Great Western Hospitals NHS
NHS Foundation Trust

Intravenous Cannulation Work book

2014

Name ……

Job Role/Department ……

Date ……..

Date of Study Day ……

Our Values
Service Teamwork Ambition Respect

Contents

Aim

This work book is designed to equip you with the knowledge and skills to enable you to attain trust competency in cannulation.

Learning made easy....

Step 1

- Read the workbook and complete the pre-course assessment on training tracker (TT).
- When the TT assessment has been completed print off your certificate and bring to the session.
- Failure to attend with your certificate will mean that you will be unable to complete the study day and will need to re-book

Step 2 - Support from your manager/mentor

- Prior to applying, ensure that your manager/mentor would like you to learn and practice this/these skill(s)
- It is hoped that during your appraisal you have reflected upon those existing skills and experiences you have acquired within your current role, and have now secured support for your further development from your clinical manager.
- On completion of this workbook, your clinical manager is required to sign the relevant section of the competency. This demonstrates their continued support for your role development regarding cannulation.
- Please ensure that you send a copy of your completed Competency to The Academy to ensure you are entered into ESR

Step 3 - Getting help to learn

- Identify a practice supervisor/assessor to help you achieve competency.
- You should contact a suitable practice supervisor/assessor within your work area, which will be able to guide and support you as you develop your knowledge and skills.
- The person(s) you choose must themselves be an expert and active practitioner in cannulation and be have a current cannulation competency.
- Formal contact with this person should be negotiated, allowing you to plan your development, review your progress, discuss and resolve any area of difficulty or uncertainty.

Step 4 - Ensuring compliance with local guidelines and professional practice

- Ensure you have accessed, read and understood your health care organisation guidelines/policies relating to cannulation and any national guidelines that have been adapted for use in your clinical area

Step 5 – Maintaining Competence

- This competency needs to be updated every two years with the current competency available on the intranet, you will need to:
    - Read through updated competency and the relevant policies and guidelines
    - Perform an observed insertion and maintenance of an intravenous cannula observed by a competent practitioner.
    - Print off the competency, complete the 3.1 Competency Standard Form and keep the original for your own records, photocopy two and send one to the Academy and give one to your Manager

Objectives

- State key aspects of relevant policies and procedures and protocols in relation to cannulation
- Understand the legal and professional issues which apply to cannulation
- To identify complications associated with Intravenous Cannulation
- Explore the documentation requirements.
- Demonstrate correct and safe cannulation on the model arm during the follow up practical session

Legal and professional issues

You must be registered practitioner (all disciplines), an Emergency Department Assistant or a Band 4 Assistant Practitioner.

- You must work within The Trust's Scope for Enhancing the Scope of Professional Practice
- The NMC code of conduct / HCPC Code must be applied
- You must have competency so that you are covered under the Trust's vicarious liability
- You gain informed consent and seek assistance if patient is not able to give consent
- You must use all products correctly and according to manufacturer's instructions
- Adherence to trust policies and procedures is vital
- Documentation in nursing notes must be accurate and timely.

This workbook aims to assist the learner to understand the requirements in the following areas relating to cannulation:

- Accountability
- Legal Responsibility
- Negligence
- Vicarious Liability
- Reasonable Care
- Valid Consent
- Local policies and procedures
- Implications for the practitioner

- All healthcare practitioners must be aware of the professional issues related to performing a new skill such as cannulation. This ensures a safe and effective procedure for all parties concerned.
- As professionals, healthcare practitioners are accountable for their actions and must adhere to the stated principles of their professional bodies.

Accountability

There are four areas of accountability:

1. Criminal Law (for example manslaughter by gross negligence)
2. Civil Liability (e.g. action for negligence)
3. Professional Liability
4. Accountability to Employer

Nursing and Midwifery practitioners should refer to the Nursing and Midwifery Council (NMC)'s: The Code: Standards of conduct, performance and ethics for Nurses and midwives (2008).
Other health care professionals have an equal code of conduct which will provide clear and robust guidelines.

Duty of care

- Healthcare practitioners owe a legal duty of care to their patients.
- The duty of care is a legal status which is held by registered practitioners when they are involved in planning, delivering and evaluating care.
- The duty of care is passed from one shift to another, one department to another so that someone is accountable for the patient or client at all times.
- The duty of care is only relinquished if the patient is handed over, transferred out, discharged home (as a care episode has ended) or if they die.
- The Standard of Care which applies is that of a responsible body of practitioners in the relevant speciality. Two practitioners who are level in rank should display and possess similar levels of skills and knowledge (The Bolam test).
- Responsible means just that, it is not equal to accountability. It does not necessarily mean the 'majority' and it will be measured by the knowledge at the time the event took place. Non-registered practitioners can assume responsibility as they are aware of their actions and limitations.

- If a practitioner breaches their duty of care and in doing so causes actual harm to a patient, the patient may be entitled to compensation.

Negligence

Negligence requires three conditions to be satisfied:

1. The practitioner owed the patient a duty of care
2. A breach of that duty has occurred
3. As a result of this breach, harm has been caused to the claimant.

Vicarious Liability

- An employer will bear vicarious responsibility for the acts and omissions of its employees unless they are on a 'frolic of their own'. i.e. acting outside the normal course of their duties. It would be extremely unusual for an employer of a healthcare practitioner to avoid vicarious responsibility for the acts of the practitioner done in the course of his or her duties.
- All NHS clinical and nursing practitioners are subject to NHS indemnity. Under this the NHS takes responsibility for legal proceedings brought against an employee arising from their NHS activities.
- An employer can also be held to be directly liable where the standard of care owed by the Trust to the patient has been breached. For example by failing to supply sufficient or properly qualified staff.
- It is recommended that all staff also have personal insurance via a professional body e.g. RCN, RCM, BMA, HPC

Reasonable Care

The Standard of Care

- Healthcare practitioners must attain the standard of a responsible body of practitioners professing the particular speciality under scrutiny (This is known as the Bolam Test). What amounts to a "responsible body" must withstand logical analysis.
- This can be measured using the Bolam Principle which is a legal template for measuring ability of medical/clinical practitioners. This was based on a case from 1957 where Mr Bolam, a psychiatric patient was injured due to one doctor's inexperience (look it up on the internet)

The same standard of care applies to an emergency situation.

Example:

A nurse witnessing a road traffic accident will be required to stop and offer help to the standard of a responsible practitioner trained in this procedure, whether or not she is experienced in doing so.

Inexperience

In law, the same standard of care is expected of an inexperienced practitioner as of an experienced practitioner. A newly, qualified nurse or Midwife, for example, will be required to attain the same standard of competence as an experienced nurse.

Orders

Where a healthcare practitioner receives an order regarding treatment and carries it out without due consideration they may be breaching the duty of care. It is rarely a defence to claim to be merely following orders. The practitioner must show that the action was reasonable having regard to approved practice to be expected from a practitioner trained in the procedure.

Local Policies and Guidance

As far as is reasonable, local policies and procedures should be followed. However, in rare circumstances there may be reasons why a particular policy is inappropriate and it may be justifiable not to follow procedure. Where a practitioner does not follow usual practice but the actions were in accordance with the standard of reasonable care, there is no breach of duty.

It is recommended that where a policy is not followed, the practitioner records what was done and why the circumstances justified a modification from usual practice.

Consent

Adult mentally competent patients have an absolute right to decide whether to accept or refuse treatment.

Information to be provided before consent

Before consent is provided a patient should receive some explanation of the treatment to be undertaken. The explanation should be in line with that which would be provided by a responsible body of practitioners. Where a patient asks questions they should be answered fully. How much detail should be given depends on the particular circumstances.

For cannulation, it is recommended that before consent can be given, an individual should be aware of the reason for having a cannula inserted, what is involved and how long it will take.

Forms of Consent

Consent can be given verbally, can be in writing or can be implied through conduct.

In cannulation, a patient offering their arm for insertion can imply consent provided that the elements of consent are satisfied.

Verbal consent should be recorded in the patient's notes and should be limited to those procedures where there is little risk.

Who may provide consent?

Consent cannot be given by proxy. Where an adult patient is mentally incapable of giving his consent, no one (including the court) can give consent on his/her behalf. Treatment in such a case may lawfully be provided by a healthcare practitioner where the treatment is in the best interests of the patient.

Those with parental responsibility for a child will usually have the legal power to give or withhold consent for a child's treatment, unless they conflict with the interpretation of those providing care about the child's best interests

Consent by children under 16 years of age depends upon the child's ability to understand the nature and the implications of the treatment. The ability to understand has to be determined by the medical practitioner or the relevant health professional.

As a result of the Mental Capacity Act 2005, which comes into force on 2 April 2007, practitioners will be obliged to assess the capacity of all patients whom they believe do not have capacity to consent to or refuse treatment. Having established a patient lacks capacity the practitioner will be obliged to act in that patient's best interest.

Who should request consent?

Consent must be taken by a practitioner who is both capable of performing the procedure and is able to explain the risks and benefits.

Elements of Consent

For valid consent, the following elements must be satisfied:

- **Capacity**: Ensure that the patient/client is capable of giving consent. Adults are always assumed to be competent unless demonstrated otherwise.
- **Voluntary**: An individual must be free to choose. Consent must be given without coercion.
- **Informed**: Patients are entitled to receive sufficient information in a way they can understand about the proposed treatment, the possible alternatives, and any substantial risks so they can make a balanced judgment
- **Specific**: The consent given must be specific to the situation
- **Current**: Giving and obtaining consent is usually a process, not a one off event. Patients can change their minds and withdraw consent at any time. If there is any doubt, you should double check with the patient what their current wishes are.

Local Policies and Procedures

- Local policy and procedures may be found to support cannulation in every area or on the intranet
- The policies may have variances but should be followed. They will include information on training, cannula selection, skin preparation and aftercare pertaining to the local environment.
- It is the responsibility of the practitioner to follow local policy and procedure guidelines, or discuss any deviations with the author of such guidelines.
- Standards for competence will also be issued by each Trust. These must be followed to ensure completion and confirmation of competence.

Implications for the practitioner

In practice these issues mean that a practitioner should:

- Check that he/she has the training and supervision identified by local policy before carrying out the procedure.
- Feel competent to carry out the procedure. Justifying competence can be achieved by keeping a log of supervised practice and training. Ensuring reflective practice and critical analysis.
- Carry out the procedure in accordance with the local policy.
- Keep up to date with changes in practice and use his/her skill regularly.
- Never attempt cannulation unless he/she is confident with all aspects required to be considered, before, during and after the procedure.
- Always refer to an experienced colleague before cannulation procedure if he/she is unsure.
- Follow the NMC guidance and recommendations.
- Registered Nurses must comply with the NMC's Code of Professional Conduct (2008). This Code has been designed to provide a clear framework for logical development of practice. The code emphasises the need for application of knowledge and the exercise of professional judgement and skill (see section 6). Responsibility and accountability are placed on the individual. The Code also advises nurses to acknowledge personal skill and take steps to remedy any deficits.
- Operating Department Practitioners, Assistant Practitioners and Emergency Department Assistants must comply with the Health and Care Professions Councils(HPCP) Standards of Conduct, Performance and Ethics (2008)
- Doctors must comply with the General Medical Council's Code of Conduct (2011)
- Ensure that the procedure is fully documented in the records

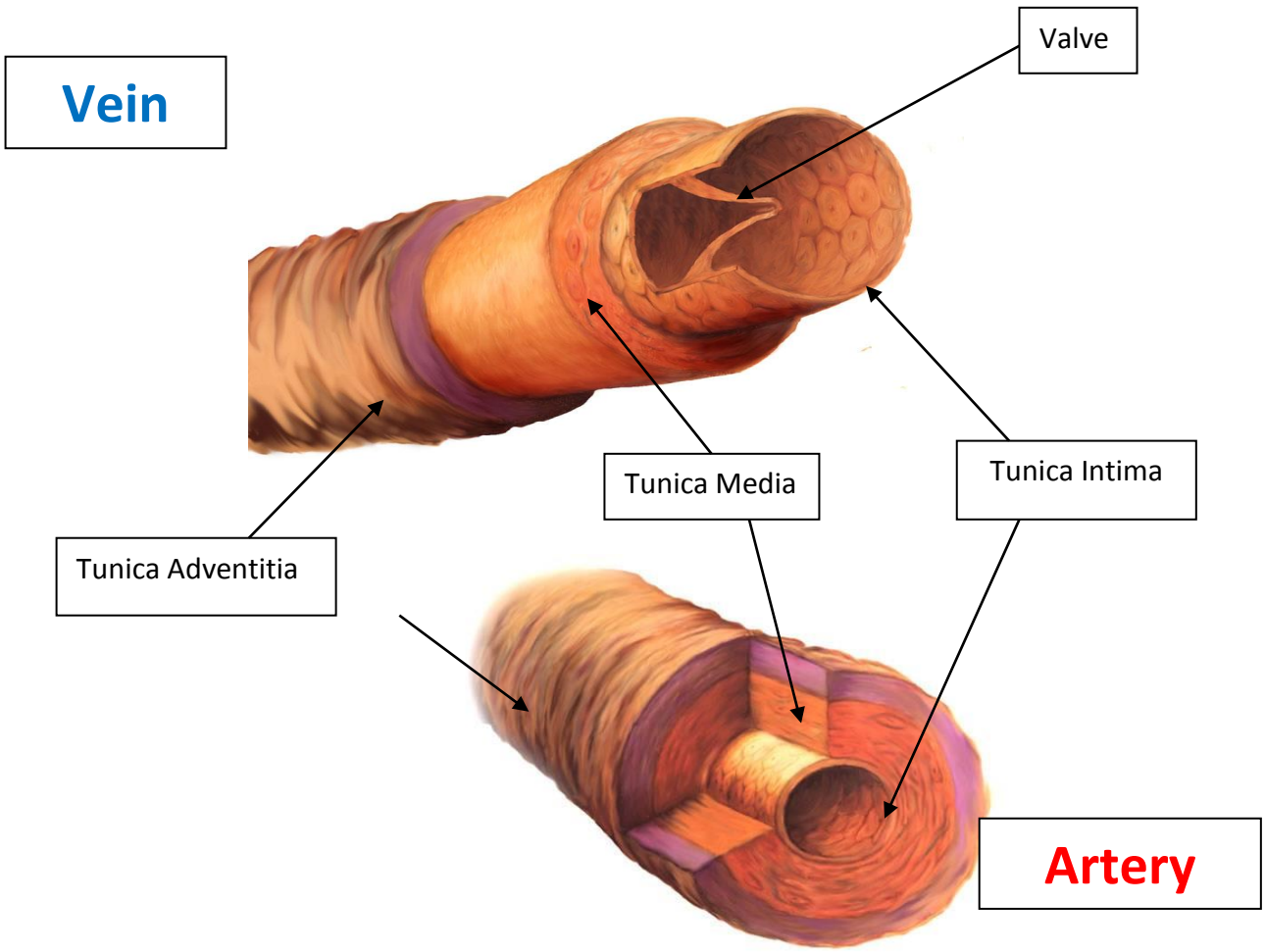
NMC (2010) recommends that:

- Documentation should provide clear evidence of the care planned, the care delivered and the information shared
- Good record keeping is a mark of a skilled and safe practitioner
- Good record keeping helps to protect the welfare of patients and clients.

