Phlebotomy – Blood Sampling From the Arm by Venipuncture

Short Title	**Arm Venipuncture**
Effective Date	May 4, 2017
Approved by REB	May 4, 2017
Version Number	1

A. PURPOSE AND BACKGROUND

1. Venipuncture is the transcutaneous puncture of a vein to withdraw a specimen of blood. *Please note that this does not cover the use of indwelling catheters for blood samples*. Venipuncture is commonly used in physiology to measure systemic factors. The main aim of this protocol is to ensure the safety of the tested individuals as well as the testing personnel and anyone who might inadvertently come in contact with the associated equipment and materials. Specifically, the aim is to ensure that blood from a tested individual is not transferred to the next participant. The risks of blood-borne pathogen transmission are described in Appendix 7.1, below.
2. According to the Brock REB Guidelines on Blood Draws, all phlebotomy or venipuncture in research studies at Brock will normally be done by a certified and current laboratory technician (e.g., Life Labs) or registered nurse. As technicians typically have their own detailed procedures according to their training, this document is meant to outline the minimum standard.

B. PROCEDURES/STUDY PROTOCOL

Are there any controlled act(s) to be performed: **X** Yes No
If you checked yes, list the controlled act(s) below:

Section (2) Performing a procedure on tissue below the dermis, below the surface of a mucous membrane, in or below the surface of the cornea, or, in or below the surfaces of the teeth, including the scaling of teeth.

B1. Terms and definitions

(1) Venipuncture - the transcutaneous puncture of a vein to withdraw a specimen of blood

(2) Palpate - to feel or to examine by hand

(3) Antecubital fossa - hollow or depressed area at the bend (anterior side) of the elbow

(4) Anticoagulant - substance that prevents or delays the clotting of the blood

(5) Hematoma - swelling or mass of blood confined to an organ, tissue, or space and caused by a break in a blood vessel (also known as a bruise).

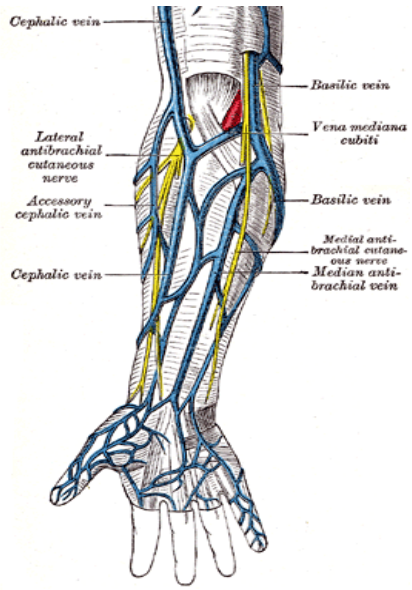
B2. Veins used for drawing blood

(1) Median cubital vein - first choice, well supported, least apt to roll

(2) Cephalic vein - second choice

(3) Basilic vein - third choice, often the most prominent vein, but it tends to roll easily and makes venipuncture difficult

(4) Dorsal vein (back of hand) – at the discretion of the phlebotomist and the consent of the participant.



B3. Steps and Procedures to Perform a Venipuncture

Phlebotomy – Blood Sampling From the Arm by Venipuncture

1. Gather equipment.
2. Explain procedure to the participant. It may be possible that the phlebotomist may ask if she/he chooses to use the anesthetic cream (e.g., EMLA).
3. If the cream is to be used, check the screening questionnaire if there is any allergy to medication. If not, apply the cream. Please note that the cream may interfere with some blood tests, and therefore should be applied 30 min prior to any blood draws.
4. Thoroughly wash and dry your hands or, if this is not possible, disinfection with alcohol gel may serve as an alternative. Put on gloves.
5. Have the participant seated in a comfortable position. Instruct patient to relax, stretch the forearm at about chest height, and make a fist.
6. Select the appropriate vein and apply the tourniquet above it.
7. Palpate along length of vein with index finger up and down 1 or 2 inches from selected site in both directions so size and direction of vein can be determined (vein should feel like a spongy tube). (Please note that sometimes it is easier to palpate before putting the gloves on. If this is the case, once the veins are located, put on the gloves and clean the area.)
8. Wipe site with antiseptic. Allow for drying. Do not touch puncture site with gloved fingers after you have cleansed the area (Do not re-palpate the vein after cleansing the skin).
9. Remove protective cover from needle.
10. Position needle in line with vein, about ½ inch below the proposed site of entry, and grasp patient's arm below entry point with free hand.
11. Place thumb of free hand 1 inch below entry site and pull skin taut toward hand
12. Hold the needle in “bevel up” position to facilitate venipuncture and cause less trauma to the skin and vein.
13. Insert the needle through the skin and tissue at a 15-30^{o} angle. Do not insert the needle where veins are diverting, because this increases the chance of a hematoma.
14. Decrease angle until almost parallel to skin surface, then pierce vein wall
15. A faint "give" will be felt when the vein is entered, and blood will normally appear in the needle.
16. Move the needle slowly into the vein.
17. Hold vacutainer unit and needle steady with dominant hand. Collection tube is positioned against, but not through, the needle.

