

Venepuncture No: 008D

1. Introduction

Blood sampling is a necessary requirement to assess the biochemical and haematological profile of subjects who enter clinical research studies. Risks to the subject from the procedure may include discomfort, bruising and infection. It is therefore vital that the technique be carried out efficiently by competent physicians or trained research nurses.

2. Responsibilities

Physicians and research nurses who have attended and successfully completed the appropriate training session are responsible for blood sampling of subjects.

3. Equipment

- Tourniquet
- 21G butterfly needle (preferably) or 18G green needle
- Alcohol impregnated skin wipe (mediswab)
- Vacutainer / syringes
- Becton-Dickinson vacutainer blood tubes/bottles
- Micropore
- Materials tray (disposable or autoclavable)
- Sharps bin
- Disposable gloves (recommended - but optional)
- Cotton wool balls or gauze squares
- Plasters
- Chair or couch

4. Method

All specimens of blood should be taken using a good aseptic technique. The following information should provide some guidance to those individuals who are less familiar with the standard procedure and revision for those already competent. All blood (like bodily fluids) should be considered potentially infectious and handled accordingly.

4.1 Preparation of materials

- A designated area will have been assigned for all blood specimens to be taken. All blood should then be taken in that area only.
- In accordance with local practices and local rules, adequate protective measures must always be taken when sampling. A protective coat or overall must be worn to protect personal clothing and use of disposable gloves is highly recommended.

- Wash your hands prior to commencing the procedure and apply a pair of correctly fitting disposable gloves.
- Check whether there are any special conditions required for the test, for example fasting. Ensure the subject has adhered to these requirements.
- Place in the tray the correct amount of blood tubes, vacutainer / syringes and needles for the entire procedure. Remove any outer wrappings.
- Take the tray and sharps bin to the subject.