Anatomy and Physiology

When cannulating, a sound knowledge of anatomy and physiology increases success and prevents complications.

Each individual's anatomy is unique and a positive approach reduces stress for the individual having a cannula inserted.



The Structure of Veins and Arteries

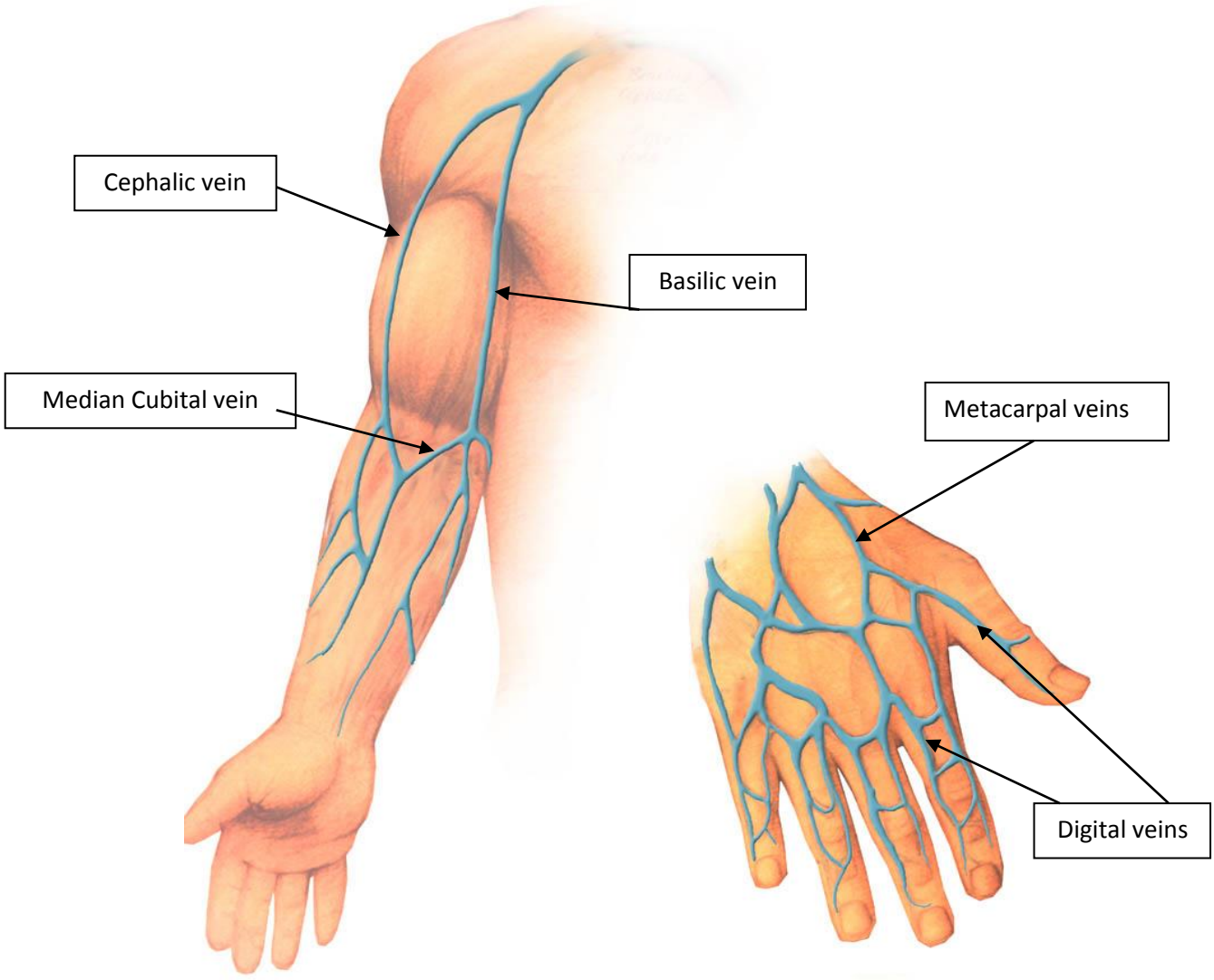
Veins consist of three layers:

The ***tunica intima*** is made up of endothelial cells lining the lumen of the vein, these are fragile and sensitive.
The ***tunica media*** is a smooth and elastic muscle layer, controlling the vein through constriction and dilation. This layer is supplied by nerve endings from both sympathetic and parasympathetic nervous systems.

The final layer is the ***tunica adventitia*** which is a thick fibrous layer acting as protection and contains the ***vasavasorum;*** these are tiny arteries and veins that supply the walls of blood vessels.

Veins

Veins contain ***valves***, pouch like folds made up of the tunica intima layer of vein. They open towards the heart, prevent pooling and ensure venous return to the heart. Valves may be seen as bumps along the course of the vein and at bifurcations. There are no valves in the veins of the head and neck or in arteries.



Passing up the front of the forearm, the ***cephalic vein*** runs between the deltoid and pectoralis major muscles. At the elbow the ***median cubital vein*** branches to the median side and joins the basilic vein. The ***basilic vein*** runs up the medial side of the arm.

The ***metacarpal veins*** run along the back of the hand and join the cephalic vein at the wrist.
The ***digital*** veins run from each finger and the thumb and join the metacarpal veins

Arteries

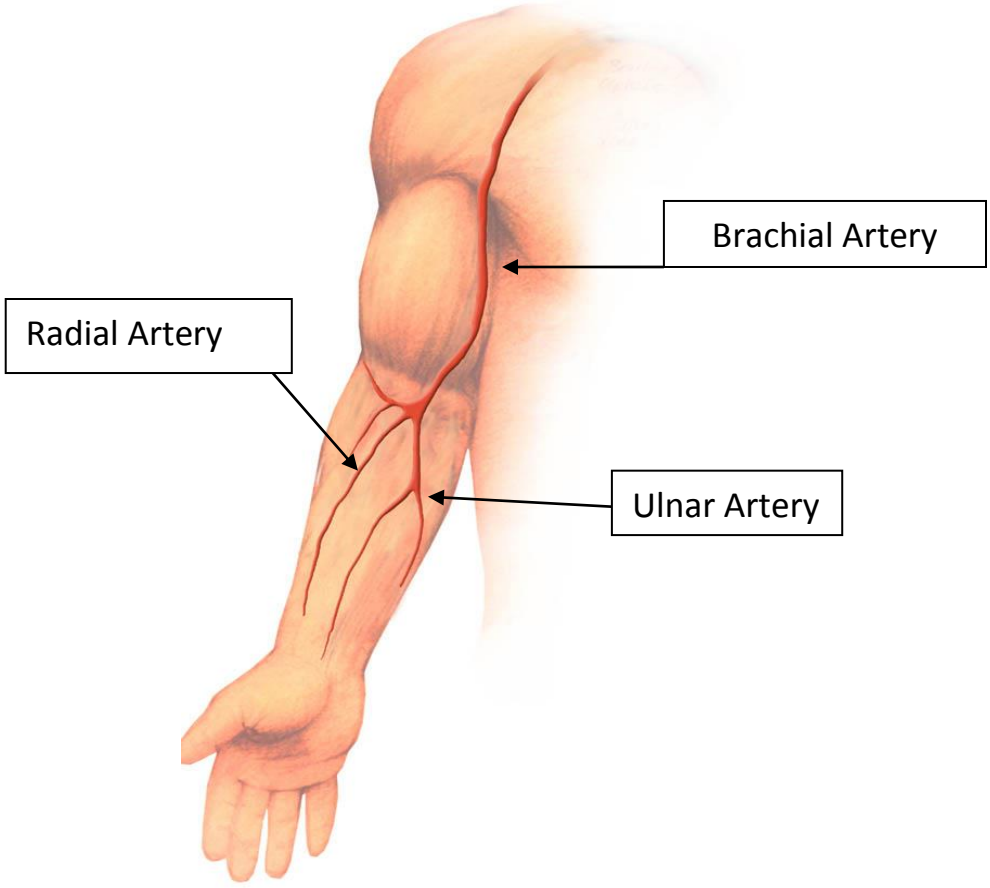
Arteries are made up of the same three layers as the vein; the notable differences are:

- a thicker muscle layer because of the high pressure within the vessels.
- An absence of valves

Arteries tend to be deeper and are far more painful when cannulated.

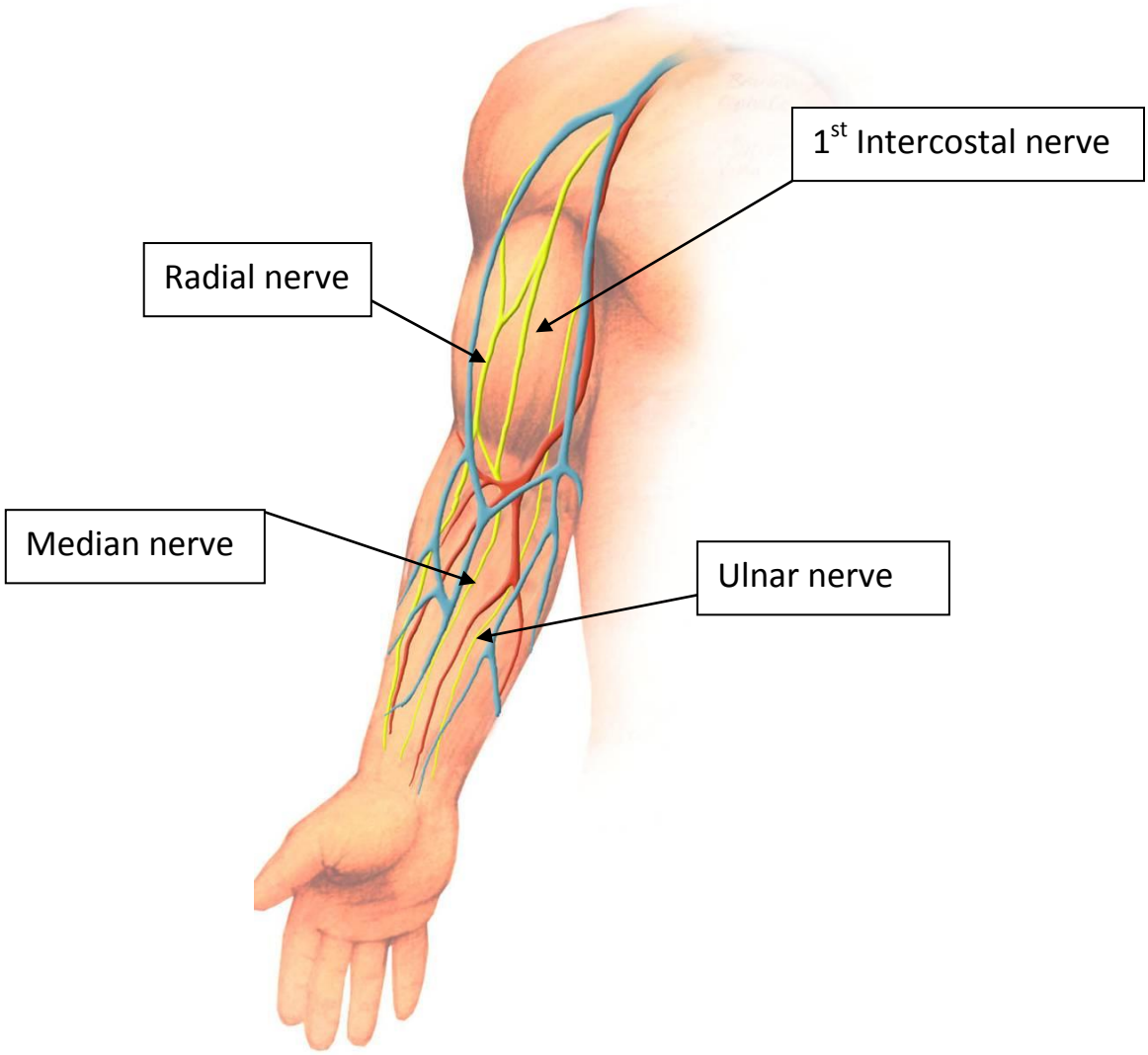
Arteries feel much rounded in shape and firm under palpation, and they do not collapse.