18. Place index and middle fingers of other hand behind flange of vacutainer.
19. Push the tube as far forward as possible with thumb of non-dominant hand without causing excessive movement.
20. Instruct patient to relax and unclench fist after blood has started flowing.
21. Release the tourniquet by pulling on long end of looped tubing with the non-dominant hand. When the last tube is about two-thirds full of blood or blood stops, grasp tube firmly and remove tubes.
22. Prepare to withdraw needle.
23. Withdraw needle and place a cotton ball directly on puncture site and apply pressure. Place sharps in sharps container as soon as possible. DO NOT unscrew needle from sleeve with hands. DO NOT recap needle.
24. Ask participants to put pressure over the wound with a piece of cotton. Check the wound to ensure bleeding has stopped. Then apply a bandage, or tape and gauze over the venipuncture site.
25. Remove gloves and wash hands.
26. In order maintain quality control, document (e.g., attached data collection chart):

    a. Participant ID#, experimental condition, date
    b. Name of phlebotomist
    c. Appearance of venipuncture site.
    d. Participant's tolerance of procedure and particulars
    e. Number of attempts made (to a maximum of 2 attempts per participant per sample) and written consent/initials for a second attempt (see section B4 below).
    f. Any complications or difficulties encountered.

B4. Second Attempts

IF A SECOND ATTEMPT IS NECESSARY:

- Obtain and document written consent (e.g., initials on data collection form) for a second attempt at blood sampling from the participant (as part of general quality control – see section B3.26e).
- Pre-warm the region of the vein to reduce vasoconstriction and increase blood flow or select the other arm.

- A participant should never be stuck more than twice per sample.

C. EQUIPMENT

1. Single-specimen double-ended Vacutainer needle (contamination-protected on both ends until actual use) or some researchers will us butterfly needles, particularly for pediatrics.
2. Vacutainer sleeve/holder.
3. Antiseptic swabs, cotton balls/gauze pads, or equivalent and (if needed) EMLA anaesthetic cream.
4. Tourniquet.
5. Protective, latex or nitrile equivalent gloves.
6. Tape.
7. Proper blood specimen tube for the test to be performed (e.g., red, gold, purple or green. These indicate the type of anticoagulant used. There are specific needs, depending on analysis).
8. Dispensing containers for biohazardous wastes and sharps.
9. Biohazard waste bag secured in a holder
10. Sharps-disposal container.
11. Disinfecting fluid (typically, 70% isopropyl alcohol, or equivalent).

D. TRAINING REQUIRED FOR RESEARCHERS

Safety training courses that are required for the **researchers**:

- Science Safety
- Biosafety

NOTE: The safety training requirements apply to the investigators, student investigators, and/or any research assistant that will be handling or transporting blood samples. For researchers that are transporting blood to Brock from an off-site location it may be necessary to have Transportation of Dangerous Goods Training. Contact the Biosafety Office.

E. DESCRIPTION TO STUDY PARTICIPANTS

1. Explicitly state the total number of samples per participant that will be taken over the course of the study, as well as the total volume of blood collected.
2. State the 'second attempt' procedure and the requirement for written consent to perform a second attempt.

F. RISKS

1. PARTICIPANTS

   Participants can unexpectedly feel faint or actually lose consciousness with the sight of the needle or at the sight of blood. It is important that the researcher present during the experiment has completed first aid training to deal with such adverse events.
   A hematoma may form under the skin adjacent to the puncture site.
   There is always a risk of infection whenever the skin is punctured.
   The blood may be arterial (bright red) rather than venous.

2. RESEARCHERS

   Risk of transmission of blood-borne pathogens. Blood-borne pathogens, such as HIV, Hepatitis B Virus (HBV), and Hepatitis C Virus (HCV), can be transmitted through contact with infected human blood (as well as other body fluids). ***Note***: infected individuals might be asymptomatic carriers of the pathogen, who are not necessarily aware of the infection, nor show any signs or symptoms of disease. It is therefore necessary to avoid contact with blood, even when it comes from apparently healthy individuals. It is not possible to tell if an apparently health person is infected, and HIV, HBV, and HCV can be transmitted in many ways. Therefore, all blood must be treated as if it is infected, and this is known as universal precautions. The following are relevant to blood sampling:

   - Accidental puncture from contaminated needles, broken glass, or other sharps.
   - Broken skin or mucous membrane contact with blood residues or blood-contaminated equipment (*e.g.*, needles, Vacutainers, and gloves).

