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Beaumont

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Area	Laboratory-Chemistry
Applicability	All Beaumont Hospitals

Specimen Aliquots and Dilutions - Chemistry

Document Type: Procedure

I. PURPOSE AND OBJECTIVE:

A. The purpose of this procedure is to provide laboratory staff with instructions to properly aliquot specimens, to verify the identity and to maintain integrity of micro container specimens, aliquots, and specimen dilutions throughout the testing process.

II. CLINICAL SIGNIFICANCE:

A. At times, single specimens are sent to the lab with multiple test requests. Sometimes these specimens require splits or aliquots. Examples of such specimens include:

1. Tests which must be sent to reference labs
2. Select fluid specimens that are received in a cup but must be poured off into a specimen tube for centrifuging
3. Specimens that must be frozen.
4. Tests which must be performed on the same specimen
5. Specimens that must be poured off into a special specimen container, tube or cup for testing

B. Although Specimen Processing personnel prepare specimens for testing, Chemistry personnel are responsible for such whenever further specimen processing is necessary at the workstation.

III. EQUIPMENT / SUPPLIES:

A. Automated sample processing modules

B. Laboratory Information System (LIS)
C. Primary specimen
D. Collection/accession labels
E. Test tube rack
F. Centrifuge
G. Pipettes
H. Aliquot tube, cap, transfer cup
I. Pen or permanent marker
J. Personal Protection Equipment (PPE)
K. Biohazard bag

IV. SPECIAL SAFETY PRECAUTIONS:

Wear PPE (gloves, lab coat, use shield, face mask or goggles) whenever engaging in specimen handling activities likely to create a splash or spill.

V. PROCEDURE:

A. **Instrument – Prepared Aliquots**
The Accelerator a3600 is an automated processing system with modules that centrifuge, decap, aliquot, label, recap, and sort specimens for distribution. Whenever possible, specimens are processed and required aliquots are prepared using this instrumentation. Samples that default from the automation without making an aliquot must be handled as a manually prepared aliquot.

B. **Manually - Prepared Aliquots**
1. Obtain proper secondary specimen tube, container or transfer cup.
2. Always LABEL the secondary vessel with correct patient name, MRN (medical record number), order number and test. Whenever possible, generate a bar code label in the LIS with this information to label secondary aliquot vessel. Labeled aliquot tubes that default with the primary tube due to an aliquot failure may be used to manually process the aliquot.
3. If specimen is a **reference testing specimen (i.e. send out lab)**:
    a. Verify proper specimen type
    b. Verify correct storage information
    c. Record this information on the specimen label
    d. Initial label documenting patient identification with the primary tube and specimen handling.
4. Centrifuge the specimen if necessary.
5. Use a rack to hold sample containers and match the primary specimen w/ the proper pour over tube(s), container(s) or cup.

6. Make sure that each original specimen tube/container matches correctly with the pour over tube/container by matching 2 patient identifiers (patient name, Medical Record Number [MRN], order number, birthdate), test(s) and collection times.
7. Determine the specimen type needed and aliquot as follows:
    a. **Serum**: Use a pipette to deliver the specimen or carefully pour it into the secondary vessel. Be careful to not let the pipette tip touch the serum separator gel at the bottom of the SST (serum separator tube), or the cells from a non-SST tube.
    b. **Plasma**: Use a pipette to aliquot specimen, being careful to not let the pipette tip touch the cells at the bottom of the tube.
    c. **Whole Blood**: Invert tube several times to mix. Pour blood into secondary vessel.
    d. **Cerebral Spinal Fluid (CSF) or Other Fluid**: Use a pipette to aliquot required amount of CSF/fluid into secondary vessel.
    e. **Urine:** Use a pipette to aliquot required amount of urine into secondary vessel.
8. Secure tube cap or specimen container lid onto aliquot specimen and original specimen.
9. Recheck 2 patient identifiers on the primary tube and the aliquot tube. Initial the pour-over tube/container with your initials documenting that the identification recheck has been completed.
10. Deliver specimen to the proper testing station or storage area.

C. **Aliquots into Nested Cups**
Whenever the secondary vessel is too small for a patient bar code label (e.g. a sample cup to be seated in the primary specimen collection tube for instrument analysis):

1. The Medical Technologist (MT)/Medical Laboratory Technician (MLT) will process only one specimen at a time
2. Carefully pour required aliquot volume into a clean sample cup and immediately nest the cup into its primary specimen collection tube that is labeled with correct patient name, MRN, order number and test.
3. If a secondary specimen tube must be prepared to hold the nesting cup, generate a bar code label in the LIS with this information to label secondary specimen tube. Recheck 2 patient identifiers on the primary tube and the aliquot tube. Initial the secondary tube documenting that the identification recheck has been completed.
4. Process aliquot AS SOON AS POSSIBLE to minimize evaporation
5. **It is strongly recommended that you do NOT return aliquot to original tube, to avoid contamination.** We do recognize, however, that when small sample volumes must be shared, the possibility for add-on or repeat testing or requirements for instrument dead space volumes may preclude this. Do not store samples with nested cups. Under no circumstance should an aliquot be returned to the original container for forensic drug testing, molecular-based testing, or for biorepository storage.

6. Should the nested cup become separated from its parent primary specimen collection tube or properly labeled secondary tube, the cup and its contents **must** be discarded.

D. **Dilutions** (technical MT/MLT staff only)

1. Obtain proper secondary specimen tube, container or transfer cup, pipettes and diluent for the dilution procedure to be performed.
2. Use a permanent marker or generate additional bar code label in the LIS with correct patient name, MRN, order number and test to label secondary dilution vessel.
3. Prepare dilution according to the individual procedure protocols.
4. Initial the secondary dilution vessel with your initials.
5. **Mark dilution factor (X ___) on the secondary dilution vessel.**
6. If the dilution preparation must be transferred into a sample cup to be seated into the barcode-labeled dilution vessel for instrument sampling, use a permanent marker to **also label the sample cup with the dilution factor before seating it.**
7. **NEVER** nest a dilution cup into a primary specimen tube!
8. For automated instruments
    a. Program the dilution factor, at the analyzer, into the patient request
    b. These instruments will automatically multiply the result by the dilution factor and transmit the final result to the LIS.
9. For all manual methods and those instruments that utilize worksheets,
    a. Record the dilution factor onto the worksheet.
    b. Multiply the result of the diluted specimen by the dilution factor, and manually report the final result into the LIS.

E. **Archive Storage of Aliquots or Dilutions**
Any dilutions made on a specimen are not archived but discarded.

Approval Signatures

Step Description	Approver	Date
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Medical Directors	Ryan Johnson: OUWB Clinical Faculty	12/27/2023
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Applicability

Dearborn, Farmington Hills, Grosse Pointe, Royal Oak, Taylor, Trenton, Troy, Wayne