An artery is readily identifiable by the presence of a pulse.



The B***rachial Artery*** runs from the axilla to the elbow (cubital fossa). This then divides into radial and ulnar arteries.
The ***radial artery*** follows the lateral bone of the forearm. The first part of the artery is covered in muscle then just above the wrist it becomes superficial. This is where a pulse may be taken by pressing the artery against the radial bone.
The ***ulnar artery*** runs down the medial side of the forearm.

Nerves



The *ulnar nerve* runs with the brachial artery passing behind the medial epicondyle to the ulnar side of the forearm.

The *median nerve* runs close to the brachial artery and down the front of the forearm. There are an increased number of nerve fibres present in the antecubital fossa and around the wrist joint.

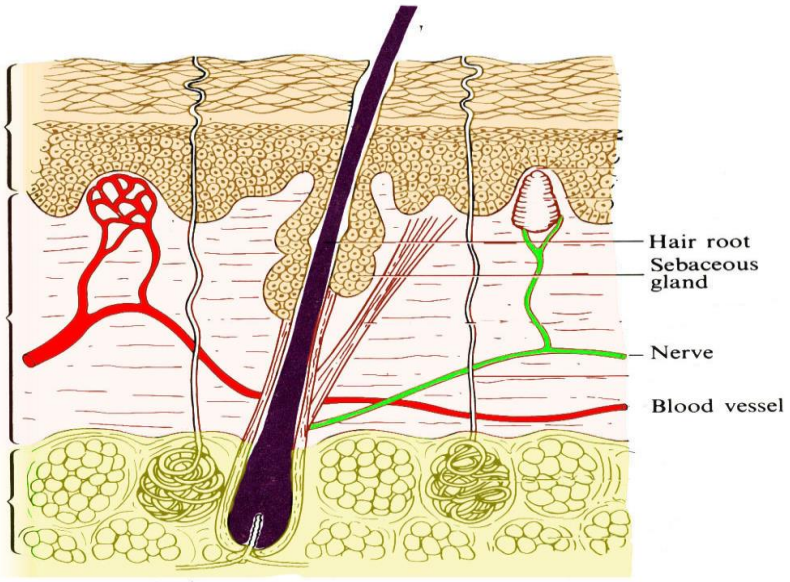
If a nerve is cannulated accidentally, the patient will experience extreme pain and parasthesia in the limb. Remove the cannula immediately.

The layers and function of the skin

Epidermis

Dermis

Subcutaneous tissue (fat layer)



Skin is made of two layers. The ***epidermis*** is the outer protective covering for the ***dermis*** which is the sensitive and vascular under layer.

The epidermis thickness varies over the body, is thickest on palms of hands and soles of feet, and is thinnest on the inner surface of limbs.

Skin thickness can be affected by drugs (e.g. steroids) which can make the skin thinner and weaker. Age also alters the texture generally making it less elastic, thinner and more prone to damage.

The epidermis also varies in thickness according to different racial origins. Research shows that a patient of black origin will have an epidermis which may be up to 4 times thicker than a patient of white origin. (

The dermis contains capillaries and nerves, making some areas of body skin more sensitive than others.

Cannulation may be very painful in one area and only mildly painful in another. The inner wrist can be very sensitive and should be avoided.

The thickness of the fat layer is important as the fat affords some anchorage of blood vessels. If there is a lot of fat, the veins may be deeper and less easy to see. If the fat layer is very thin, the veins are easily visible but may move around more due to less anchorage so need to be manually supported during cannulation.

In the elderly, the epidermis may be so thin on the dorsum of the hand it will not adequately support the vein for cannulation.

How Cannulation affects physiology

The Autonomic Nervous System is responsible for regulation of internal organs and glands, which occurs unconsciously. It consists of the sympathetic and parasympathetic divisions.

The anticipation of cannulation may cause a sympathetic nervous response. Good explanation and reassurance may help to reduce this. Individuals must be managed in a safe environment in case of sudden collapse, due to a drop in blood pressure.

Vasoconstriction may be caused by external or internal factors, making cannulation difficult. Whatever the cause this will make it much more difficult for the practitioner to gain venous access through narrowing and constriction of the venous wall. Peripheral shutdown affects distal veins first and so the practitioner will have to work higher up the vein to gain access in larger vessels. Causes of vasoconstriction are as follows:

- Temperature from cold to hypothermia.
- Shock - Hypovolaemic, cardiogenic, anaphylactic, septic, spinal, toxic and insulin all have the effect of vasodilation and are known as **vasogenic shock**).
- Drugs, oral or IV prescribed or illegal (narcotic).
- Stress and anxiety.

When trying to perform any kind of cannulation it is easy to stimulate the sympathetic nervous system, causing vasoconstriction.

As the cannula or needle enters the tunica intima of the vein the parasympathetic nervous system can be stimulated.

SYMPATHETIC NERVOUS RESPONSE

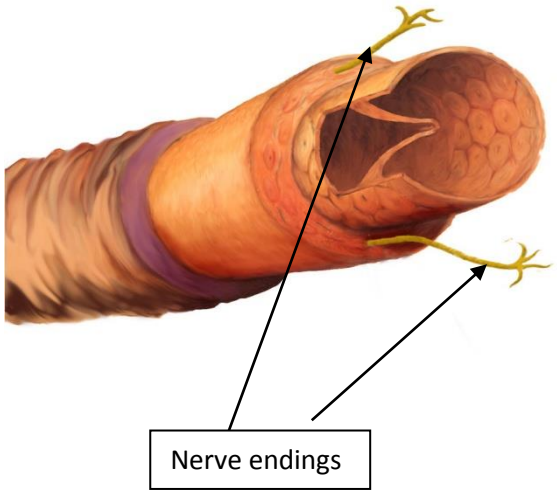
Tachycardia

Hypertension

Hyperventilation

Sweating

Vasoconstriction



PARASYMPATHETIC NERVOUS RESPONSE

Bradycardia

Hypotension

Pale

Clammy

Nausea/vomiting

Vasodilation

Cannulation may cause diverse symptoms for the individual. A sound knowledge base ensures prompt and effective care, preventing further potential complications.

Potential Complications

Aim:

Upon completion of this section the learner will understand the potential complications with peripheral cannulation including:

- Phlebitis
- Catheter Related Blood Stream Infection
- Transfixation
- Haematoma
- Infiltration
- Extravasation
- Embolism (Air + Cannula)
- Thrombo-embolism
- Thrombo-phlebitis

The potential complications identified may have serious consequences for both the practitioner and the individual having a cannula inserted, leading to serious negative outcomes and extended time in hospital. Prevention of complications before, during and following cannula insertion is essential.

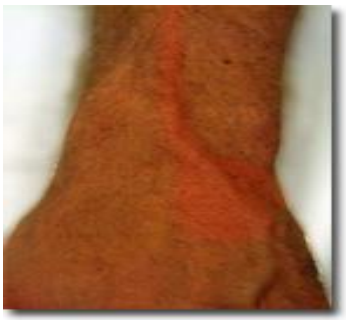
Phlebitis

Phlebitis is defined as the inflammation of a vein. ("phleb" = vein, "itis" = inflammation of)

Symptoms include pain, redness, warmth, oedema, induration, palpable cord and purulence. (Lamb 1996)

It is progressive and there are three main types:

- chemical
- mechanical
- bacterial



There are 3 areas of risk involved with the development of phlebitis.

a. Infusates and drugs.

b. Intravenous equipment.

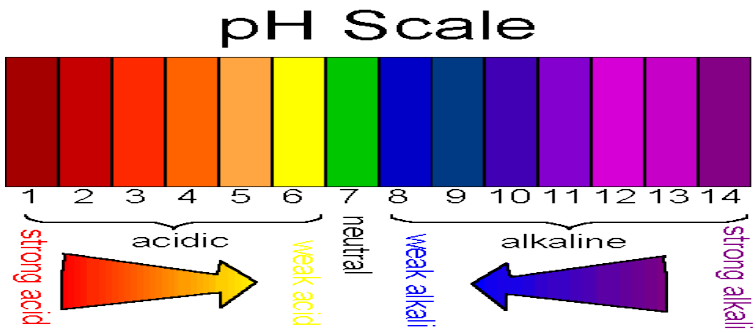
c. Physical condition of the individual.

Chemical Phlebitis

Chemical related phlebitis is caused by irritation to the endothelial layer of the vein by the chemical properties of the infusate or drug.

pH

- The pH of infusate may influence chemical phlebitis
- pH is the acidity or alkalinity of a solution as determined by the degree of its hydrogen ion concentration.
- Most intravenous infusates range between pH 3-7. Phlebitis is caused by a too high or too low pH and may be reduced by:
    - ❖ Further dilution
    - ❖ Infusing at a slower rate
    - ❖ Using larger veins

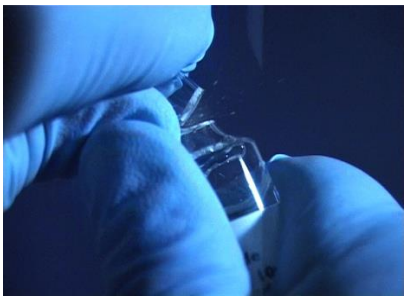


Osmolarity

Chemical phlebitis may also be influenced by the osmolarity of a drug or infusate.

- Osmolarity describes the pressure exerted by all particles per unit of solution. It is expressed as milliosmoles (mOsm) per litre of solution
- Normal serum osmolarity is approximately **280 to 300 mOsm / litre** and is isotonic. This normal isotonic plasma level is used as the standard for comparing the tonicity of IV infusates.
- Infusates with an osmolarity greater than plasma, hypertonic solutions, may cause pain at the insertion site and irritate the endothelial lining of the vein.
- To reduce the potential risk of phlebitis from infusates some drugs need to be reformulated to reduce osmolarity. Hypertonic Infusates will need to be infused into large central veins.

Particulates



Micro-particulate contamination may be caused by glass, rubber, cellulose fibres, plastics, antibiotic crystals and starch powder from gloves.

This can also occur when incompatible solutions are mixed together or infused intravenously and crystallisation occurs. Flushing with normal saline between different drugs will stop this and it is vital to check drug compatibilities before mixing. Never mix solutions together that may cause precipitates.

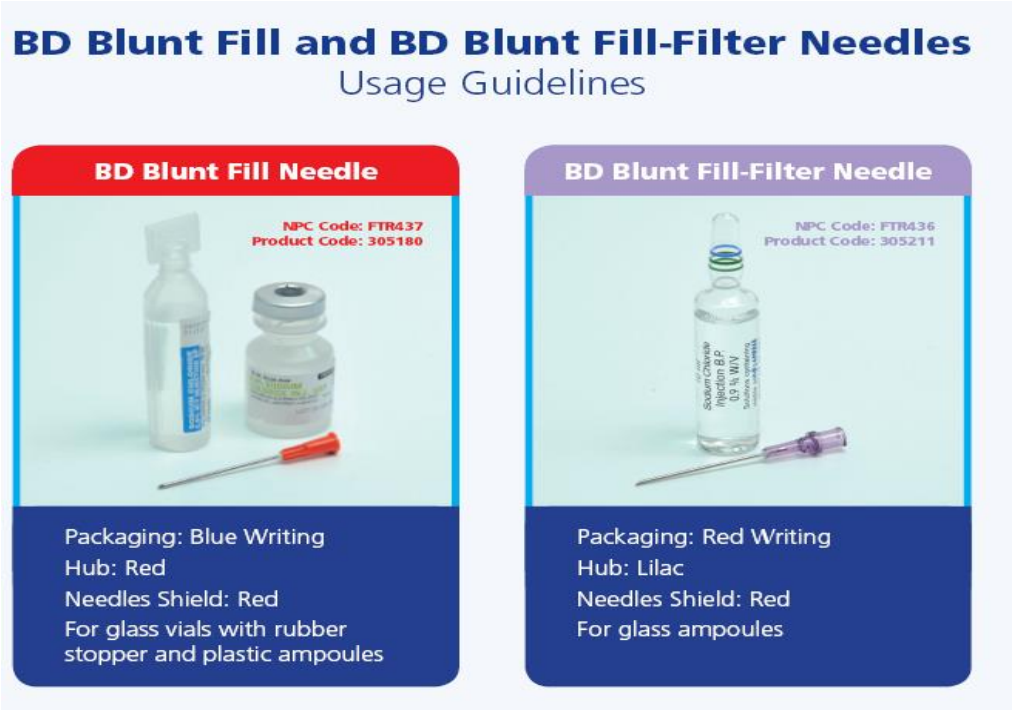
Particulates induce irritation, vasoconstriction and may cause a neoplastic or sensitising response.

Particulates may travel to the right atrium of the heart, through the tricuspid valve into the right ventricle. From there they travel into the pulmonary artery and branches of arteries until they are trapped in the capillary beds of the lungs. They may also gain access to the systemic circulation. (Weinstein 2001)

Particles as large as 300 micrometres can pass through an 18 gauge green cannula. Capillaries in the lungs measure 7-12 micrometres in diameter. Occlusion of small arterioles inhibits oxygenation, metabolic activities, cellular activities or may even cause tissue death.

In-line filter and filter needles for drawing up reduce the risk. In the absence of a filter needle, it is recommended to use a blue 23g hypodermic needle which has a small internal lumen so is less likely to pick up particulates.