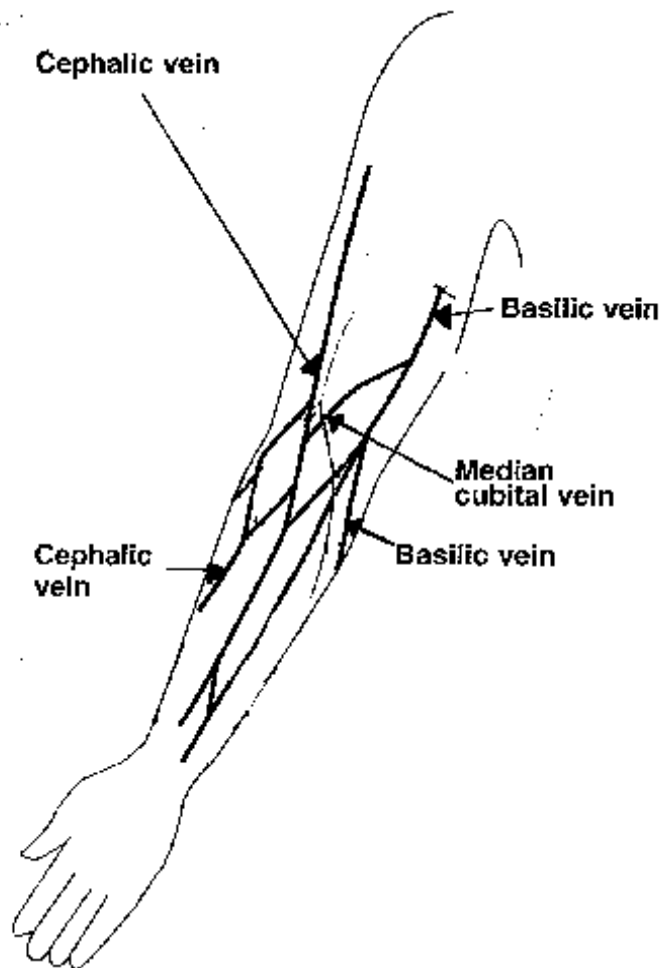
4.2 Preparation of subject

- Ensure the subject is sitting comfortably on a chair or lying back on a couch. Subjects who have previously reported fainting or are likely to do so **MUST** lie down.
- Ask the subject whether they have ever had any problems giving a blood sample before and if so, what was the difficulty. Any major problems should be discussed with the medical co-ordinator before continuing.
- Use the non-dominant arm (if possible), however, if ambulatory blood pressure recordings are being made, it is preferable to do these on the non-dominant arm. The dominant arm must then be used for the venepuncture.
- **DO NOT** use the same arm for both blood sampling and either ambulatory blood pressure or manual blood pressure measurements.
- Explain to the subject what you intend to do prior to commencing the procedure.
- Ensure their arm is firmly supported, either on the couch or arm rest.
- Ensure that there is adequate light over the arm. If necessary an artificial light may be used for illuminating the area.
- Sit on a chair or kneel parallel to the arm requiring venepuncture. Place the tray with the materials required between the arm and yourself.
- Instruct the subject to remove any clothing from the forearm and sufficient of the upper arm to allow a tourniquet to be applied.

4.3 Finding a suitable vein

- Apply the tourniquet to the upper arm. It should be moderately tight, the radial pulse should still be palpable. (If the tourniquet is applied too tightly it can affect the serum calcium and coagulation results obtained.) Look for a suitable vein in front of the elbow. The best veins for venepuncture are usually found in the antecubital fossa (inner elbow), cephalic/basilic or median basilic veins are best as there are few nerve endings there. See figure 1, for a diagram illustrating the veins.

- If a suitable vein cannot be found in that area, a vein lower down the arm may be used. However, these veins are usually smaller, more mobile and are significantly more painful to take blood from.
- If the veins are not very visible after applying the tourniquet it may be necessary to remove it and ask the subject to warm their arm. Warmth increases blood flow to the veins and may therefore make them more visible. The subject should be instructed to warm their arm by placing it under a warm running tap or by rubbing both hands together. Encourage the subject to check the water temperature prior to placing their arm under the tap.



Superficial veins are the best for venepuncture as they lie just beneath the skin. The median cephalic and basilic veins in the antecubital fossa are ideal veins. They are easy to palpate and visualise, and are well supported by muscular and connective tissue, enabling venepuncture in this location to be more successful.

A good vein for venepuncture should hold some of the following characteristics:-

Bouncy

Refills when depressed

Has a large lumen

Straight

Soft

Visible

Is well supported

Veins to avoid are those which are bruised, hard, mobile, thin or those near bony prominences.

- A blood pressure cuff applied to the arm and inflated to 60mmHg, may also aid the procedure instead of a tourniquet.
- Tapping the skin lightly over the place you expect to find a vein and instructing the subject to clench and unclench their fist in a rhythmic manner may also facilitate finding a suitable vein.

5.4 Venepuncture procedure

- Ensure both the subject and you are in a comfortable position and everything you need is within easy reach.
- Clean the skin over the vein using an alcohol impregnated wipe and allow the alcohol to air dry (residual alcohol may hurt the subject on venepuncture and may also affect the results of the blood specimen).
- Using one hand draw the skin towards the subject's hand so that the skin is tight. With your other hand hold the wings of the butterfly needle together (above the needle) using your thumb and index finger. Pinch the tubing closed between the third and fourth finger. (If using a syringe and needle, hold the needle in such a way that it is in line with and above the vein.) Insert the needle, ensuring the bevel is in the upwards position, through the skin into the vein.
- Filling of the plugged butterfly tubing or needle tip indicates that the needle has entered the vein. If using a needle and syringe hold the needle end of the syringe firmly with one hand, collect the correct amount of blood and then place it in the correct blood tubes / bottles.
- Using the butterfly needle, keeping the tubing clenched, apply a piece of micropore over the needle wings (these should be opened up and lying over the skin surface). This secures the needle in place whilst the blood is taken. Unclench the tubing and allow the blood to flow to the stop plug. Clench the tubing again, remove the plug and attach the vacutainer connection / syringe securely. Collect the required volume of blood into the designated vacutainer blood tubes. Replace each new tube as required.
- If using syringes, ensure that the syringe piston, is pulled back slowly with one hand in a steady motion. Over-vigorous pulling may cause the vein to collapse. Ensure that the subject remains relaxed and keeps the arm supported. Sudden jerks may allow the needle to dislodge from the vein and

should be avoided.

