National Human Exposure Assessment Survey (NHEXAS)

Maryland Study

Quality Systems and Implementation Plan for Human Exposure Assessment

Emory University
Atlanta, GA 30322

Cooperative Agreement CR 822038

Standard Operating Procedure **NHX/SOP-G07**

Title: Training of Field Technicians

Source: Harvard University/Johns Hopkins University

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

Notice: *The U.S. Environmental Protection Agency (EPA), through its Office of Research and Development (ORD), partially funded and collaborated in the research described here. This protocol is part of the Quality Systems Implementation Plan (QSIP) that was reviewed by the EPA and approved for use in this demonstration/scoping study. Mention of trade names or commercial products does not constitute endorsement or recommendation by EPA for use.*

1. Title of Standard Operating Procedure

   Harvard University/Johns Hopkins University Standard Operating Procedure:
   G07 Training of Field Technicians, Rev. 1.0

2. Overview and Purpose

   This SOP outlines the responsibilities of the Field Technician (FT) and the Field Coordination Center Supervisor (FCC-S) before, during, and after sampling at residences; and the training system that will teach them what they need to know to handle these responsibilities.

   The field team for the NHEXAS Phase I Field Study consists of one Field Interviewer, a Phlebotomist, and two Field Technicians, designated FT1 and FT2.

   - The interviewer will visit the respondent's home on Day 1 and Day 8 to explain the consent form and incentive information; administer questionnaires; teach the target individual how to use the personal air sampler; and collect water, food, dermal wipe, and urine samples.

   - The phlebotomist will visit the home on Day 2 to take blood samples and to pick up a urine sample and the personal air monitor.

   - FT1 will visit the home on Day 1 and Day 8 to set up and take down equipment for sampling indoor and outdoor air for metals, pesticides, and PAHs.

   - FT2 will visit the home only on Day 1, to sample dust and soil and to draw plans of the house and yard.

   All personnel are responsible for the labeling and handling of the samples they take until they deliver the samples to the Field Coordination Center (FCC) and formally transfer custody to the Field Coordinator (FC) or his designate.

   Field Technicians and Interviewers will be trained together so that they are familiar with all tasks and can change positions if necessary.

   The Field Coordination Center Supervisor (FCC-S) will prepare equipment, including maintaining pumps and HVS3 vacuum samplers, assembling and dismantling Harvard Impactors, and testing pH meters. The FCC-S will be trained along with the Field Technicians and Interviewers.

   The overall responsibilities of the FT are:

   - To collect samples that are representative of the residence, by carefully following the defined procedures.

   - To label and record all samples and observations accurately, and deliver them to the appropriate recipients.

   - To behave professionally with respondents, colleagues, and the public.

3. Discussion

This and the related SOPs, G08 "Training of Interviewers," G09 "Training of Laboratory Technicians," G10 "Training of Phlebotomists," G11 “Training of Field Coordination Center Staff,” and the appropriate field and laboratory SOPs will be the basis for field and laboratory manuals to be used by staff. For details such as how to test an air sampler, refer to the appropriate SOPs.

Qualifications for FT positions include a bachelor's degree in chemistry (preferred) or another scientific, engineering, technical, or medical/social field. Experience in field sampling is preferred. A second language (appropriate to the population being surveyed) is advantageous.

Field technicians will be trained professionals from Westat, who will receive further training in procedures specific to this investigation.

4. Personnel Responsibilities

4.1 Planning Training Curriculum

Harvard and Westat personnel will plan the curriculum for the 6-day training session.

4.2 Hiring Field Technicians

Candidates for FT positions will be interviewed and selected by Westat.

4.3 Training Field Technicians

Training for the technicians will take place at the Westat offices in Rockville, MD. Training will be by Harvard and Westat scientists and engineers familiar with all aspects of the field instrumentation. The training will be supplemented by actual field sampling in residences occupied by Westat staff members.

4.4 Audits

During the 15-month survey period, audits will be performed by HSPH, JHU, and/or Westat personnel, and by an independent entity. See Section 8.2.

5. Required Equipment and Materials

Field Manual (including SOPs)
Sampling equipment, including tools and containers (listed in SOP for each medium)
Labels, logsheets, forms

6. Responsibilities of Technicians

Tables 1 and 2 show the Field Technicians' responsibilities organized by medium (air, dust, etc.) and time (before Visit 1 of each Cycle, etc.). Table 3 shows the FCC-S’s responsibilities.

Dermal wipe, duplicate diet, water, urine, and blood sampling are handled entirely by the interviewer and the phlebotomist; FTs have no responsibilities for these media. In the mini-market basket survey, FT1 has no responsibilities; FT2's only responsibility is in selecting grocery stores and purchasing food.

Table 1 Responsibilities -- Field Technician 1

Medium	Visit 1 (Day 1)			Visit 2 (Day 2)			Visit 3 (Day 8)		
	Before	**During**	**After**	**Before**	**During**	**After**	**Before**	**During**	**After**
Air -- Indoor	Check pumps, samplers, field packet.	Select sampling location, set up equipment, record IDs, check flows. Safety checks. Explain safety precautions, what to do if anything seems to go wrong.	Return log-sheets etc. to Field Coord. Center (FCC).	--	--	--	--	Record flow rate & timer reading, check switching valve. Disconnect samplers, replace sealing caps, label & log.	Return equipment to FCC: samplers to lab, other equipment to be prepared for next use.
Air -- Outdoor	Check pumps, samplers, field packet.	Select sampling location, set up equipment, record IDs, check flows. Safety checks. Explain safety precautions, what to do if anything seems to go wrong.	Return log-sheets etc. to FCC.	--	--	--	--	Record flow rate & timer reading, check switching valve. Disconnect samplers, replace sealing caps, label & log.	Return equipment to FCC: samplers to lab, other equipment to be prepared for next use.
Air -- Personal	Check Personal Exposure Monitor (PEM), field packet.	Check flow rate, assemble PEM to strap. Safety checks. Help interviewer explain use of PEM if needed.	Return log-sheets etc. to FCC.	--	(phleb-otomist will deliver PEM to FCC)	(FCC-S will disas-semble and clean PEM)	--	--	--