In line with the new European Council Directive (2010) the trust now provides :

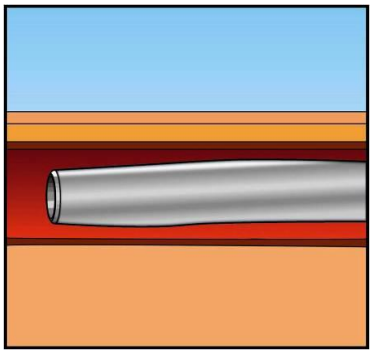


Mechanical Phlebitis

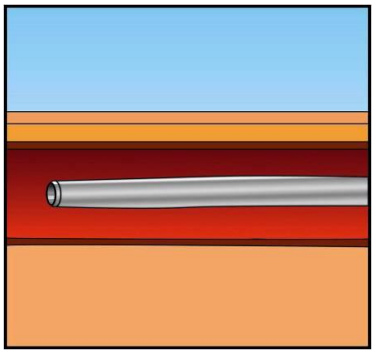
▪ Mechanical phlebitis represents the second type of phlebitis. It is associated with the cannula itself, its care, size and fixation once inserted.

▪ A soft flexible material allows the cannula to bend and move with the vein. BD Vialon™ used in Nexiva and Venflon Pro-safety Cannulas are clinically proven to reduce the risk of phlebitis. Some Cannulas are made from Teflon™ and polyurethane. Cannulas made from a polyurethane material, have been associated with a lower incidence of phlebitis

• Vein-cannula ratio is an important factor. A smaller cannula reduces vein trauma, allows greater blood flow around the cannula allowing infusates to be diluted through haemo-dilution. A large cannula can partially occlude blood flow.



Poor vein to cannula ratio



Good vein to cannula ratio

▪ Good site selection with secure fixation techniques reduces unnecessary movement.

▪ The length of time a cannula is in place should be within the local policy. This is usually within 48-72hrs. (DHSS 1972 cited Wilson 1994). (Winning Ways 2003)

Other factors:

Physical condition of the individual having a cannula inserted may influence all three types of phlebitis. For example chronic diseases may influence in the following ways:

Diabetes

The secondary condition of peripheral neuropathy destroys peripheral nerve endings, this loss of sensation may prevent an individual from noticing if the site has become tender.

Cancer

Individuals receiving chemotherapy experience a decreased white blood cell and platelet count, which may be associated with increased risk of infection.

Also their veins can be very frequently used for access and become very fragile and inflammed.

Immuno-suppressed

Individuals may exhibit delayed signs and symptoms of infection, if at all.

Mastectomy

If an individual has had lymph tissue removed there is an increased risk of infection and swelling in this side of their body. Research has suggested that to interfere with this arm can also worsen lymphoedema.

Presence of an infection

In some cases the external surface of the catheter tip becomes colonized by bacteria circulating in the blood from another focus (e.g. the respiratory or urinary tract.) This is called haematogenous seeding. The bacteria may then multiply on the catheter tip and subsequently cause a catheter associated infection.

Age

Elderly adults and young children have been shown to be prone to phlebitis development as their risk factor is raised by having an invasive device in place.

Children's veins are small and fragile, whilst their skin presents challenges by being thin or having a substantial layer of fat, depending on their age. .

The elderly will experience changes in both their skin and intima as they age, which results in much more motile veins which are less flexible and potentially harder to access

Skin condition

Intact skin is very important as it is the barrier to infection. It also needs to be robust as it needs to tolerate a dressing which will hold the cannula in place.

Broken skin should be avoided as it is sore and difficult to disinfect and may not be such a good infection barrier or tolerate a dressing.

Nutritional state.

Any patient who is eating less than a full diet and may also be unwell has been shown to be more susceptible to phlebitis. As protein supplies are the building blocks for recovery, a patient whose intake is lower is much less robust.

Monitoring phlebitis

- It is essential to observe cannulae and monitor the incidence of phlebitis and ensure minimal complications, prompt treatment and implementation of procedures to prevent phlebitis occurring.
- There are many scales that may be used to assist the practitioner. e.g. Maddox 1977, Jackson 1997, Chelsea and Westminster 2000.
- All checking and monitoring should be performed in accordance with local policies – the VIP score is in use at the Great Western NHS Foundation Trust Hospital.

Name: Unit No: NHS No:	Great Western Hospitals NHS NHS Foundation Trust **Peripheral Line Record**

Cannula 1: Inserted by:	Number of attempts:
Date & time of insertion:	Site of insertion:
Ward / Department:	Size / Colour:
Date & time of removal:	VIP Score on removal:
Name & signature of person removing cannula:	
Cannula 2: Inserted by:	Number of attempts:
Date & time of insertion:	Site of insertion:
Ward / Department:	Size / Colour:
Date & time of removal:	VIP Score on removal:
Name & signature of person removing cannula:	

Reasons for Insertion

1. IV Fluids	2. IV Medication	3. Blood Transfusion	4. Procedure within 24 hrs	5. Other

Cannula 1	Date & time	VIP Score	Dressing dated & intact	Reason for insertion	IV line dated	Signed
Day 1 : a.m.						
p.m.						
Day 2 : a.m.						
p.m.						
Day 3 : a.m.						
p.m.						
Remove cannula unless poor venous access						
Day 4 : a.m.						
p.m.						
Day 5 : a.m.						
p.m.						

Cannula 2	Date & time	VIP Score	Dressing dated & intact	Reason for insertion	IV line dated	Signed
Day 1 : a.m.						
p.m.						
Day 2 : a.m.						
p.m.						
Day 3 : a.m.						
p.m.						
Remove cannula unless poor venous access						
Day 4 : a.m.						
p.m.						
Day 5 : a.m.						
p.m.						

Authors: P.Hanlon & V.Taylor IP&C Unscheduled Care Directorate July 2009

evaluation record.

Date & time	Evaluation record	Signed

Visual Infusion Phlebitis Score (VIPS) Record score overleaf twice daily (Jackson 1997)			
Observation	**Score**	**Description**	**Action**
IV site appears healthy. No pain	0	No signs of phlebitis	Observe cannula
One of the following is evident: • Slight pain near IV site **Or** • Slight redness near Iv site	1	Possible first signs of phlebitis	Observe cannula
Two of the following are evident: • Pain at IV site • Redness • Swelling	2	Early stage of phlebitis	Resite cannula
All the following signs are evident: • Pain along path of cannula • Redness • Induration	3	Medium stage of phlebitis	Resite cannula Consider treatment
All the following signs are evident & extensive: • Pain along the path of the cannula • Redness • Induration • Palpable venous cord	4	Advanced stage of phlebitis or thrombophlebitis	Resite cannula Consider treatment Complete IR1
All the following signs are evident & extensive: • Pain along the path of the cannula • Redness • Induration • Palpable Venous cord • Pyrexia	5	Advanced stage of thrombophlebitis	Initiate treatment Resite cannula Complete IR1

Catheter Related Blood Stream Infection

- Infection is the third area of phlebitis risk. It may be reduced by strict adherence to infection prevention and control procedures.

- Following cannula insertion fibrin will form on the tip of the cannula within 24-48 hrs. A nidus forms where micro-organisms may multiply, if present, shielding them from the host's defences and antibiotics.

- A nidus is a breeding place where bacteria, parasites, and other agents of a disease lodge and develop

- A cannula infection can be identified by signs of phlebitis, pyrexia and a general feeling of being unwell. On blood test, results a raised white blood cell count may be observed.

- Prompt management of suspected cannula infection will prevent further serious complications such as septicaemia.
    i. Remove the cannula immediately and send tip for culture and sensitivity.
    ii. Inform medical team and implement treatment plan.
    iii. Re-site new cannula and continue therapy as prescribed.

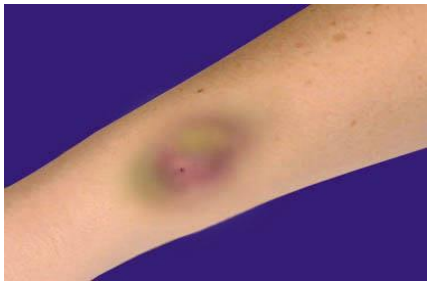
- The Pathology Unit requires blood cultures to be sent with the tip of the cannula for comparative purposes. This may involve one or a series of cultures sets.

Haematoma

- A haematoma is a collection of blood that clots to form a solid swelling (Oxford Concise Medical dictionary 1989). It is formed by a leakage of blood around the insertion site or following removal.

- To reduce the risk and ensure good venous filling, select veins that are clearly defined. Maintain pressure following removal for at least one minute ensuring bleeding has stopped

- Once a haematoma has occurred it restricts site availability and may be painful and unsightly.

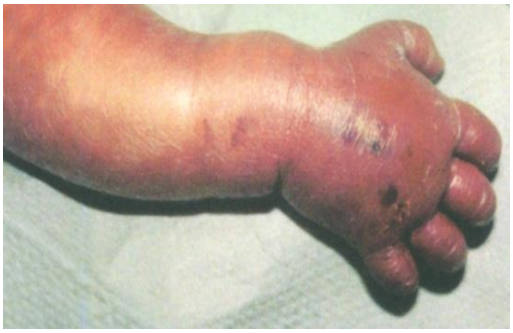


Transfixation

- Transfixation occurs during the insertion procedure. The cannula has entered the vein and continued through the other side. Flashback of blood will have occurred because the cannula has passed through the vein, but does not continue.

- This may be reduced by lowering the angle of the cannula after initially puncturing the vein before advancing the cannula. Flushing the cannula immediately after insertion confirms the correct location of the cannula in the vein.

Infiltration



- Infiltration occurs when the cannula has dislodged allowing fluid to enter the surrounding tissues. This is the infiltration of a **non-vesicant** solution so the body is likely to absorb the fluid without lasting damage.

- A vesicant solution is one which will create blisters (vesicles) and will cause tissue break down unless it is stopped.

- The area may be cool to touch and oedema present.

- An individual may be deprived of fluid and drug absorption at a rate for successful therapy from Infiltration.

- Infiltration limits available veins and predisposes the individual to infection.

- To reduce the risk, flush the cannula after insertion, before and after administering fluids and drugs. Use a flexible cannula and good fixation methods. Maintain regular observation of cannula site and infusion in accordance with local policy.

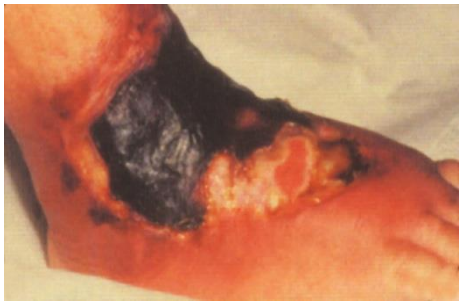
- A tourniquet applied proximal to the cannula will restrict venous flow. If the infusion continues, infiltration is evident.

Extravasation

- Extravasation is linked to infiltration where tissue necrosis has occurred. A **vesicant** drug or infusate enters the subcutaneous tissue by accident and is likely to cause tissue damage unless action is taken.

- A vesicant drug is one which will cause blisters (vesicles) and destroy tissue unless action is taken to try to avert its action.

- Damage can also be caused to nerves, tendons and joints.



- If superficial tissue loss occurs and remains free of infection, debridement will yield a clean bed capable of granulating. If deep structures are involved wide excision, debridement, grafting and amputation may be necessary (Weinstein 2001).

- Extravasation may continue even after the cannula has been removed. Some drugs are found to be still bound to tissue DNA months later.

Risks can be reduced by:

A) Extravasation protocols:

- Familiarity with policy and procedure
- Calling Pharmacist to ask for advice - immediately
- Protective clothing / equipment
- Immediate action

B) Education of all staff:

- Drugs likely to cause extravasation (high risk and identified as red category - only to be prescribed by certain consultants and their teams)
- Use of devices and syringe pumps
- Site selection
- Detection, management and treatment
- Reporting via accident / incident system

C) Extravasation kits:

- Location of kits
- Contents of kits
- Possible antidotes
- Ice packs / heat packs
- Out of hours locations

Management of extravasation must be prompt to reduce further damage. If treatment is delayed, surgical debridement, skin grafting and amputation may be needed.

Reporting of injuries or near misses is the role of the Pharmacist. A “Green Card” system exists where reports are sent to a central body in Birmingham called the National Extravasation Information Service(NEXIS). All results are collated and guidelines are then issued to try to improve safety linked to drugs and infusates at high risk of causing further injuries.

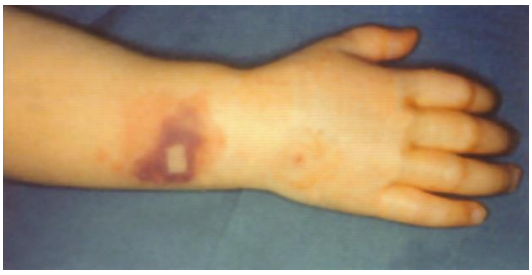
At risk patient groups:

- Cancer
  - Veins of people receiving chemotherapy are often fragile, mobile and difficult to cannulate.
  - Patients who have had an extravasation and receive future chemotherapy given at a site may experience tissue damage at the original site. (“Recall phenomenon”)
  - Radical mastectomy, axillary surgery or lymph node dissection may impair circulation in the limb, causing reduced venous flow and pooling and potential leakage of Infusates around the site of cannulation.

- Peripheral vascular disease
  - Atherosclerosis may reduce venous flow with risk of leakage at the intravenous site
  - Patient may also be debilitated with reduced venous and tissue tone.

