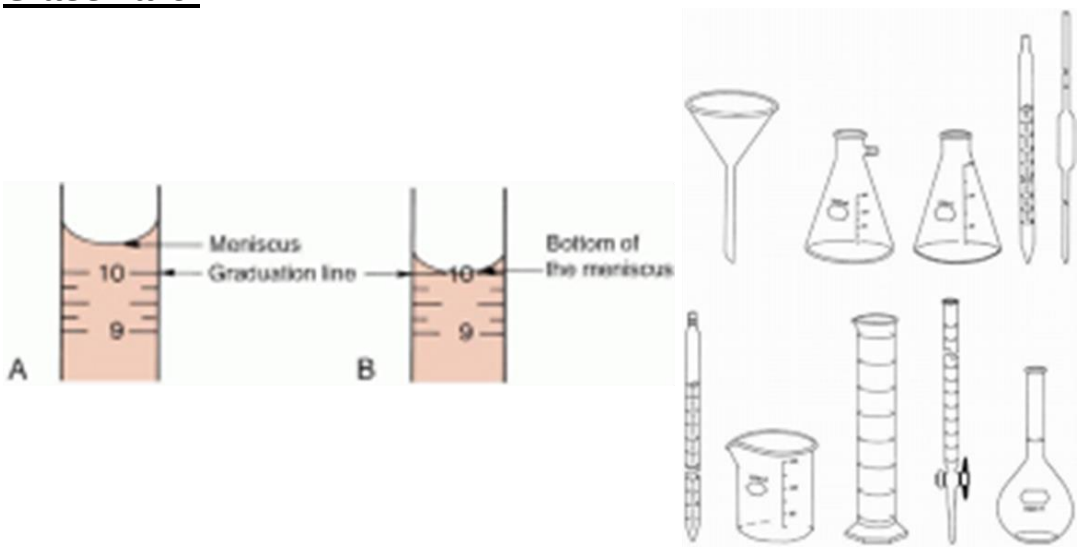
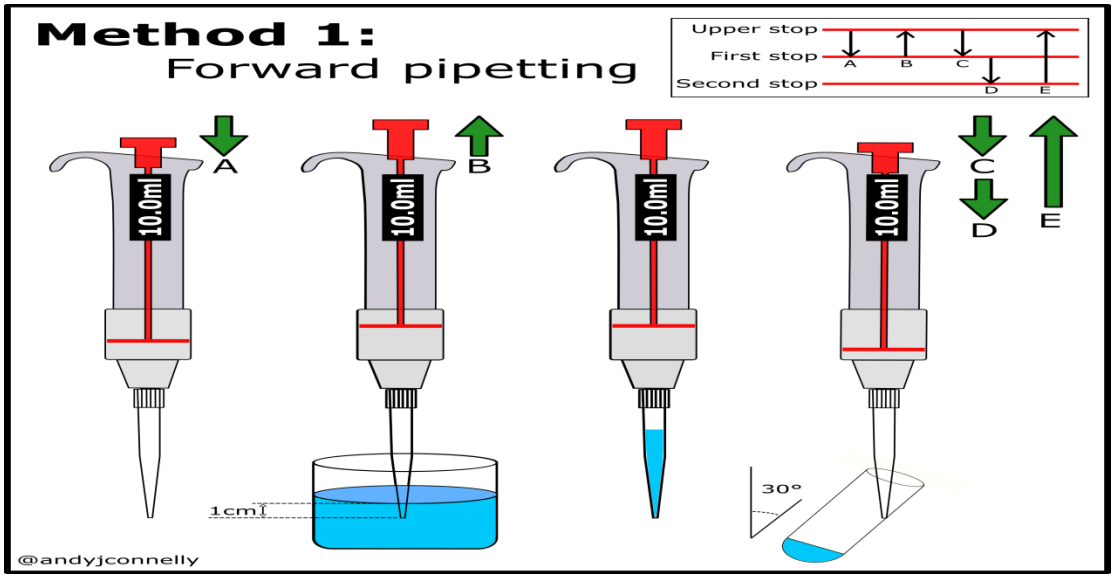
Laboratory supplies

