, paternity testing, DNA studies
10	Oxalate/fluoride (light grey top)	Sodium fluoride and potassium oxalate	Antiglycolytic agent preserves glucose up to five days	Glucoses, requires full draw (may cause haemolysis if short draw)

Appendix 6 (f) Visual Infusion Phlebitis (VIP) Score: Jackson A. (1997)

Visual Infusion Phlebitis Score		
IV site appears healthy	0	No signs of phlebitis **OBSERVE CANNULA**
One of the following is evident: • Slight pain at IV site • Redness near IV site	1	Possible first sign of phlebitis **OBSERVE CANNULA**
Two of the following are evident: • Pain • Erythema • Swelling	2	Early stage of phlebitis **RESITE THE CANNULA**
All of the following signs are evident: • Pain along the path of the cannula • Erythema • Induration	3	Medium stage of phlebitis **RESITE THE CANNULA** **CONSIDER TREATMENT**
All of the following signs evident and extensive: • Pain along the path of the cannula • Erythema • Induration • Palpable venous cord	4	Advanced stage of phlebitis or start of thrombophlebitis **RESITE THE CANNULA** **CONSIDER TREATMENT**
All of the following signs are evident and extensive: • Pain along the path of the cannula • Erythema • Induration • Palpable venous cord • Pyrexia © Andrew Jackson 1997 Rotherham General Hospitals NHS Trust	5	Advanced stage of thrombophlebitis **INITIATE TREATMENT** **RESITE THE CANNULA**

Appendix 6 (g) Neonatal Intravenous Extravasation Scoring System (NESS) adapted from Portsmouth Hospitals Trust as developed by Heather Byman 2003

Observation		Action
PIVC Site Appears Normal ● Ensure dressing is intact and site of entry is visible ● Ensure T- Piece is secured with a loop	0	**No Signs of Extravasation** ● Observe cannula site at least hourly whilst on continuous infusion and ● minimum 6 hourly when having bolus injection ● Document findings
One or more of the following is evident 1. Increased pressure on pump 2. Slight swelling/oedema around site 3. Slight redness around the site 4. Signs of pain 5. Blanching in absence of induration	1	**Possible Extravasation** 1. Flush cannula with saline and observe 2. Observe at a minimum of 15 minutes when infusion ongoing 3. Consider effect of limb or cannula position 4. If fluid leakage ensure all connections are tight, flush again, if leakage remove cannula and inform Dr/Nurse for resitting
One of the following is present 6. Resistance to flush despite good position 7. Slight swelling 8. Inflammation at PIVC site 9. No blanching 10. Obvious induration around site 11. Evidence of pain originating from PIVC site	2	**Possible Extravasation** 5. STOP infusion 6. Inform Dr/Nurse for assessment/resitting 7. Cannula should be removed if site deteriorates
1. Area of blanching with easily differentiated boarder plus/minus exudation of serous fluid 2. Formation of haematoma with evidence of epithelial damage 3. Painful PIVC site 4. Marked swelling 5. Cool skin to touch	3	**Medium Stage of Extravasation** 1. STOP infusion immediately and inform medical personnel 2. Extract as much fluid as possible from cannula 3. Resite cannula 4. Experienced medical personnel to consider treatment as per extravasation guidelines before removing of cannula
Blanching with easily differentiated border plus evidence of the following: 1. Inflammation 2. Tissue necrosis (blackened area) or epitheral tissue breakdown 3. Lack of blood return cap refill 4. Painful PIVC site 5. Marked swelling 6. Cool skin to touch	4	**Advanced Stage of Extravasation** 1. STOP infusion immediately and inform medical personnel 2. Extract as much fluid as possible from cannula 3. Resite cannula 4. Experienced medical personnel to initiate treatment as per extravasation guidelines before removing of cannula

Appendix 6 (h) Venepuncture Problem Solving Prevention and Resolution (source taken from Dougherty & Lister 2015)

Problem	Cause	Prevention	Action Suggested
Limited venous access	Repeated use of same veins. Peripheral shutdown. Dehydration. Hardened veins (due to scarring and thrombosis). Poor technique/choice of vein or device.	Use alternative sites if possible. Ensure the room is not cold. Ensure correct device and technique are used.	Do not attempt the procedure unless experienced. Put patient's arm in warm water. Apply glycerol trinitrate patch. May be necessary to rehydrate patient prior to venepuncture. Do not use these veins as venepuncture will be unsuccessful.
Needle inoculation of or contamination to practitioner	Unsafe practice. Incorrect disposal of sharps.	Maintain safe practice. Activate safety device. Ensure sharps are disposed of immediately and safely.	Follow accident procedure for sharps injury, for example make site bleed and apply a waterproof dressing. Report and document. An injection of hepatitis B immunoglobulin or triple therapy may be required.
Accidental blood spillage	Damaged/faulty equipment. Reverse vacuum.	Check equipment prior to use. Use vacuumed plastic blood collection system. Remove blood tube from plastic tube holder before removing needle.	Report within hospital and/or MHRA. Ensure blood is handled and transported correctly.
Missed vein	Inadequate anchoring. Poor vein selection. Wrong positioning. Lack of concentration. Poor lighting. Difficult venous access.	Ensure that only properly trained staff perform venepuncture or that those who are training are supervised. Ensure the environment is well lit.	Repalpate, withdraw the needle slightly and realign it, providing the patient is not feeling any discomfort. Ensure all learners are supervised. If the patient is feeling pain, then the needle should be removed immediately. Ask experienced colleague to perform the procedure.
Spurt of blood on entry	Bevel tip of needle enters the vein before entire bevel is under the skin; usually occurs when the vein is very superficial.		Reassure the patient. Wipe blood away on removal of needle.