- Reynaud’s Phenomenon
  - Arterial spasm may compromise peripheral circulation and reduce venous flow

- Diabetes
  - Patients with peripheral neuropathy may not feel the pain of an extravasation.



Signs and Symptoms include:

Initially:

- Burning, itching or stinging at the site
- Erythema, swelling and tenderness.
- Sensation of heat or coolness around the site

After some time:

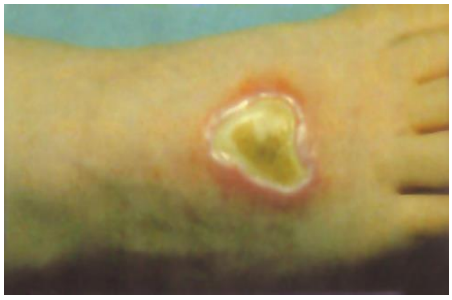
- Blistering of the skin
- Mottling or darkness of the skin
- Persistent pain at the site which can indicate that a more severe injury has occurred .

Long term damage:

- Induration suggests ulceration will occur
- When full thickness of skin is damaged, skin may be very white and cold with no capillary filling.
- After a period of time, may develop a black, dry eschar.
- Eschar will slough to reveal an underlying ulcer cavity.
- Surgical excision and /or skin grafting may be needed.

An **Eschar** is a slough or piece of dead tissue that removes itself from the skin surface.

High risk sites



- Dorsum of hand or foot
- Ankle
- Antecubital fossa
- Near joints
- Joint spaces
- Limbs with vascular problems, such as lymphoedema
- Peripheral cannulation versus central line access
- Previous sites of radiotherapy

Risk factors

- Majority occur at night and go unnoticed
- Multiple cannulation attempts may create risk of leakage of the drug especially along the same vein segment.
- Lack of familiarity with the nature of the drug or the group of patients
- Covering the site with occlusive dressing may 'hide' an extravasation
- Use of high pressure pumps as opposed to volumetric pumps.
- Steel needles cause more episodes then flexible plastic but they are less likely to be used.

Air embolism

Air embolism is a possible complication in intravenous therapy. It is unlikely in peripheral cannulation but not unknown. During cannula insertion this is limited by positive peripheral venous pressure (3-5cm H2O). Negative pressure may occur if the site selected is elevated above heart level.

Air must be removed from all connectors and lines before attaching to the cannula. All connectors must be luer lock type.

The clinician must be aware of the symptoms associated with the occurrence of air embolism. This will ensure prompt and effective treatment. They are as follows:

- Sudden vascular collapse
- Cyanosis
- Hypotension
- Weak, rapid pulse
- Increased central venous pressure.

- The clinician must turn the individual onto their left side, with head down (Trendelenburg position).
- Medical team must be informed immediately
- 100% oxygen
- Attempt aspiration of air if Central Venous Catheter is in place
- Support right ventricular function with intravenous fluids.

Q: How does positioning on the left side, with head down help?

A: It causes air to rise into the right atrium, preventing it from entering the pulmonary artery

Cannula Embolism

• Cannula embolism occurs when a fragment of cannula has broken off and should not occur if the correct insertion procedure is followed. **The stylet must never be re-introduced** when the cannula has entered the vein. This may cause a fragment of cannula to break off and enter the circulatory system.

Shearing of catheter tip caused by reinsertion of a needle. The distal fragment may completely fracture and cause embolization. Once a needle is removed from a catheter, it should never be reinserted.

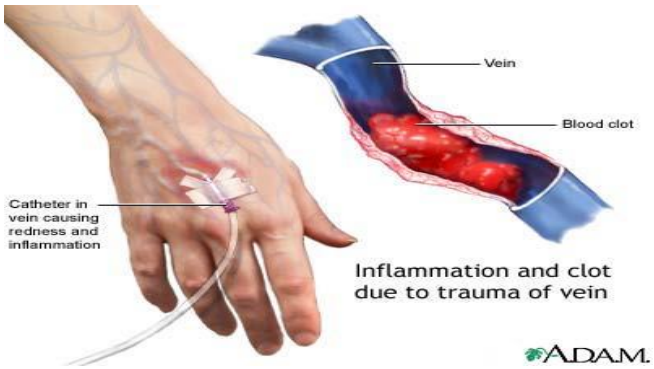
Thrombo-embolism

- Thrombo-embolism occurs when a blood clot on the cannula or vein wall is carried by the venous flow to the heart and pulmonary circulation.

- Where the cannula enters the vein, trauma will occur. Thrombi form on the vein around the cannula and at its tip, following insertion.

- Using small gauge cannula may reduce this, allowing blood flow around the cannula. Avoid using veins in the lower extremities because of reduced venous return.

Thrombo-phlebitis



Thrombo-phlebitis involves inflammation of a vein caused by a blood clot inside. With superficial thrombo-phlebitis, the clot is in a vein just below the surface of the skin.

Superficial thrombo-phlebitis may occur after the recent use of an intravenous (IV) line, after trauma to the vein, or for no apparent reason in persons at risk for thrombo-phlebitis.

Risks for superficial thrombo-phlebitis include the following:

- Disorders that involve increased blood clotting.
- Infection.
- Varicose veins.
- Chemical irritation of the area.
- Being immobilized for a prolonged period.

Signs and symptoms:

- Skin redness or inflammation along a superficial vein.
- Warmth of tissue around a superficial vein.
- Tenderness or pain along a superficial vein (worse when pressure is applied).
- Pain in limb.
- Hardening of a superficial vein where the vein feels cord-like.

Diagnosis:

- Doppler ultrasound.
- Duplex ultrasound.
- Venography.

If infection is suspected, cultures of the skin or blood cultures may be performed.

Treatment is to reduce pain and inflammation plus reduce complications

- Remove cannula and re-site in an alternative place if needed.
- Analgesics for pain.
- Non steroidal anti-inflammatory drugs (NSAIDs) to reduce inflammation.
- Intravenous anticoagulants followed by oral anticoagulants to reduce the likelihood of clotting.
- Consider elevation of limb but do not immobilise, encourage movement.
- Antibiotics are prescribed if infection is present.
- Surgical removal (phlebectomy), stripping, or sclerotherapy of the affected vein are occasionally needed.

Prognosis:

Superficial thrombophlebitis is usually a benign and short-term condition. Symptoms generally subside in 1 to 2 weeks, but hardness of the vein may remain for much longer.

Correct method for flushing peripheral cannula

Flushing peripheral cannulae is an essential part of the care and maintenance of a cannula for the following reasons:

1. Checking the cannula is correctly positioned in the vein following insertion.
2. Checking the cannula is patent and in the vein prior to adminstration of intravenous fluids, medication or blood and blood products.
3. Prevent the mixing of incompatable solutions leading to potential interactions.
4. Ensuring entire volume of the drug has entered the vein.
5. Prevent cannula occlusion.

There have been many studies examining the use of saline flushes versus heparin. Saline 0.9% has been found to be as effective as heparin in adults. The use of saline 0.9% avoids the risk of side effects of heparin such as thrombocytopenia and allergic reactions (Randolph et al 1998) or incompatibility with other medications.

NB: the following procedure and guidelines are for adults. Although the procedure may be similar for paediatrics the volumes and equipment may vary.

- Flush cannula in accordance with local policy to check for patency and correct placement.
- A **10 ml syringe** must be used to prevent causing too much pressure and subsequent trauma to both vein and cannula.
- Prescribed 2-5mls of normal saline using positive pressure is commonly used. Positive pressure is accomplished by maintaining continual pressure on the syringe plunger while withdrawing the needle or needle free adapter, preventing backflow of blood into the cannula. Alternatively a positive pressure valve can be used.
- Ensuring aseptic non-touch technique throughout the flush procedure prevents the potential risk of contamination. Using pre-filled flush syringes may also help reduce this risk.
- Using a push / pause, pulsated method to create turbulence.

- The amount of Sodium Chloride 0.9%, syringe size, frequency and flushing technique must be clear and local policies adhered to. A general guide would be as follows:
  a) 5ml syringes of Sodium Chloride 0.9% is sufficient - 2ml before and 3 ml after administration of medication (Dougherty and Lamb 1999).
  b) Flushing every eight to twelve hours for patency. Before and after any transfusion or administration of medication.
  c) A positive pressure technique is recommended to prevent backflow of blood into the cannula, which may clot and form a blockage.

Positive pressure can be achieved in two ways:

a) Maintaining pressure on the syringe plunger, while withdrawing the syringe.
b) Using a closed system with a positive pressure valve.

Pre-filled syringes may be beneficial for flushing. Reducing the risk factors associated with microbial contamination of manually filled syringes (Worthington et al 2001).

Monitoring, Measuring and Recording Complications

- To ensure best practice for care and maintenance of peripheral cannula, it is essential to keep accurate data of complications. For example the rate of phlebitis in local area compared with national rates. This allows issues to be addressed and a continual learning curve to be made. They can also support good practice.

- Local standards policies and procedures must be in place to support the practitioner and ensure the individuals well being. These must include training and assessment with support from experienced practitioners.

- It is essential the care, maintenance and monitoring of the cannula are documented regularly in the individual records in accordance with local policy. Documentation is the record showing care has taken place.

European Union Directive

Saving Lives Directive 2(b) Peripheral Cannulas

A new directive has been published by the EU, specifically designed to help prevent injuries and infections to healthcare workers from sharp objects such as needles and intravenous catheters.

The EU has estimated that there are 'more than one million injuries each year'. The prevention of needle stick injury has become an issue that all healthcare organisations across Europe have to address. The new directive, which **must be transposed into national law in each member state by**

May 2013. This directive states that compliance is mandatory and that all members must convert to medical devices incorporating safety-engineered protection mechanisms.

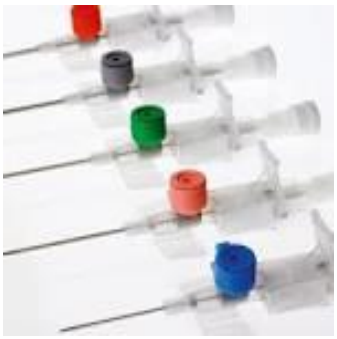
Cannula Selection

Knowledge of the cannula available and understanding their features ensure selecting a cannula meets the needs of an individual.
BD Venflon Pro Safety
BD Nexiva Closed IV Catheter System

Nexiva

Pro-safety

Pro-safety



Types of cannula

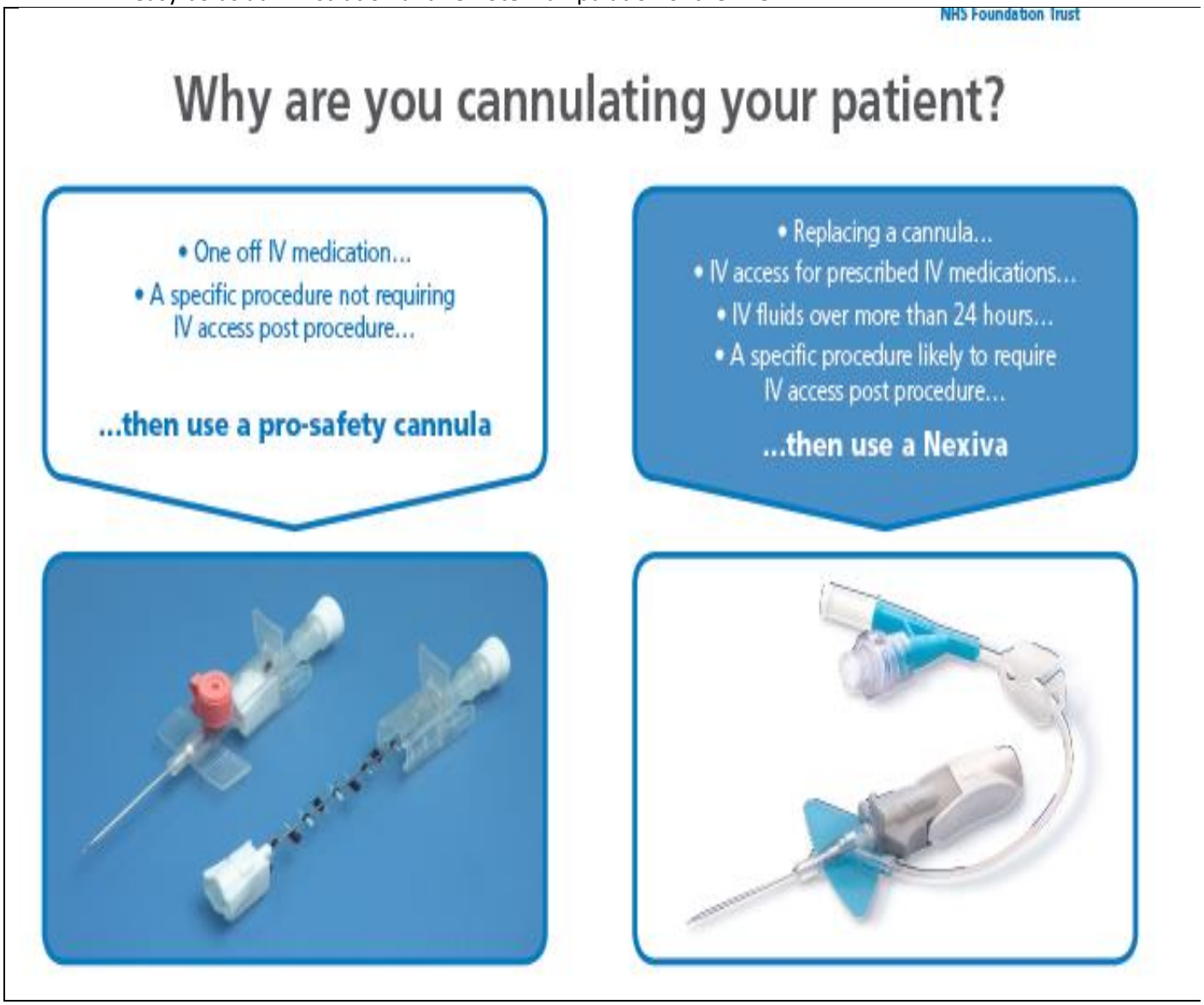
- Cannulae are made of a flexible material and contain a sharp needle called a stylet, enabling insertion through skin into the vein. The stylet is removed and a hollow cannula remains in the vein, allowing infusate to enter.
- Different cannula designs may be found within these three groups
- Short peripheral cannulae are divided into three main groups.