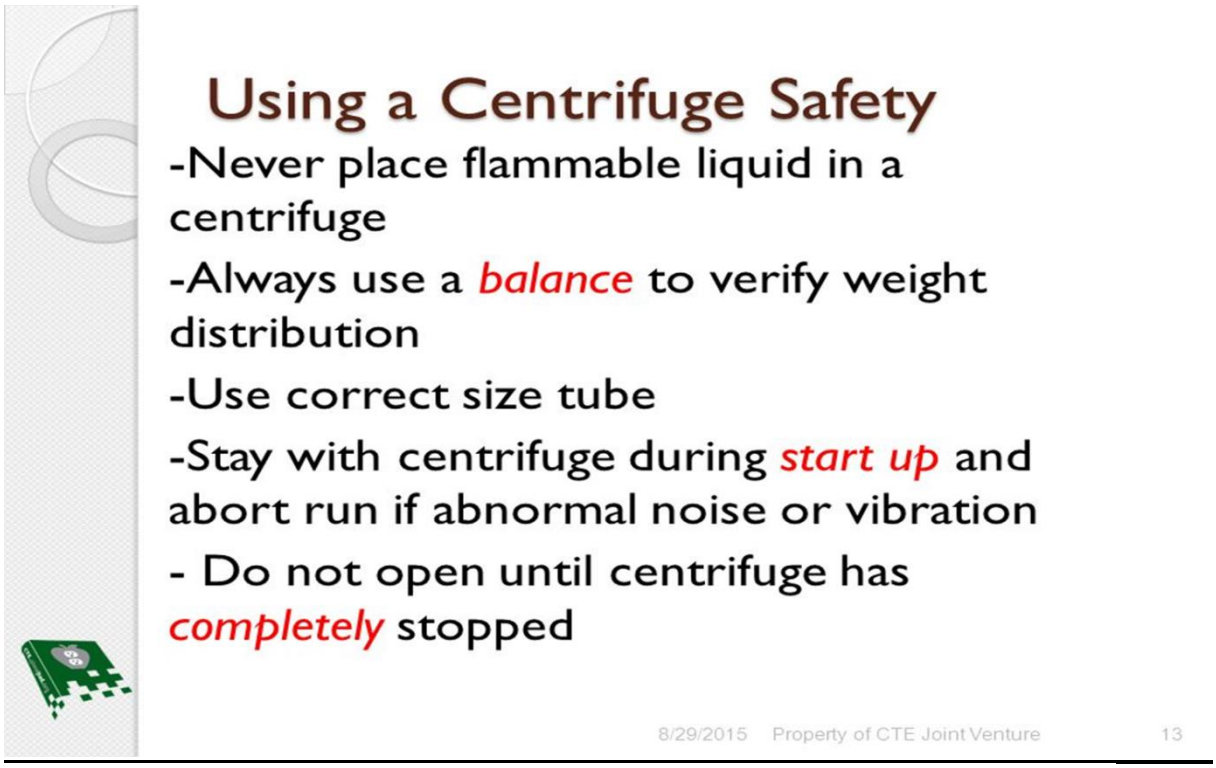
Glassware:



Pipettes

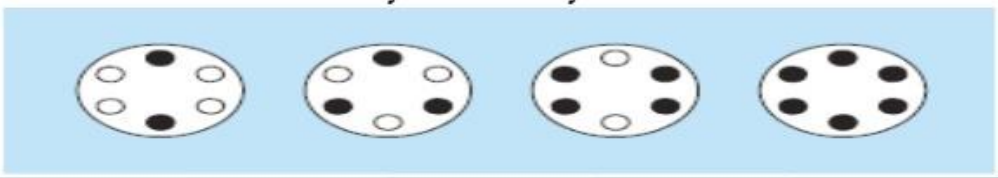

Method 1:
Forward pipetting
Upper stop
First stop
Second stop
A
B
C
D
E
10.0ml
1cm
30°
@andyjconnelly

