

National Human Exposure Assessment Survey (NHEXAS)

Region 5 Study

Quality Systems and Implementation Plan for Human Exposure Assessment

Research Triangle Institute
Research Triangle Park, NC 27079

Cooperative Agreement CR 821902

Field Operations Protocol

RTI/ACS-AP-209-046

Title: Procedure for Collection, Storage, and Shipment of Hair
Samples for Trace Metals and Arsenic

Source: Research Triangle Institute

U.S. Environmental Protection Agency
Office of Research and Development
Human Exposure & Atmospheric Sciences Division
Human Exposure Research Branch

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**FIELD
OPERATIONS
PROTOCOL**

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SAMPLES FOR TRACE METALS AND ARSENIC**

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PROCEDURE FOR COLLECTION, STORAGE, AND SHIPMENT
OF HAIR SAMPLES FOR TRACE METALS AND ARSENIC

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1.0 SCOPE AND APPLICATION

The procedures described in this protocol are designed to guide the collection, storage, and shipping of human scalp hair samples for trace metals and arsenic or potential adduct analysis during Phase I of the National Human Exposure Assessment Survey (NHEXAS). The NHEXAS primary target analytes are lead and arsenic. The secondary analytes are cadmium and chromium. This protocol describes the sample containers, sample collection, preservation, storage, shipping, and custody procedures.

2.0 SUMMARY OF THE METHOD

Scalp hair samples will be collected from each participant that agrees to provide the sample. Thinning shears will be used to cut full hair strands as close to the scalp as possible. Hair samples will be placed immediately into Zip-lok bags. All samples will be shipped to the analytical laboratory within fourteen days of collection. Completed custody records will be submitted with each sample.

Method Reference

Research Triangle Institute, "Epidemiologic Study Conducted in Populations Living Around Nonferrous Smelters to Determine Body Tissue Burdens of Selected Nonferrous Metals," Field Training Manual and Notebook File, EPA-RTP Contract No. 68-02-2442, 1977.

3.0 SAMPLE COLLECTION MATERIALS

- 3.1 Thinning Shears
- 3.2 Zip-lok Plastic Bags (size may range from 4" x 6" to 8" by 10")
- 3.3 Plastic Comb with a Long Handle
- 3.4 Powder-free Gloves
- 3.5* Alcohol Wipes, Kendall Webcol Alcohol Prep No. 6818, or equivalent
- 3.6 Example Hair Sample, Approximately 100 mg, for Sample Size Guide

4.0 PREPARATION OF MATERIALS

4.1 Shears and Comb

Use one or more alcohol wipes and carefully wipe all cutting surfaces on the shears. Allow the shears to air dry. Use one or more alcohol wipes and carefully wipe the comb. Allow the comb to air dry. Place the shears and comb together in a clean Zip-lok bag. Mark the bag "Clean".

4.2 Zip-lok Bags

A new Zip-lok bag will be used for each hair sample. The bags will not be cleaned prior to use. The bag should be pre-labeled with a sample identification code.

5.0 SAMPLE COLLECTION

5.1 Identify the study participant and ask him or her to be seated. (If the participant is a child then it may be necessary to ask an adult family member to keep the child calm.)

5.2 Put on a new pair of powder-free gloves.

5.3 Remove the comb and thinning shears from the Zip-lok bag.

5.4 Open the Zip-lok bag that will be used to store the hair sample.

5.5 Place the cutting edge of the shears as close to the scalp as possible. Collect samples from the occipital position (rear base of the head). If insufficient hair is present in the occipital area, the sample may be collected from a different area or areas of the head.

5.6 Cut hair from the selected location and place immediately into the bag. Do not place in the bag any hair that has fallen on the floor.

5.7 Repeat cutting as necessary to collect sufficient sample size. The minimum sample size is approximately 100 mg. Refer to the example hair sample to estimate the amount. Collect a larger sample if possible and if the participant does not object.

5.8 Immediately close and seal the Zip-lok bag, making sure that hairs are not protruding through the opening. If necessary, use the comb to push hair completely into the bag.

5.9 Make sure that the bag containing the hair sample has a sample code label affixed to the outside.

5.10 Record the sample code and the date in the sample collection record.

5.11 Clean the comb and shears with alcohol wipes as described in Section 4.0 before collecting another hair sample.

6.0 SAMPLE STORAGE AND SHIPMENT

6.1 Hair samples do not require refrigerated storage conditions. Hair samples may be placed in the sample storage refrigerator for organizational purposes.

6.2 Ship the sample to the Research Triangle Institute within fourteen days of collection.

6.3 No refrigeration is required during shipment.

7.0 QC PROCEDURES

7.1 Sample Code

7.1.1 A unique sample code must be assigned to each sample.

7.1.2 The sample container must have a label with a sample code identical to the code in the sample collection/custody record.

7.2 Custody

7.2.1 Complete the sample collection information (sample code and date collected) on the sample collection/custody record when the sample is collected. Information to be included on the sample collection record is shown in Figure 1.

7.2.2 Enter the collector ID in the appropriate field on the collection record.

7.2.3 Print the sample custody record prior to shipping the sample and include the original sample custody record with the sample as it is shipped.

7.3 Quality Control Samples

7.3.1 Container Blanks

7.3.1.1 Unused Zip-lok bags will be used as container blanks in this study. Analytical methods have not been selected at the writing of this protocol, precluding a pre-study preparation of QC materials. Container blanks may be used to assess the potential for sample contamination, or may be used for direct post-study measurements with a suitable QC material.

- 7.3.1.2 Container blanks will be deployed at a small percentage of the homes, with the percentage to be defined in the QSIP.
- 7.3.1.3 A label will be affixed to Zip-lok bags designated as container blanks.
- 7.3.1.4 The bags will be transported to the field, shipped with samples, and stored with the samples.

SAMPLE TYPE:	Hair
SAMPLE CODE:	Same as label on container
PARTICIPANT ID:	Three digit participant i.d. number
COLLECTION DATE:	Date sample collected
COMMENT CODE:	Default = 0; change to 1 or 2 if a comment is added below
COMMENT:	Add text for any comments associated with this particular sample.

Figure 1. Information to be included on the sample collection record.

EXPLANATION OF REVISIONS

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Section 3.5

Added the phrase "or equivalent" since specified brand and number might not always be available.