- Release the tourniquet as the blood begins to flow into the blood bottles. Most subjects will not need the tourniquet on after access to the vein has been established. If the blood does not flow keep on some pressure / tightness of the tourniquet. Each subject will be different, be confident with the tightness of the tourniquet and apply it as necessary for blood flow. Pressure of the tourniquet can be painful, ensure to keep the subject as free from pain as is possible with this procedure.
- When the correct volume of blood has been collected, remove the tourniquet completely. Remove the micropore off the butterfly wings. Apply a clean, dry gauze or cotton wool dressing over the needle tip. Remove the needle and then apply pressure on the puncture site (applying pressure before removing the needle will cause pain/discomfort to the subject). Ask the subject to apply the pressure and elevate the arm slightly - this potentially minimises bruising. DO NOT allow the subject to bend their arm as this may potentially cause a haematoma.
- Remove the needle from the vacutainer / syringe and place it all in the sharps bin. If the vacutainer system was not used, the blood should be placed immediately into the appropriate tubes.
- Some tubes may need to be inverted, such as those containing lithium/heparin. Invert gently as vigorous shaking destroys the blood composition. Ensure the correct volume of blood is placed in the correct tubes.
- Label the tubes as required and place those that need cooling in the appropriate place. Samples requiring centrifugation should be collected and spun down in the centrifuge at the desired temperature, speed and time duration. Some samples will need to clot and should be left for approximately 40-50 minutes pre-centrifugation. See blood tube identification and sample preparation SOP 009, for more details.
- After a few minutes remove the dressing from the subject's arm. If requested or required by the subject apply plaster to cover the puncture site. If bleeding persists re-apply the pressure and repeat this process a few minutes later.
- When you are satisfied that the bleeding has ceased, the blood tubes have been clearly labelled and all the other materials have been disposed of in the appropriate manner, the procedure is complete.
- The subject is free to leave, having been thanked for their assistance.
- Wash your hands after all the blood tubes have been stored away.

5. Additional Information

- If the subject feels faint during the procedure, STOP immediately. Lie the subject flat and elevate their legs. Stay with the subject until they feel well

again. Arrange to take the blood sample at a later time or date. If fasting bloods are not required, ensure that the subject has had a snack/drink prior to the procedure.

- DO NOT take blood through a skin lesion or open wound.
- Arterial blood is brighter and flows more easily than venous blood. If you accidentally puncture an artery press firmly over the puncture site for 5 to 15 minutes after removing the needle.
- Ensure that all sharps are placed immediately into a designated sharps bin and all blood samples are labelled with the correct subject details.
- Accidental puncture wounds should be dealt with IMMEDIATELY. Encourage the puncture site to bleed whilst held under a cold running tap, for at least 5 minutes. Seek medical advice from the research co-ordinator and comply with any local rules for needlestick injuries.
- DO NOT take any more than 80mls of blood at any one time.
- The tourniquet should not be applied for longer than 1 minute. If sufficient blood has not been collected in this time, it should be released. The subject should be encouraged to clench and unclench their fist for a few minutes (whilst elevating their arm above their head). Depending on the volume of blood still required, it may be necessary to reapply the tourniquet to gain the requisite amount.
- Some blood tests are affected by diurnal rhythm, it is up to the physician/research nurse to be aware of this.
- Clotting times often vary between individuals, so the time the subject needs to put pressure over their puncture site may be different. Subjects taking warfarin therapy need to apply pressure for a longer period and are more likely to bruise.

6. Reference Documents

1. Safe working and the prevention of infection in clinical laboratories - model rules for staff and visitors, HSE.
2. Safe working and the prevention of infection in clinical laboratories, HSE.
3. Phlebotomy for nurses - guidelines for practice, The Royal Hospitals NHS Trust.