Centrifuge

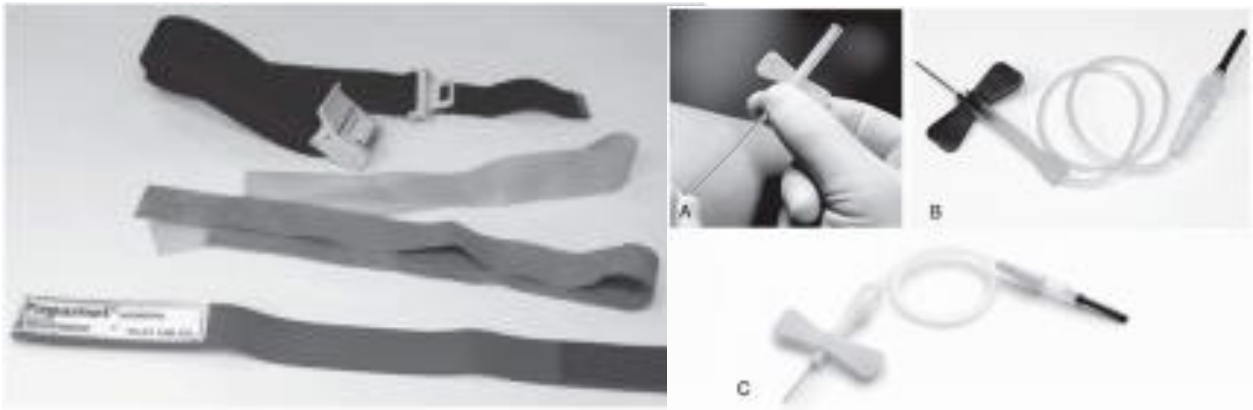

Using a Centrifuge Safety
-Never place flammable liquid in a centrifuge
-Always use a balance to verify weight distribution
-Use correct size tube
-Stay with centrifuge during start up and abort run if abnormal noise or vibration
- Do not open until centrifuge has completely stopped
8/29/2015
Property of CTE Joint Venture
13

Rotor Balance

- The mass of a properly loaded rotor will be evenly distributed on the ultracentrifuge drive hub, causing the rotor to turn smoothly with the drive.
- An improperly loaded rotor will be unbalanced; consistent running of unbalanced rotors will reduce ultracentrifuge drive life.
- To balance the rotor load, fill all opposing tubes to the same level with liquid of the same density.
- Weight of opposing tubes must be distributed equally.
- Place tubes in the rotor symmetrically.



Blood withdraw



Collecting Samples for Testing

Overview

Today's technologies allow testing on an impressively wide variety of samples collected from the human body. Most often, all that is required is a blood sample. However, samples of urine, saliva, sputum, feces, semen, and other bodily fluids and tissues also can be tested. For some samples, they can be obtained as the body naturally eliminates them. Others are quick and easy to acquire because they reside in

the body's orifices. For some, minor surgery and anesthesia give the health practitioner access to the required sample.

Samples that are Naturally Eliminated

Some samples such as urine, feces, and sputum can be collected as the body naturally eliminates them, while semen can be collected by the patient. Collection of some samples from young children or patients with physical limitations may require assistance. Usually, collecting these samples is painless, but obtaining them can occasionally be awkward and unpleasant because they involve elimination of bodily wastes and involve body parts and functions people prefer to keep private.

Sometimes these types of samples can be collected at home and brought to a medical office or facility, but they also may be collected at a medical facility such as a doctor's office, clinic, laboratory patient service center, or hospital.

Below are examples of types of samples typically collected by the patients. It is very important that all instructions for sample collection are carefully followed. Make sure you understand the instructions before collecting your specimen.

Sputum: Patients are instructed to cough up sputum from as far down in the lungs as possible. (A health practitioner may assist the patient in some situations.) This is best accomplished first thing in the morning before eating or drinking, by taking several deep breaths before expectorating into the collection cup. Sputum should be relatively thick and not as watery as seen when producing saliva.

Stool*:* Patients usually collect this sample themselves during toileting, following instructions to prevent the sample from becoming contaminated from other material in the toilet bowl.

Urine: urine specimens are collected by having the patient urinate into a container or receptacle. To keep the sample from becoming contaminated by materials outside the urinary tract, patients are given instructions on how to clean the genital area and void a bit of urine before collecting the specimen into the container. For certain tests, 24-hour urine samples are collected at home and must be refrigerated during the collection process. Remember to wash hands well after collecting the specimen.

Saliva*:* This type of sample may be collected using a swab or, if a larger volume is needed for testing, patients may be instructed to expectorate into a container without generating sputum.

Oral fluid : This is a combination of saliva and oral mucosal transudate (material crossing the buccal mucosa from the capillaries) that is also collected from the mouth. For example, a rapid HIV test uses oral fluid. The patient collects the sample by using a special device to swab around their outer gums.

Sweat*:* This type of sample may be collected using a special sweat stimulation procedure that is painless and allows sweat to be collected into a plastic coil of tubing or onto a piece of gauze or filter paper.

Samples that are Easy to Obtain

Some samples are collected by simply running a swab over the affected area. Procedures of this type can be performed in a clinic, in your doctor's office, or at the hospital bedside. Throat, nasal, vaginal, and superficial wound cultures, for example, are obtained in this way. The procedures, while they may sometimes be uncomfortable, are generally quick, relatively painless, and have no after-effects.

Examples of such collections include:

Secretions and Tissues from the Female Reproductive System : Samples of vaginal secretions are obtained by running a cotton swab over the walls of the vagina; cervical cells for a Pap test are obtained using a cotton swab and spatula or a tiny brush.