G. SAFEGUARDS/SAFETY PROCEDURES

1. PARTICIPANTS

It is important that the researcher ensures that the participant is comfortably seated before beginning to avoid any injury that may happen with a fall. The researcher must be vigilant for signs of discomfort in the participant to avoid a full faint (e.g., loss of facial colour, sweating excessively, disconnectedness, distress), but must also keep in mind that fainting can happen without warning. It is prudent to have juice/water handle to give to participants in case they feel faint and would like something to drink.

If a hematoma forms under the skin adjacent to the puncture site, release the tourniquet immediately and withdraw the needle. Apply firm pressure.

Infection risk will be managed by using aseptic techniques and a recommendation for proper after-care from the technician.

If the blood is bright red (arterial) rather than venous, remove the needle immediately and apply firm pressure for more than 5 minutes. Recommend to the participant that they may want to follow up with a doctor if there is any concern (e.g., pain, bleeding, swelling, etc.).
In the event that the participant does not feel well, terminate the procedure immediately and make sure that the participant rests comfortably until they are ready to leave the lab. The researchers can assess whether or not the participant needs to be accompanied home or to a medical clinic and should touch base with the participant later to ensure that there were no residual effects from the event. At that time, the researcher may ask the participant if they would like to be contacted again for follow-up in a few days, and ask them their preferred method of contact (e.g., email, phone).

If the participant loses consciousness, follow first aid rules to ensure that the participant is properly cared for. The participant may require assistance to get home, and follow up communication is required to ensure that the participant recovered from the event.

Remember to report any adverse events to the Research Ethics Office (reb@brocku.ca) (see Appendix 7.4).

2. RESEARCHERS

Any material or equipment contaminated, or suspected as being contaminated with blood, and which could not or would not normally be

disinfected, must be disposed of in an appropriate, University-authorized, bio-hazardous waste-disposal container, as follows:

- Sharps Waste: Used needles, glassware (if any), and any object capable of penetrating the skin, must be disposed of in a Sharps Container.
    - All sharps waste containers shall be kept in a safe place to prevent inadvertent mishandling by unauthorized persons.
    - When containers are ¾ full, they must be closed and identified indicating place of generation, supervisor of the area, and phone extension number.
- Solid, non-sharps waste: Any other materials, such as used vacutainers, cotton-balls, gauze pads, gloves, paper towels or rags, and plastic containers, must be disposed of in general bio-hazardous waste-disposal (Orange autoclaving bag). An exception to this can be made when only a limited amount of non-sharps material must be disposed of (*e.g.*, a pair of gloves and some cotton-balls). In such a case the materials could be disposed of in the Sharps container.
    - All bio-hazardous waste- shall be kept in a safe place to prevent inadvertent mishandling by unauthorized persons. If liquid waste is present in the bag and the waste is not autoclaved within the first four days of generation, it must be stored under refrigeration until autoclaving is performed. When ¾ full, or when further testing / waste generation is not foreseen for several weeks, waste bags will be autoclaved in Cairns 108.
    - The autoclave operator must have received training in autoclaving procedures, delivered by Health, Safety and Wellness every term.
    - Transportation of such waste across buildings must be in tightly closed plastic containers in a trolley or cart to avoid spillage of the content. The container must bear the biohazard symbol.
    - Please ensure that your laboratory has the appropriate biosafety permits in place and up-to-date.

WHAT TO DO IF BODILY CONTAMINATION DOES OCCUR

When intact skin has been contaminated with blood, clean and disinfect the site and the immediately surrounding area with cotton-ball/gauze soaked with 70% isopropyl alcohol.

Any adverse event that occurs during an experiment must be reported to the Research Ethics Office (within 24 hours) at reb@brocku.ca or directly to Brock Ethics Manager. All incidents and accidents that result in a potential exposure to blood must be promptly reported (within 24 hours, at the latest), using the University Injury/Incident Report form available at: http://brocku.ca/hr-ehs/environment-health-safety.

Incidents must be reported as soon as possible (within 24 hours, at the latest). Do not delay submitting the form due to technicalities; missing signatures can be obtained later. The form should be submitted to the supervisor (Principal Investigator, faculty/staff in charge), as well as to the University Biosafety Officer via email to besafe@brocku.ca, or in person to office 507 in the Cairns building.

H. REFERENCES (if applicable)