1. Integrated ported
2. Non ported
3. Integrated extension line.

Which cannula would you choose?

- Cannulae with integrated ports are common and allow easy bolus administration. They have large wings for gripping and securing firmly to the individual's skin. The pack contains a luer lock cap.
- Non-ported cannulae come with wings and lie flush with the individual's skin. The package does not contain a luer lock cap.

- Cannulae with an integrated extension line will help reduce blood spillage during insertion and allow for easy bolus administration and remote manipulation of the line.



Gauge Size and Colour Coding

- Gauge is the external diameter of the intravascular part of a cannula. It is an international standard. (ISO 10555-5)
- Gauge size is denoted by number. The smaller the number, the larger the cannula. For example an 18 gauge cannula is larger than a 22 gauge (ISO 10555-5).
- Gauge is identified by a standard colour (ISO 10555-5). This is an international standard so the cannula sizes are globally recognised.

A Guide to Choosing the Correct Cannula for your Patient

Gauge		Approximate Flow Rates (l/hr)			
Colour	**Common Applications**	**Size Gauge**	**Crystalloid**	**Plasma**	**Blood**
Orange	**Used in theatres or emergency for rapid transfusion of blood or viscous fluids**	**14G**	**16.2**	**14.2**	**12.9**
Grey	**Used in theatres or emergency for rapid transfusion of blood or viscous fluids**	**16G**	**14.1**	**10.9**	**10.0**
Green	**Blood transfusions, parenteral nutrition, stem cell harvesting and cell separation, large volume of fluids**	**18G**	**6.1**	**5.2**	**3.8**
Pink	**Blood transfusions, large volumes of fluids**	**20G**	**4.0**	**2.7**	**2.5**
Blue	**Blood transfusions, most medications and fluids**	**22G**	**2.5**	**1.6**	**1.4**
Yellow	**Medications, short term infusions, fragile veins, children**	**24G**	**0.8**	**0.7**	**0.5**

The Golden Rule: Always use the smallest possible cannula in the largest possible vein to ensure optimal blood flow, improved haemodilotion, and reduced irritation on the vein intima

Flow rates

Q. What is a flow rate?

A. Flow rate is the amount of Crystalloid fluid (litres/hour) that can be achieved, in ideal conditions, through the cannula.

- The flow rate is stated on the back of the cannula packaging in mls/min.
- Understanding the flow rate of a cannula ensures the correct cannula for the treatment is used.

Q. Which cannula should you use for blood administration?

A. If speed is not required there is no minimum or maximum size of cannula, it should depend on the size of vein.

Information stated on packaging

- The expiry date is five years after sterilisation. Each cannula must be checked and be within the expiry date to be sterile before insertion.
- Flow rate and gauge sizes are stated on the back of the cannula packaging (ISO 10555-5).
- The length of the cannula is also noted on the packaging. This varies from 19mm up to 45mm depending on the gauge size of the cannula
- Lot numbers on each cannula packet and box of cannulae ensuring every cannula can be individually tracked.
-  on the back of the cannula packaging indicate it is for single use only.
- Packaging must be checked and intact before use to ensure that the cannula is sterile. Do not store in direct sunlight as this may cause the plastic to degrade.

The components of a cannula

The needle / stylet (including bevel)

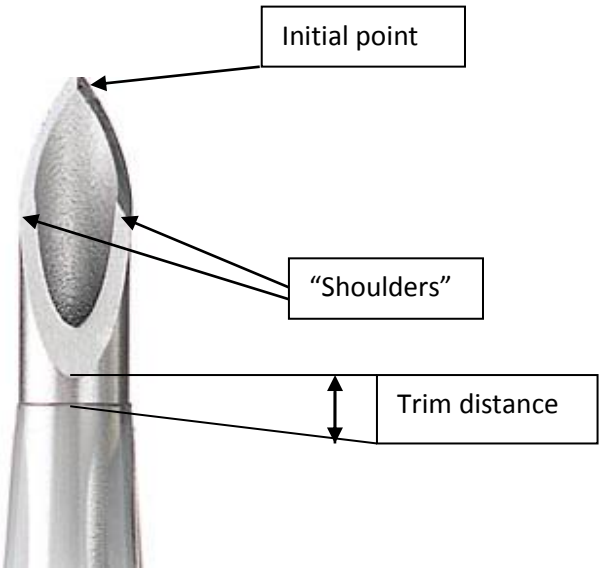
The stylet is bevelled allowing easy access and reduced trauma to the vein. The needle is cut and highly polished to ensure minimum trauma.

It has a central point which is designed to make the initial insertion through the skin

It then moves out to 2 “shoulders” which are designed to broaden the insertion space to allow for the cannula to move through the tissue easily.

The edges between the initial point and the shoulders are polished into two very sharp blades – CAUTION!

The bevel must always be facing upwards during insertion. (TIP - the eye of the needle always looks at you!)



Trim distance
Trim distance represents the measurement between the cannula tip and the needle bevel.

This is used as a measuring device to ensure that, having noted the size of this (usually between 2 and 3mm), that is how much further you need to move your cannula into the vein

To allow for trim distance during cannulation lower and advance the cannula 2mm, following confirmation of flashback of blood. This ensures both needle bevel and cannula tip are within the lumen of the vein.

Site Selection

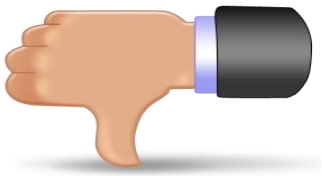
Individual Factors

- Each person must be treated as an individual to ensure success, reduce stress and gain their confidence.
- Aberrant arteries in the ***antecubital fossa*** have been found to exist in one person out of ten. (Weinstein 2001)
- Asking about known allergies must include, skin preparation solutions, dressings and cannula materials. Allergic reactions may be mild or severe.
- An individual's clinical condition may affect accessibility of veins and ease when inserting a cannula. Obesity causes difficulties in selecting a vein. Malnourishment and dehydration result in fragile veins with poor capillary refill.

Veins to cannulate safely

- Distal veins are the first choice, if suitable for the treatment and above any previous sites.
- Palpation of veins indicates the condition of the veins and assists in avoiding arteries.
- Using veins in the non-dominant side helps with an individual's compliance and activities, reduces the chances of accidental removal.
- Veins on opposite side to surgical procedure avoids any circulation impairment and interference with any area that may be painful or at risk of becoming infected by the cannula.

- The largest vein possible minimises potential complications, reduces trauma to the vein, ensures good blood flow and is easier to site.



Veins not to cannulate

- Veins in the lower extremities should be avoided because reduced circulation increases the potential for complications. These are stagnant blood in varicosities, pooling of medication and the danger of pulmonary embolism caused by thrombus extending into deep veins.
- Points of flexion reduce an individual's mobility and independence and increase chances of accidental removal.
- To increase success, avoid veins close to arteries, deep lying vessels, very small superficial veins, irritated, fragile or sclerosed veins.
- Cannulating in an infected area or an area with broken skin increases potential for contamination and spread of infection, which may result in bacteraemia or septicaemia.
- The antecubital veins are excellent for withdrawing blood because they may be used numerous times without damage however , they should be avoided if possible when cannulating.
- Non emergency cannulation should take place in the distal veins allowing for repeated cannulation above previous sites.
- Limbs affected by clinical condition e.g. cerebral vascular accident, arteriovenous shunts or fistulas, should be avoided to minimise potential complications.

How to look and feel for a vein

- Encouraging venous filling must be performed in accordance with local policy.
- Opening and closing the fist encourages blood flow into the veins distending them
- Lowering the limb below heart level increases blood supply to the veins.
- Applying a warm compress or immersing the limb into a bowl of warm water for 5 – 10 minutes causing dilation of the veins.
- Applying a soft quick release tourniquet impedes venous but not arterial flow. If a pulse cannot be felt or the limb is cool and dark in colour the tourniquet is too tight and must be removed immediately.
- Light tapping must only be used with caution so as not to cause pain or distress. The above methods are the first choices to be used to encourage venous filling.

Site Preparation

Skin preparation

- Disinfect the skin for at least 30 seconds with a Sanicloth™ (70% alcohol and 2% Chlorhexidine).
- New research states that using a cross hatch technique is more effective at disinfection
- Allow to air dry
- Do not re-palpate the vein or touch the insertion site

Hair removal

- Hair removal around the insertion site should be accomplished using scissors or clippers
- Shaving with a razor should not be performed because of the potential for causing micro-abrasions, which increase the risk of infection
- Electric clippers should have disposable heads for single-patient use
- Depilatory (hair removal cream) is not recommended due to risk of irritation and allergy. Also is expensive and can be time -consuming

Local Anaesthetic

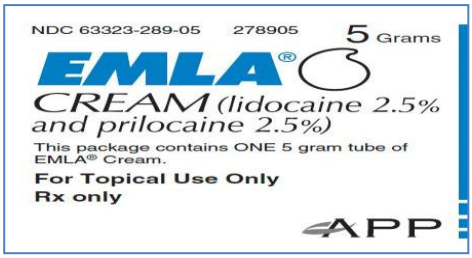
- An injectable or topical anaesthetic drug should be used only upon the written order of a doctor or under a patient group direction
- Protocol for the use of local anaesthesia should be established in organisational policies and procedures.

- The practitioner administering the local anaesthesia should have demonstrated competency and knowledge of the drug and method of administration

- Use of injectable anaesthetic should be monitored because of the potential for allergic reaction, tissue damage and inadvertent injection of the drug into the vascular system

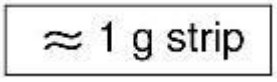
- Topical anaesthetic should be used according to manufacturer's instructions and the patient monitored for side effects.

EMLA CREAM



Instructions for application:

To measure 1 gram of EMLA, the Cream should be gently squeezed out of the tube as a narrow strip that is 1.5 inches (3.8 cm) long and 0.2 inches (5 mm) wide. The strip of EMLA cream should be contained within the lines of the diagram shown below.



1.5 x 0.2 inches

Use the number of strips that equals your dose, like the examples in the table below.

Dosing Information

1 gram = 1 strip

2 grams = 2 strips

2.5 grams = 2.5 strips

For adult and pediatric patients, apply ONLY as prescribed by your physician.

If your child is below the age of 3 months or small for their age, please inform your doctor before applying EMLA Cream, which can be harmful, if applied over too much skin at one time in young children.

When applying EMLA to the intact skin of young children, it is important that they be carefully observed by an adult in order to prevent the accidental ingestion of or eye contact with EMLA Cream.

EMLA Cream must be applied to intact skin at least **1 hour** before the start of a routine procedure and for 2 hours before the start of a painful procedure. A protective covering of the cream is not necessary for absorption but may be helpful to keep the cream in place. (Tegaderm or similar is ideal)

If using a protective covering, your doctor will remove it, wipe off the EMLA Cream, and clean the entire area with an antiseptic solution before the procedure. The duration of effective skin anaesthesia will be at least 1 hour after removal of the protective covering.

Precautions

1. Do not apply near eyes or open wounds.

2. Keep out of the reach of children.

3. If your child becomes very dizzy, excessively sleepy, or develops duskiness of the face or lips after applying EMLA Cream, remove the cream and contact the child's physician at once.

HOW SUPPLIED

EMLA Cream is available as the following:

Product No.	NDC No.	Strength	Size
278905	63323-289-05	5 gram/tube	packaged individually.
278955	63323-289-55	5 gram/tube	packaged in 5.
279030	63323-290-30	30 gram/tube	packaged individually, in a child-resistant tube.

NOT FOR OPHTHALMIC USE. Topical use only.

KEEP CONTAINER TIGHTLY CLOSED AT ALL TIMES WHEN NOT IN USE.

Store at 20° to 25°C (68° to 77°F).

AMETOP

Ametop gel 4%w/w

Tetracaine base 4.0% w/w. Tetracaine is a local anaesthetic and is believed to act by blocking nerve conduction mainly by inhibiting sodium ion flux across the axon membrane.

Tetracaine achieves this by acting upon specific receptors that control gating mechanisms responsible for conductance changes in specialised proteinaceous sodium channels. Blocking sodium ion flux prevents the setting up of an action potential in the nerve axon, thus preventing pain receptors signalling to the central nervous system.

Topical, white opalescent gel. Each gram containing 40mg of Tetracaine base.

Percutaneous local anaesthetic used to produce anaesthesia of the skin prior to cannulation or venous cannulation.