Secretions and Fluids from the Nose or Throat: The specimen is collected by running a swab over the area of interest and processed for bacteriological cultures. People typically respond to swabbing of their throat with a momentary "gag" reflex. If the throat is sore, the sample collection, brief as it is, can be uncomfortable. Similarly, a nasal swab may be a bit uncomfortable as the swab is inserted and reaches areas inside the nose that are typically never touched.

Samples from Open Wounds and Sores: If a wound or sore is located in the outer layer of skin, the specimen is typically collected on a swab by brushing the swab over the area and gathering a sample of fluid or puss. Touching the open wound area may

be temporarily painful since the wound is likely to be tender and sore. If a wound or infection is deep, however, a needle and syringe may be used to aspirate a sample of fluid or pus from the site.

Hair : (e.g., for nicotine/cotinine test, heavy metals testing, fungal tests, and testing for drugs of abuse).

Fingernail clippings (e.g., for heavy metals testing and fungal tests)

Samples from Within

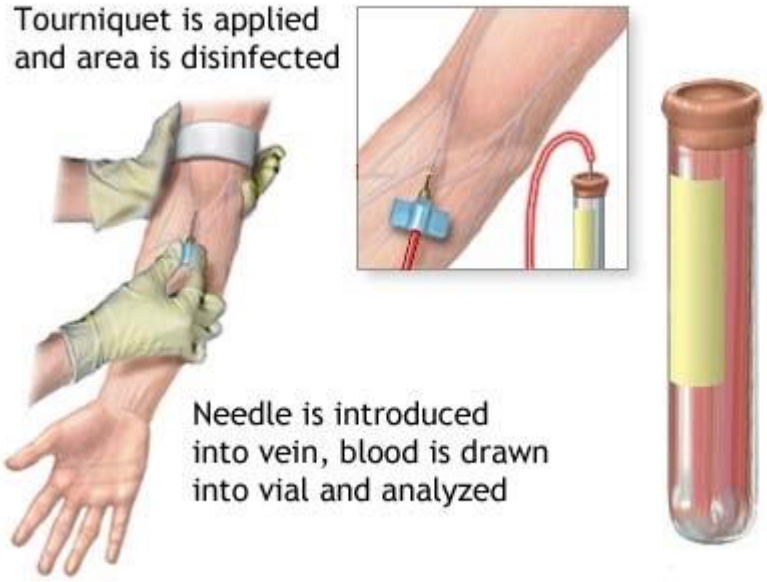
Some samples can only be obtained by breaking through the body's protective coverings (e.g., skin). Blood specimens are obtained in minimally invasive procedures conducted by specially trained physicians, nurses, or medical personnel. Collection of tissue specimens is a more complex process and may require a local anesthetic in order to obtain a specimen.

Some common examples of these kinds of samples include:

Blood: Blood samples can be collected from blood vessels (capillaries, veins, and sometimes arteries) by trained phlebotomists or medical personnel. The sample is obtained by needle puncture and withdrawn by suction through the needle into a special collection tube. Some specimens may be obtained by a finger puncture that produces a drop of blood, such as that used for glucose testing.

Step By Step Procedure for How a Phlebotomist Draws Blood

Drawing a blood sample from a patient is the main job for a phlebotomy technician. Patients are usually nervous if they've never had it done before, or sometimes they have a phobia of needles or doctor's offices. It is important for the phlebotomist to follow a step-by-step procedure to ensure consistency and to make the patient comfortable. Drawing blood, while routine, is a learned skill. The procedure can be hindered by flinching and tenseness caused by either the patient or phlebotomy technician. If you are a patient reading this that is nervous about having blood work done, read through the following and look at the pictures supplied. They should help calm your nerves and keep you cool when the phlebotomist or nurse enters the room.



The following are steps that should be followed to collect a standard blood sample.

1. Identify the patient: It is important you make sure the patient's bracelet matches their paperwork or that they can provide a bit of personal information such as a birth date.
2. Double check the requisition order against the paperwork to ensure the proper tests and samples are required. This helps prevent errors created by administration workers because of mishandled paperwork. Blame shifting is not an option here. Check the paperwork to prevent the mistake from ever occurring.

3. **Wash your hands**: It is important to do this in view of the patient.