Problem	Cause	Prevention	Action Suggested
Blood stops flowing	Through puncture: needle inserted too far. Contact with valves. Venous spasm. Vein collapse. Small vein. Poor blood flow.	Correct angle. Palpate to locate. Results from mechanical irritation and cannot be prevented. Use veins with large lumen. Use a smaller device. Avoid use of small veins wherever possible. Use veins with large lumens.	Draw back the needle, but if bruising is evident, then remove the needle immediately and apply pressure. Withdraw needle slightly to move tip away from valve. Gently massage above the vein or apply heat. Release tourniquet, allow veins to refill and retighten tourniquet. May require another venepuncture. Apply heat above vein.

Appendix 6 (i): PIVC Problem Solving Prevention and Resolution (source taken from Dougherty & Lister 2015)

Problem	Cause	Prevention	Action Suggested
Difficulty in locating a suitable vein	Excessive previous use. Shock or dehydration. Anxiety. Fragile, thready veins, for example in the elderly or in patients on anticoagulant therapy. Thrombosed veins as a result of treatment, for example cytotoxic therapy.	Alternate sites wherever possible to avoid overuse of certain veins. Use the methods described above to reduce anxiety.	Reassure the patient. Use all methods of improving venous access before attempting the procedure, for example use warm water/GTN to encourage venous dilation or vein illumination/ultrasound devices. Assess patient using an assessment tool to ascertain degree of difficulty and refer for CVAD if necessary. Do not attempt the procedure unless experienced.
Missing the vein on insertion of the cannula	Inadequate anchoring. Collapse of the vein. Incorrect position of practitioner or patient. Inadequate palpation. Poor vein choice. Lack of concentration. Failure to penetrate the vein properly due to incorrect insertion angle.	Ensure good position and lighting. Better preparation and concentration. Use correct technique and accurate vein selection.	Withdraw the needle and manoeuvre gently to realign it and correct the angle of insertion. Check during manoeuvring that the patient is not feeling any pain. If the patient complains of pain, remove the needle. If unsuccessful then remove the needle. Where necessary, pass to a colleague with more experience.
Blood flashback seen and then stops	Venospasm. Bevel of needle up against a valve. Penetration of the posterior vein wall by the device. Possible vein collapse.	Try to locate valves prior to insertion and insert the device just above the valve. Carefully level off once in the vein to prevent penetration of posterior wall. Use a good angle of approach to the vein to prevent through puncture.	Release and tighten the tourniquet. Gently stroke the vein above the needle to relieve venous spasm. Withdraw the needle slightly to move the bevel away from the valve. If the vein wall is penetrated, remove the device.

Problem	Cause	Prevention	Action Suggested
Difficulty in advancing the cannula	Releasing the tourniquet too soon, causing the vein to collapse. Removing the stylet too far and being unable to advance the cannula which is now no longer rigid enough to be advanced. Encountering a valve. Not releasing the cannula from the needle prior to insertion according to manufacturer's instructions. Poor anchoring or stretching of the skin.	Ensure the tourniquet remains sufficiently tight until insertion is completed. Ensure the cannula is released from the stylet prior to insertion, to allow for smooth advancement. Ensure that a sufficient length of the cannula is inserted into the vein before stylet withdrawal. Use good technique. Assess the vein accurately, observing for valves, and avoid them where possible.	In the event of early stylet removal or encountering a valve, connect a syringe of sodium chloride 0.9%, flush the cannula and advance at the same time in an effort to 'float' the device into the vein. Tighten the tourniquet and wait for vein to refill.
Difficulty in flushing once the cannula is in situ	Sometimes, the cannula has been successfully inserted, but on checking patency by flushing, the practitioner has difficulty because: • the cannula tip is up against the valve • the cannula has pierced the posterior wall of the vein • the cannula tip is resting on the wall of the vein • there is an occlusion.	Avoid areas along the vein where there may be valves. Ensure careful insertion to prevent puncturing the posterior wall of the vein	Withdraw the cannula slightly to move it away from the vein wall or valve and attempt to flush. If the vein wall is pierced and any swelling is observed, remove the cannula. Attempt to withdraw the clot and clear the occlusion.

Source taken from Dougherty L. & Lister S. (2015) Royal Marsden Manual of Clinical Nursing Procedures. 9th edn. Retrieved from http://www.rmmonline.co.uk/manual/c14-fea-0054 on 31 March 2016.

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