Method of administration

- Apply the contents of the tube to the centre of the area to be anaesthetised and cover with an occlusive dressing.
- The contents expellable from 1 tube (approximately 1 gram) are sufficient to cover and anaesthetise an area of up to 30 sq.cm.(6x5cm). Smaller areas of anaesthetised skin may be adequate in infants and small children.
- Each tube is intended for use on a single occasion only.
- Adequate anaesthesia can usually be achieved following a **thirty minute application time for venepuncture**, and a **forty-five minute application time for venous cannulation**, after which the gel should be removed with a gauze swab and the site prepared with an antiseptic wipe in the normal manner.
- It is not necessary to apply Ametop gel for longer than 30-45 minutes and anaesthesia remains for 4-6 hours in most patients after a single application.
- Application of Ametop gel can be repeated after a minimum of 5 hours if necessary. The maximum cumulative dose in a 24 hour period should not exceed 7 tubes for adults and 2 tubes for children.

Caution

- Not recommended for infants under 1 month of age.
- Use in premature babies or in full term infants less than 1 month of age, where the metabolic pathway for Tetracaine may not be fully developed.
- *For premature babies use of Ametop gel is not recommended before* 1 *month after the expected delivery date* (44 *weeks gestation).*
- Known hypersensitivity *to any of the ingredients or* to local anaesthetics of the ester type.
- Do not apply Ametop gel to broken skin, mucous membranes or to the eyes or ears.
- Only apply to intact, normal skin.
- Not to be taken internally.
- Ametop gel, like other local anaesthetics may be ototoxic and should not be instilled into the middle ear or used for procedures which might involve penetration into the middle ear.
- Repeated exposure to Ametop gel may increase the risk of sensitisation reactions to Tetracaine.
- *Caution should be exercised in patients with epilepsy.*

Undesirable effects

Slight erythema is frequently seen at the site of application and is due to the pharmacological action of Tetracaine in dilating capillary vessels. This may help delineating the anaesthetised area.
Slight oedema or itching are less frequently seen at the site of application. This may be due to the local release of histamine and 5-HT.

More severe erythema, oedema and/or itching confined to the site of application have rarely been reported.

In very rare instances, blistering of the skin at the site of application may be apparent - in these cases, remove the gel immediately and treat the affected area symptomatically.

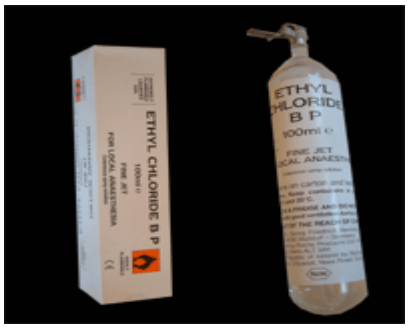
Shelf life

The shelf-life shall not exceed 24 months from date of manufacture. Within the recommended shelf life of 2 years at 2-8°C, the product, following dispensing, may be stored for up to 1 month at 25°C at point of use.

Storage

Store at 2-8°C.
Do not freeze.
Protect from heat.

ETHYL CHLORIDE



Ethyl chloride is supplied as a liquid in a spray bottle propelled by its own vapour pressure. It acts as a mild topical anaesthetic by its chilling effect when sprayed on skin, such as when removing splinters in a clinical setting.

The heat absorbed by the boiling liquid on tissues produces a deep and rapid chill, but since the boiling point is well above the freezing point of water, it presents no danger of frostbite.

The vapour is flammable and narcotic, which requires care.

Directions for Use:

- Briefly spray the area requiring analgesia until a thin snow film forms (short bursts of spray rather than a continuous flow is usually better).
- Do not overcool the skin by prolonged spraying as this may cause frostbite.
- Repeated exposure may cause skin dryness or cracking.
- Ethyl Chloride should not be sprayed near the face or eyes, nor used on wounds, broken skin, mucous membranes, eczema or other skin conditions.

Dressings

Dressings have three main requirements.

- They must protect the puncture site.
- hold the cannula in place.
- keep the site clean.
- provide a comfortable cannula site for the individual.

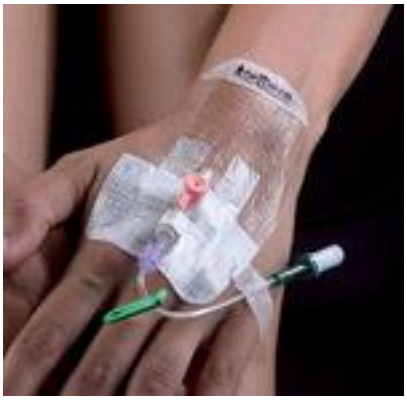
These features will reduce the potential risk of phlebitis, infection and accidental removal

- The clinician must be confident in applying a cannula dressing without touch contamination or accidental removal of the cannula. There should be no need to change the dressing until the cannula is removed as long as it is not soiled and the cannula can be visualised.

- Cannula dressing should be sterile, semi-permeable, allow for vision of the insertion site, and have capability for the dressing to be endorsed re: insertion date etc.

The two dressings below are recommended for use in this Trust. IV3000 is very broadly used and Tegaderm IV is used in specialist areas such as ICU, SCBU and Children's' Ward.

IV3000™ dressing



smith&nephew

Tegaderm IV dressings™

3M

Agents used for hand disinfection

- **Alcohol based products**.

  • Most efficient agents for reducing the number of bacteria on the hands of personnel.
  • Recommended for routine decontamination of hands in all clinical indications - except when visibly soiled.
  • Not effective against spores so should not be used for patients with Clostridium difficile

Anti-viral hand gel effective against Norovirus

- **Antiseptic soaps and detergents are the next most effective method.**
- **Soap and water.**

  • Recommended for visibly soiled hands
  • Before donning and after removal of gloves.
  • Hands **must be washed in soap and water** when caring for a patient with Clostridium difficile as this will remove spores.

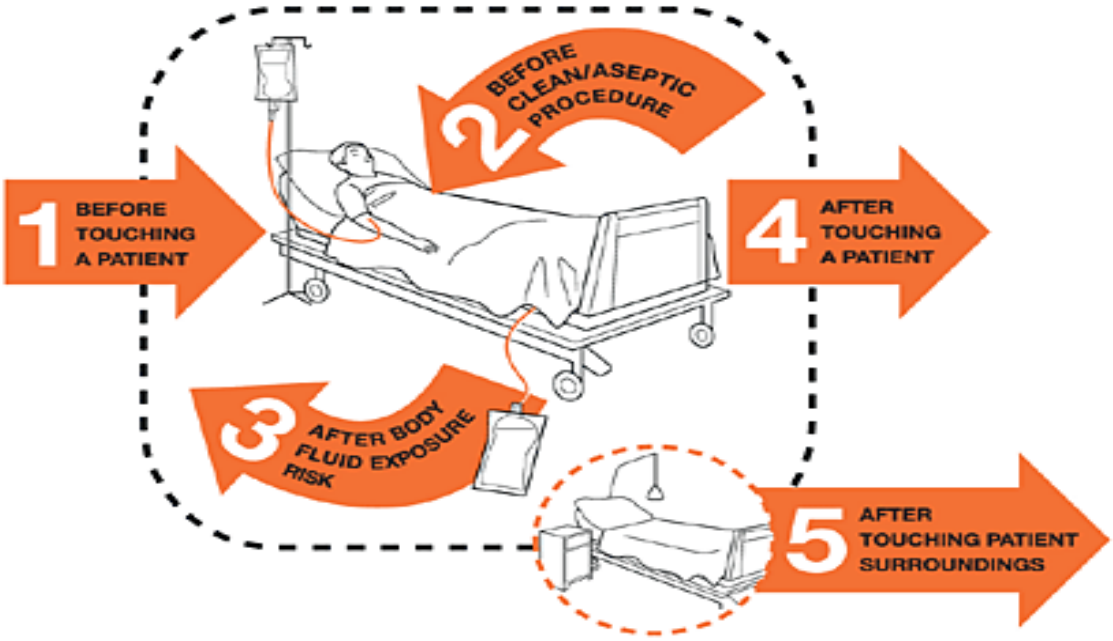
My 5 Moments for Hand Hygiene

The My 5 Moments for Hand Hygiene approach defines the key moments when health-care workers should perform hand hygiene.

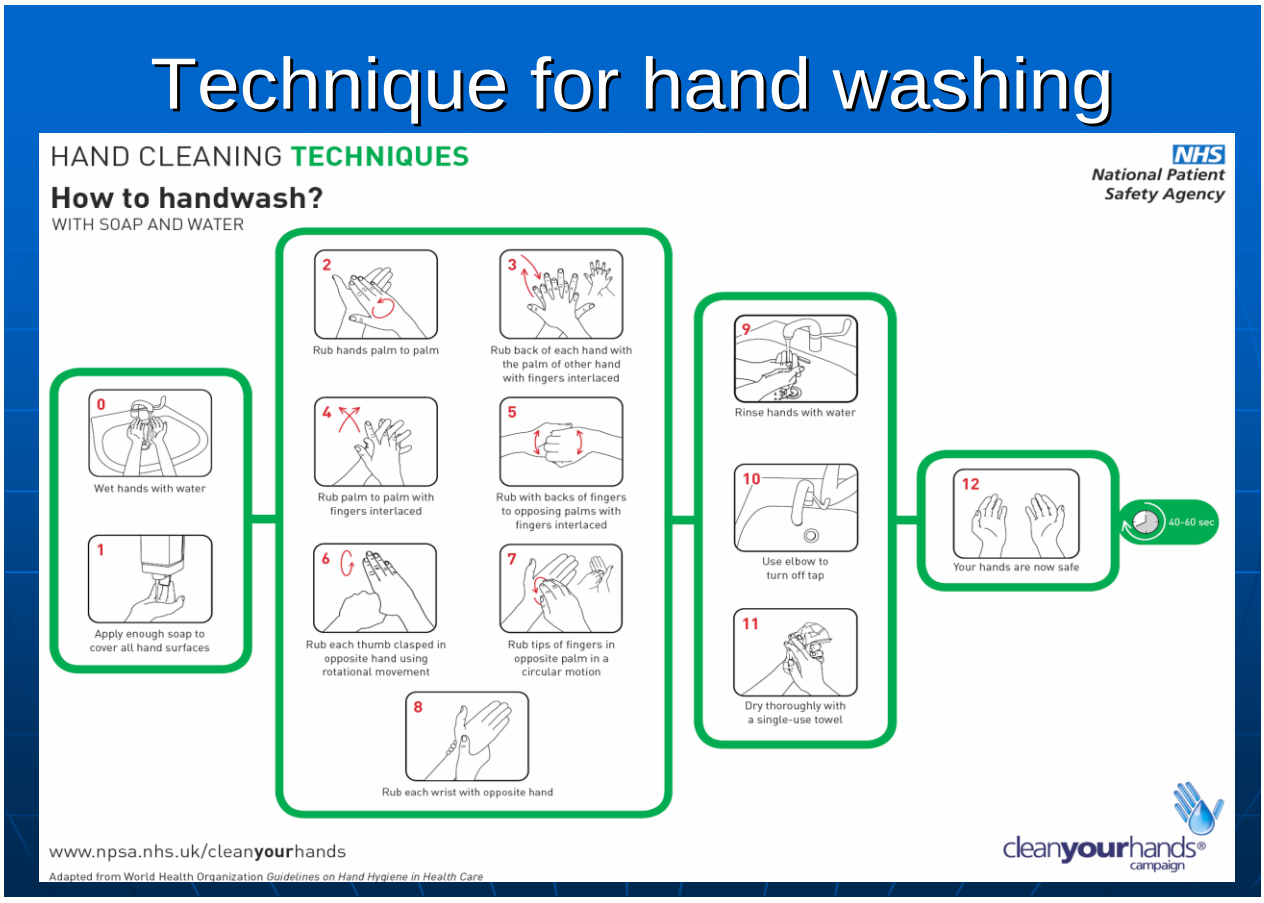
This evidence-based, field-tested, user-centred approach is designed to be easy to learn, logical and applicable in a wide range of settings.

This approach recommends health-care workers to clean their hands

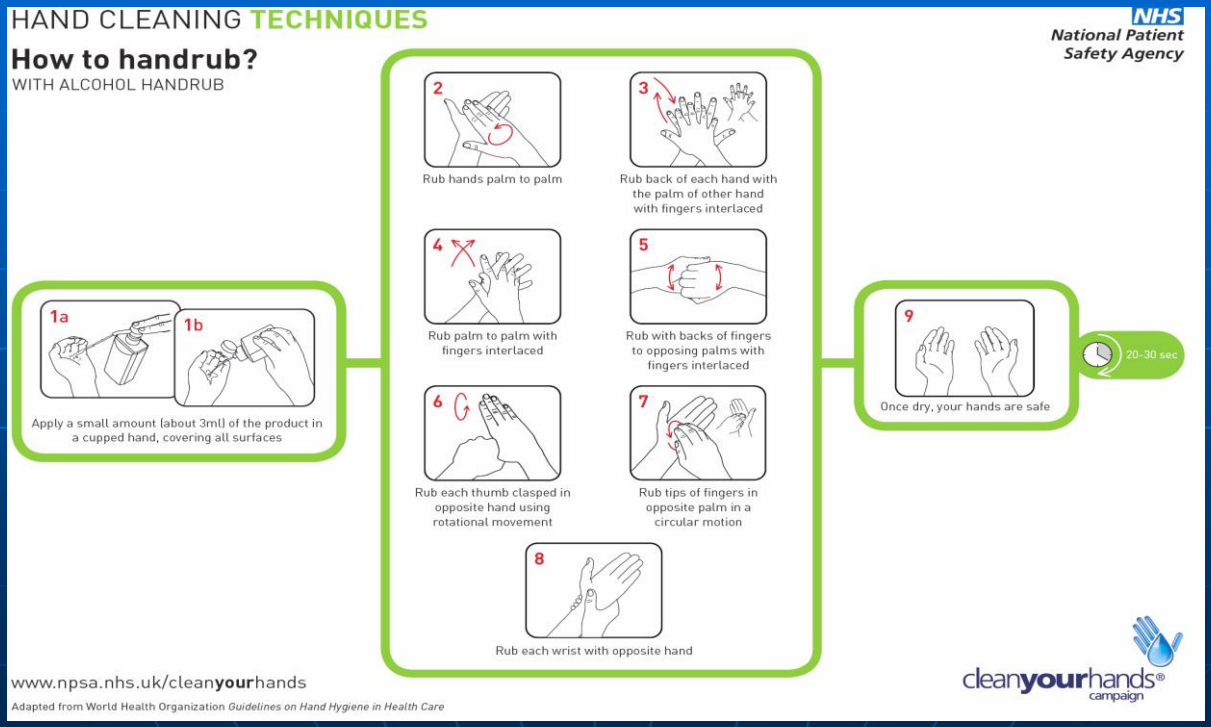
1. **Before touching a patient**
2. **Before clean/aseptic procedures**
3. **After body fluid exposure/risk**
4. **After touching a patient**
5. **After touching patient surroundings**



From the World Health Organisation (WHO)'s "guidelines on hand hygiene"



Technique for applying gel



Gloves and Hand Hygiene

When to Wear Gloves!