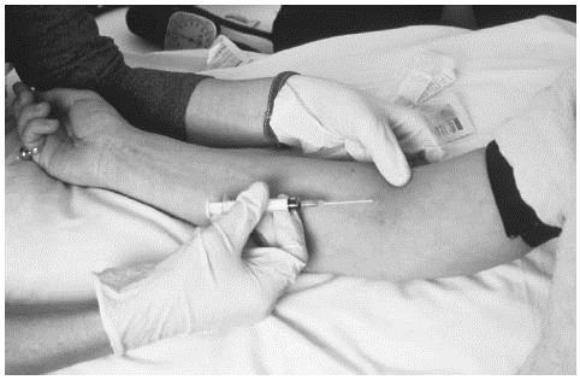
4. Prior to entering the room all supplies should be gathered and organized. They should be clean and still in packaging if applicable. It is necessary for the patient to observe the phlebotomist removing the needles from fresh packaging to ensure they are clean. Bring the tools and supplies next to the patient.

5. **Put on gloves**: These can either be latex, rubber, or vinyl.

Phlebotomist applying a tourniquet to a patient

6. Determine which arm you will be drawing your sample from. You can decide or you can let the patient decide. Then tie the tourniquet 2 inches to 3 inches above the puncture site (usual location medical term is antecubital fossa, or “elbow pit”).

7. If no veins are palpable, ask the patient to form a fist and squeeze.



8. Disinfect the area surrounding the puncture site with an alcohol wipe. Start in the middle and wipe in a circular motion gravitating outward.

9. Remove the tourniquet until you are ready to draw the sample. Failure to remove the tourniquet and leaving it on longer than 1 minute can damage both the patient and specimen.

10. Wipe down the area again with sterile cotton gauze. Do not touch the puncture site again. If you must touch it again to feel the vein, touch your fingertip to a sterile alcohol pad first. Phlebotomist inserting a needle into the vein

11. Make sure the bevel of the needle is pointing up, anchor the vein with the thumb of your opposite hand about 1 inch below the puncture site, and then insert the needle at no more than 15 degrees. Tube is inserted into the hub

12. Place a tube from your tray into the hub and check for blood flow. Let the tube fill. Once it is filled remove it from the tube holder.

13. Do not shake the tube. Invert it several time (5 to 10 times) to adequately mix the additives with the sample. Repeat steps 12 and 13 until all tubes are filled.

14. Once the last tube has filled it is time to release the tourniquet. After the tourniquet has been released, remove the tube and then the needle.

15. Have gauze ready in opposite hand and apply it to the puncture site immediately upon removing the needle. Apply firm pressure over the venipuncture site to achieve hemostasis.

16. Ask the patient to continue holding the gauze over the wound. While the patient is holding, immediately engage the needle's safety function and discard it into an approved disposal container.

17. Label all tubes correctly and in view of the patient.

Applying bandage to puncture site

18. Check the wound to ensure bleeding has stopped. Then apply a bandage, or tape and gauze over the venipuncture site.

Dispose of needle into sharps container

19. Discard all waste and used supplies into appropriate containers, and then put all other equipment away.

- **Tissue Biopsy**: Samples of tissue may be obtained from a number of different body sites, such as breast, lung, lymph node, or skin. Depending on the site and the degree of invasiveness, some pain or discomfort may occur. The time required to perform the procedure and for recovery can also vary greatly. These procedures are conducted by healthcare providers who have had specialized training. Tissue biopsies can be collected using procedures, such as:

- **Needle biopsy**: A needle is inserted into the site and cells and/or fluid are withdrawn using a syringe. A slight pinch may be felt at the site of needle insertion. Usually no recovery time is required and slight discomfort may be experienced afterwards.

- **An excisional biopsy** is a minor surgical procedure in which an incision is made and a portion or all of the tissue is cut from the site. A *closed biopsy* is a procedure in which a small incision is made and an instrument is inserted to help guide the surgeon to the appropriate site to obtain the sample. These biopsies are usually performed in a hospital operating room. A local or general anesthetic is used, depending on the procedure, so the patient remains comfortable. If a general anesthetic is used, recovery may take one to several hours.

- **Cerebrospinal Fluid (CSF)** : A sample of cerebrospinal fluid is obtained by lumbar puncture, often called a spinal tap. It is a special but relatively routine procedure. It is performed while the person is lying on their side in a curled up, fetal position or sometimes in a sitting position. The back is cleaned with an antiseptic and a local anesthetic is injected under the skin. A special needle is inserted through the skin,

between two vertebrae, and into the spinal canal. The health practitioner collects a small amount of CSF in multiple sterile vials; the needle is withdrawn and a sterile dressing and pressure are applied to the puncture site.

- **Amniotic fluid** : A sample of amniotic fluid is obtained using a procedure called amniocentesis to detect and diagnose certain birth defects, genetic diseases, and chromosomal abnormalities in a fetus. Amniotic fluid surrounds, protects, and nourishes a growing fetus during pregnancy.