ARUP LABORATORIES

A nonprofit enterprise of the University of Utah and its Department of Pathology

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TRACE ELEMENTS SPECIMEN COLLECTION GUIDE

Analysis for trace elements at ARUP is performed in a clean laboratory environment that includes a system of positive-pressure and HEPA-filtered air. Since detection limits for many trace elements are calculated in parts per billion, this helps minimize environmental contamination of specimens. Additionally, contamination control during specimen collection provides more accurate and clinically useful results.

Note: Refer to the ARUP Laboratory Test Directory for specific instructions when collecting specimens for cadmium exposure testing (**http://ltd.aruplab.com/Tests/Pub/0025013**).

URINE COLLECTION

Although it is nearly impossible to obtain a completely uncontaminated urine specimen, steps can be taken to minimize environmental contamination.

- Avoid collecting the specimen in an area where environmental contamination is likely to occur. In an industrial or construction setting, it is important that clothing worn in the workplace be removed prior to specimen collection to prevent dust on the clothing from contaminating the specimen.
- Wash and dry hands thoroughly before collection.
- Use a clean plastic container for collection.
  - The containers must not have metal caps or glued inserts.
  - The containers should not be colored due to metals found in dyes.
- Minimize contamination of the sample by avoiding contact with the inside of the container or lid.
- Do not use preservatives, as they may cause contamination. Refrigeration is sufficient to preserve specimens.
- Transport urine in trace element-free transport tubes (ARUP supply #**43116**).
- Pour the collected specimen directly into the transport tubes. Do not use utensils (i.e., syringes, needles, or pipettes) in the collection or transfer of the sample.

24-Hour Collection

- Do not urinate directly into the 24-hour collection container. Collect urine in a clean plastic container and then carefully pour into the 24-hour collection container.
- Minimize contamination by avoiding contact with the inside of the container or lid.
- Wrap the 24-hour collection container in a clean polyethylene bag between collecting samples to prevent potential contamination from dust.
- If possible, keep the 24-hour collection container refrigerated during collection.

Spot Collection

First morning urine is recommended for a spot or random collection.

TISSUE COLLECTION

Follow information found on individual pages of the Laboratory Test Directory.

WHOLE BLOOD, SERUM, AND RED BLOOD CELL COLLECTION

Consider the materials comprising the tube and the tube top. Rubber stoppers in collection tubes other than the royal blue tubes are known to contain elements that can contaminate a specimen. Contamination can be introduced as the needle punctures the stopper in any tube other than royal blue. Most of this also holds true for syringes and transport tubes. A sterile tube is not necessarily a trace element-free tube.

Preparing for Collection

- Avoid collecting the specimen in an area where environmental contamination is likely to occur.
- Use only stainless-steel needles and nonpowdered gloves when handling and collecting the specimen.
- Wash the collection site with soap and water, followed by an alcohol swab. Studies indicate that using alcohol alone is not as effective at preventing trace elements contamination. Do not use disinfectants containing iodine.
- Consider collecting trace element samples in a separate venipuncture from other tubes. The stopper from other tubes may contaminate the phlebotomy needle.

Whole Blood

- For Arsenic, Bismuth, Cadmium, Cobalt, Mercury, Manganese, Thallium, and Zinc:
  - Collect samples in a royal blue K_2EDTA tube (ARUP supply #**16313** or #**58783**) OR Greiner Bio-One Vacuette Tube 6 mL NH Trace Elements Sodium Heparin tube.
- For Lead (Venous):
  - Collect samples in a royal blue K_2EDTA tube (ARUP supply #**16313** or #**58783**), Greiner Bio-One Vacuette Tube 6 mL NH Trace Elements Sodium Heparin tube, OR tan K_2EDTA tube.
- For Lead (Capillary):
  - Use a lavender microtainer with K_2EDTA for capillary lead specimens only (ARUP supply #**24347**).
- Invert the tube 8–10 times to mix the anticoagulant with the blood.
- Avoid opening the tube as it may introduce contamination.
- Specimens can be transported in the collection tube.
- Never transport specimens in glass collection tubes.
- If pouring off, do so in a clean environment and use the trace element-free transport tube (ARUP supply #**43116**). These transport tubes come precapped to avoid contamination. Remove the cap just before pouring off and replace immediately.
- Do not use utensils (i.e., syringes, needles, or pipettes) in the sample tube.

Plasma

- Collect samples in a royal blue K_2EDTA tube (ARUP supply #**16313** or #**58783**).
- Invert the tube 8–10 times to mix the anticoagulant with the blood and centrifuge immediately.
- Pour plasma into a trace element-free transport tube (ARUP supply #**43116**) within 2 hours of collection.

Serum

- Collect samples in a royal blue serum tube (ARUP supply #**16359**). This tube contains a clot activator.
- Invert the tube 8 times to mix the clot activator with the blood.
- Allow the specimen to sit at room temperature for 60 minutes and then centrifuge immediately.
- Pour serum into a trace element-free transport tube (ARUP supply #**43116**) within 2 hours of collection.

Red Blood Cells (RBCs)

- Collect samples in a royal blue K_2EDTA tube (ARUP supply #**16313** or #**58783**) OR Greiner Bio-One Vacuette Tube 6 mL NH Trace Elements Sodium Heparin tube.
- Invert the tube 8–10 times to mix the anticoagulant with the blood.
- Centrifuge immediately and remove plasma.
- Submit packed RBCs in original collection tube OR transfer 2 mL RBCs to a trace element-free transport tube (ARUP supply #**43116**) within 2 hours of collection.
- Never transport specimens in glass collection tubes.

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TRACE ELEMENTS WHOLE BLOOD AND SERUM COLLECTION TUBES

Trace Elements (K_2EDTA, 6mL) (for whole blood, plasma, or red blood cells) ARUP Supply #**16313**	**Trace Elements (K_2EDTA, 3mL)** (for whole blood, plasma, or red blood cells) ARUP Supply #**58783**	**Trace Elements Sodium Heparin** (for whole blood, plasma, or red blood cells) ARUP Supply #43116	**Lavender Microtainer (K_2EDTA)** (for Lead-Cap whole blood only) ARUP Supply #**24347**	**Trace Elements Serum Tube** (no additive, 6mL) (for serum only, red stripe) ARUP supply #**16359**
				

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