- If you are likely to come across any blood or body fluid you should wear gloves.
- You should put gloves onto decontaminated hands immediately before the procedure requiring their use and you should remove them immediately after the procedure.
- You must then decontaminate your hands before touching anything else.

Why Wash Your Hands?

It's important to wash your hands after glove removal because:

- You can contaminate your hands while removing the gloves
- Some gloves leak and hands can become contaminated as a result
- The substances that cause latex allergy will be removed.

Aprons

- Correct use of plastic aprons is also important in protecting yourself and preventing cross infection.
- Aprons are single use and must be changed between patients.
- You must use an apron to protect your uniform and clothing from body fluids and micro organisms.
- You can easily change an apron but you are unlikely to have a change of uniform or clothes available.
- Your apron will also protect patients from any micro organisms you may have picked up on your uniform.
- Use an apron when:
    - there is a risk that your uniform or clothes may be contaminated with blood or body fluids
    - your uniform is in close contact with patients or patient care equipment

Types of Face and Eye Protection

If you are dealing with a high risk patient, it is important that you also protect your face and eyes from blood splash or splatter.

Face mask

To protect against any airborne transmission of micro-organisms.

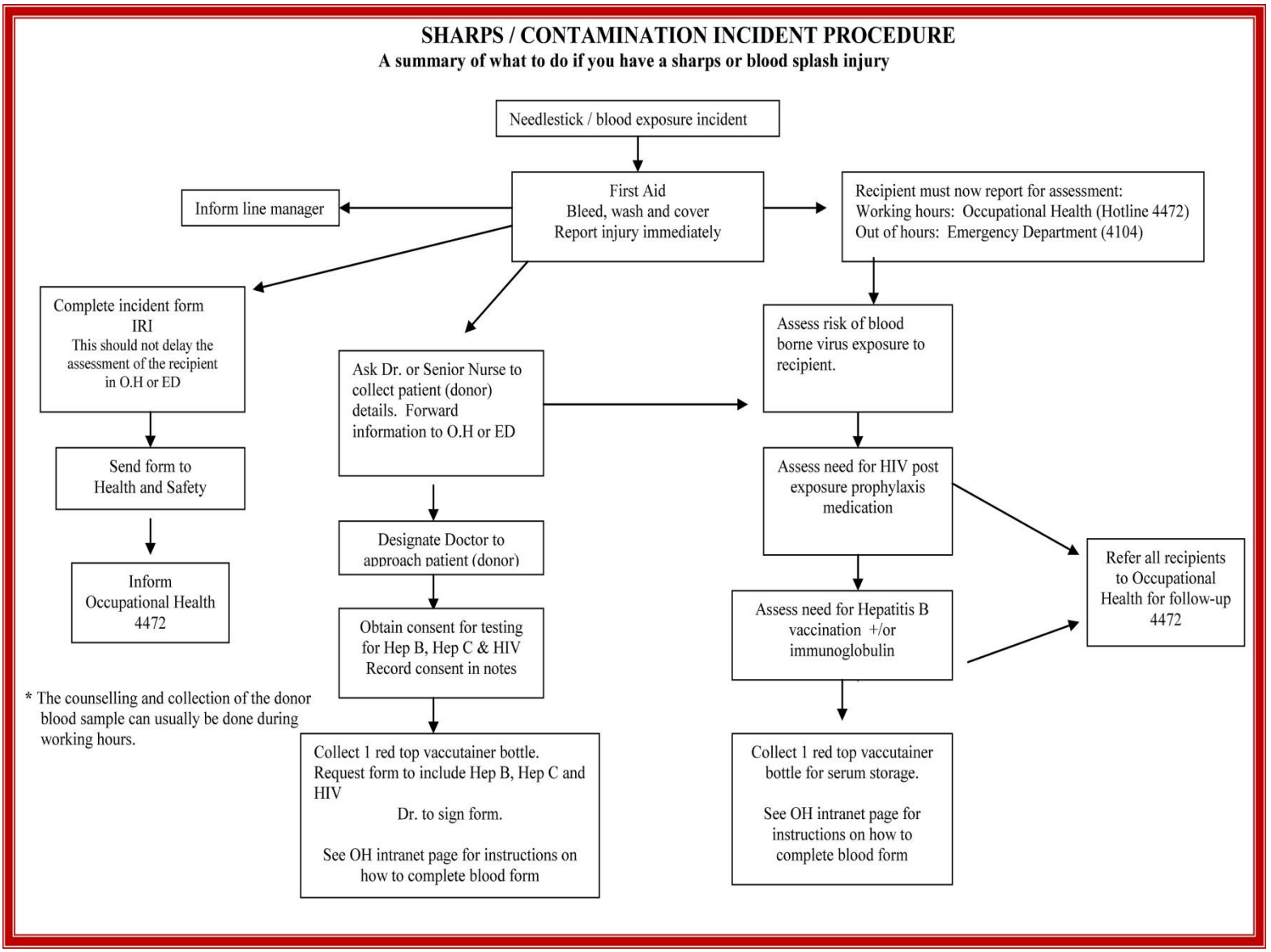
Goggles and mask

If there is a risk of blood or bodily fluids being splashed into the eyes and mouth.

Full face visor

If there is a high risk of blood, bodily fluid or tissue being splashed into the eyes, nose or mouth.

Needle stick and sharp object injury management



- A sharps injury (including needle stick) is anything that causes a break in the skin.
- Take <u>immediate</u> action – encourage bleeding, wash the area thoroughly with warm running water and cover with a waterproof dressing
- Note the patient's name involved in the incident to assess risk (if applicable)
- Report immediately to Manager or Nurse in Charge
- Complete an IR1 form

- Report for assistance as quickly as possible – do not wait until the end of your shift or fail to report it at all.
- If you have been exposed to blood borne viruses, you will require to have a blood tested immediately (within 1 hour)
- Other sharps injuries need to be reported too, including glass, bone, teeth (if bitten), scalpels etc.
- Clean sharps injuries should also be reported as this may help to identify devices which are difficult to use and, therefore, could be a risk.

Seeking assistance in the event of sustaining a needle stick injury:

Report all injuries via the Contamination Hotline (Occupational Health and Wellbeing)**: 01793 60 4472**

Out of hours Emergency Department : 01793 60 4104

Sharps Containers

Within the GWH NHS Foundation Trust Hospitals an assortment of Sharps containers are in use, however community staff will only use a purple lidded sharps container.

To adhere to Trust Policy: *Safe Handling and Disposal of Sharps Policy and Guidelines 2012*

- That the temporary closure is used in transportation and between use.
- Ensure that the sharps bin is closed and sealed when it is **¾ full**.
- The endorsement is completed accurately and is legible.
- Ensure Sharps containers are used for the sole purpose of safe sharps disposal

Positive Patient Identification

Between February 2006 and January 2007 the National Patient Safety Agency (NPSA) received nearly 25,000 reports of patients being mismatched to their care. Ensuring that patients receive the right care is essential if their treatment successful and timely, it also reduces the risk that a patient will be harmed as a result of receiving the wrong treatment.

To positively identify a patient, staff should check the patient for 4 identifiers:

- First name;
- Surname
- Date of birth;
- Hospital number

For staff working in the community the address would need to be checked and for residential homes it would be important to check the patient's identity verbally and with the residential home staff.

Insertion Procedure

Pre-insertion assessment

- Talking to the patient before beginning the insertion procedure is essential. Giving a realistic explanation of the procedure and rationale for it reduces stress and gains compliance. Stress causes constriction of peripheral veins making cannulation difficult.
- Valid consent must be obtained.
- Reviewing the treatment plan enables correct cannula and site selection for safe insertion.
- Inspecting a patient's veins and encouraging venous filling confirms suitable veins are present and may be used.

Insertion Guidelines

- Practitioners must give careful consideration to the method they use to grip a cannula. It must be safe and not contaminate the intravascular part of the cannula by not touching the key components. A straight grip maybe beneficial when using non-ported cannulae. Check the stylet is correctly placed within cannula once the chosen grip is adopted by ensuring the bevel of the stylet is upward, beyond the cannula tip.
- Gathering together all the equipment before starting the insertion procedure facilitates a professional, safe and aseptic insertion of a cannula.
- Well fitting non sterile single use gloves are suitable for use during cannula insertion.
- A well lit, safe and comfortable environment reduces stress for both parties.

- Clean hands with soap and water and use hand gel. Prepare equipment on alarge plastic tray and clean with Clinell Universal wipes and dry with a paper towel, which prevents the potential risk of contamination. It presents an opportunity to check expiry dates and ensure all equipment is present.

- Use methods to encourage venous filling. Always follow the Trust policy guidelines.

- Open cannula packaging without touching the key parts.

- Prepare site for insertion by cleansing skin with Sanicloth™ or Clinell wipe (2% Chlorhexidine + 70% alcohol) using a cross hatch technique. An area of 4-5 cm in diameter, the average size of a cannula dressing, is recommended.

- **Do not re-palpate area after cleansing.**

- Decontaminate hands and apply appropriate gloves

- Re-apply a tourniquet, and adopt favoured grip to hold the cannula.

- Ensure the bevel of the cannula is in the upward position (the eye of the needle always looks at you). The bevel up position facilitates cannulation and reduces trauma to the skin and vein on puncture.

- Apply skin traction using a thumb and hold the hand or arm to be cannulated. Skin traction keeps the skin taut aiding visibility and prevents the vein rolling away at the moment of entry with the cannula (Weinstein 2001).

Never re-insert the stylet into the cannula. This may potentially cause part of the cannula to break off and enter the circulatory system.

Points to practise

BD Nexiva™ Closed IV Catheter System

Adopt your preferred grip.

Insert needle into vein at an angle of 30 degrees. The deeper the vein the greater the angle required

Look for initial flashback along the cannula.

Lower the device and advance the entire system slightly (approx 2 mm) to ensure cannula tip is inside the vein.

Note continued flashback along the extension tube confirming vein entry.

Advance the cannula into the vein using your preferred technique.

Release the tourniquet

Hold the wings; place both fingers on the grips and pull back in one smooth, straight movement until the needle separates from the cannula hub. Don not hold push tab on removing needle. Dispose of needle into a nearby sharps container.

Apply the dressings, ensuring the rear septum is covered.

Engage pinch clamp.

Remove vent plug.

Attach BD Q-Syte™

Attach flushing syringe and disengage pinch clamp. Then flush using pulsating technique. (to avoid catheter reflux, maintain pressure when flushing complete and at the same time re-engage pinch clamp prior to disconnecting).

Important To avoid catheter reflux, maintain syringe pressure when flushing complete and at the same time.

BD Venflon Pro™ Safety

Adopt your preferred grip and remove needle cover.

Insert the cannula at a low angle of about 30 degrees. The deeper the vein the greater the angle required

Upon flashback lower the angle almost parallel to the skin.

Advance the cannula slightly, two to three millimetres, to ensure the cannula tip is in the vein.

Stabilise the cannula.

Ease the needle back two to three millimetres.

Secondary flashback between the needle and cannula will confirm correct placement in the vein.

Advance the cannula completely into the vein.

Remove the tourniquet.

Stabilise the cannula

Occlude the vein just above cannula tip and withdraw the needle holding the needle grip or grip plate.

Do not hold onto the needle protection shield.

Close the IV access with the end cap, other add-on devices or add administration set.

Apply sterile dressing.

Flush the cannula to verify correct placement in the vein.

Dispose of needle in a nearby sharps container

- Documenting the cannulation procedure in the patient's records is an essential part of the insertion procedure. The record must show who inserted the cannula, who dressed and flushed the cannula, the date and time the cannula was inserted, the type of cannula gauge used, the insertion site chosen and the reason for the cannulation.

Q. **How many attempts should a practitioner have before abandoning the procedure?**

A. **Cannulation must only be attempted twice. If both attempts fail the procedure must be abandoned and the practitioner must refer to a more experienced colleague**

Relevant policies

- Royal Marsden Manual of clinical nursing procedures (8th edition)(2010)
- Framework for Enhancing the Scope of Professional Practice
- Infection control policies
- Record keeping guidelines
- Mental Capacity Act (2005 & 2010)
- Epic3 guidelines (2014)
- Safe Handling and Disposal of Sharps Policy and Guidelines 23.7.2012

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Worthington T. et al (2001) Are contaminated flush solutions an overlooked source for catheter-related sepsis? **Journal of Hospital Infection** 2001 (49) issue 1, pages81-83.**Cannula selection**