Table 2 Responsibilities -- Field Technician 2

Medium	Visit 1 (Day 1)			Visit 2 (Day 2)			Visit 3 (Day 8)		
	Before	**During**	**After**	**Before**	**During**	**After**	**Before**	**During**	**After**
House, Yard, Foundation Plans	Prepare plan forms.	Sketch and measure house, yard, foundation; show sampling sites.	Deliver plan forms to Field Coordination Center (FCC).	--	--	--	--	--	--
House Dust	Prepare sample kit.	Identify activity room & other sampling sites. Place template, adjust vacuum, take sample. Label & log samples.	Deliver samples to FCC.	--	--	--	--	--	--
Soil	Prepare sample kit.	Ask about play areas & food garden. Select sampling sites, mark measurements on plans, take samples. Label & log.	Deliver samples to FCC.	--	--	--	--	--	--
Technician Questionnaire	Label question-naire	Observe house, fill out questionnaire.	Deliver question-naire to FCC.	--	--	--	--	--	--
Mini-market basket	--	--	--	Select grocery stores.			--	--	After check-lists are analyzed, buy food.

Table 3 Responsibilities -- Field Coordination Center Supervisor

Medium	Visit 1 (Day 1)			Visit 2 (Day 2)			Visit 3 (Day 8)		
	Before	**During**	**After**	**Before**	**During**	**After**	**Before**	**During**	**After**
Air -- Black Box Pumps & Timers	Check flow rates. Set timers.	--	Test any pumps & timers that are not operating properly; fix or send to be fixed.	--	--	--	--	--	Test all pumps & timers; if not operating properly, fix or send to be fixed.
Air -- Harvard Impactor Samplers	Inspect filters (inspected & packaged by assistant), assemble Harvard Impactors (HIs).	--	Check any damaged samplers; fix or send to be fixed.	--	--	--	--	--	Disassemble HIs, package filters. Clean O-rings & impactor plates (after each Cycle)
Air -- PUF samplers	Inspect PUF samplers, affix ID labels, seal into bags.	--	Check any damaged samplers; send to SwRI to be fixed or replaced.	--	--	--	--	--	Package sampler for shipping.
Air -- Personal	Inspect filters, assemble Personal Exposure Monitor (PEM). Check personal sampling pump	--	--	--	--	Disassemble & clean PEM; package filter.	--	--	--
Dust -- HVFS Vacuum Sampler	Assemble & calibrate HVFS if needed. Label catch bottles.	--	Check filter bag (change every 2 weeks), decontaminate nozzles & tubing.			--			--
Water	Mark & label jars, test pH probe								

7. Curriculum

7.1 Contact with respondents

At each residence, the Interviewer will introduce FT1 and FT2 to the respondent and present an overview of each Technician's tasks and the code of conduct.

7.1.1 Behavior

- Maintain the privacy and confidentiality of respondents.
- Be courteous and professional.
- If it is necessary to move any of the respondents' possessions to set up equipment or take a sample, ask permission, move the items carefully, and leave them in plain sight.

7.1.2 Conversation

- Be prepared to answer questions about the survey, including confidentiality (see SOP "Confidentiality Assurance").
- Avoid conversation on unrelated topics, especially controversial topics.
- Do not give advice on environmental or health concerns, even if asked by the respondent. You will have a list of information sources to offer if they have questions.

7.1.3 Appearance

- Clothing should be neat and clean. Do not wear clothing or pins that express personal opinions or advertise products.
- Wear photo ID badge.

7.2 Sample Handling

7.2.1 Labeling, logsheets, and forms

- Trainees will learn the labeling and tracking system, and practice the procedures. For general information, see SOPs "Identification Numbers for Samples and Forms" and "Chain of Custody and Sample Tracking." For labeling of samples for each medium, see the SOP for that medium.
- How to assemble and prepare the labels and forms that will be needed for each field visit.
- How to use field log codes for problems such as timer failure and for any

circumstances that might affect the representativeness of a sample.

- How to log in samples and records after a visit.

- How to use a bar code reader.

7.2.2 Storage and shipping

- How to handle each type of sample until it is delivered to the field coordination center. See SOPs "Chain of Custody and Sample Tracking" and "Storage of Samples." The SOP for each medium describes any special requirements (e.g., chilling) and tells where samples go for analysis.

7.3 Equipment Preparation

7.3.1 General

- How to pack the sample kit for each visit, and check the list.

- What to do on site if equipment breaks or is missing.

7.3.2 Containers and seals

- What containers and seals are needed for each visit.

- How to prepare, label, and pack them.

- What to do with unused ones after a visit.

7.4 Air sampling, indoor/outdoor

7.4.1 Equipment

- Black Box pumping unit: preparation, siting, setup, testing, operation, disassembly, etc.

- Harvard Impactor: preparation, siting, setup, operation, etc. The FCC Supervisor will assemble and disassemble the HI at the FCC.

- Pesticide/PAH sampler: how to set up, test, take down, transport to FCC. (Samplers will be assembled and disassembled by SwRI.)

- Sample labeling and handling.

7.4.2 Instructing respondent/family about equipment

- Safety precautions: leave electrical connections and air intakes alone, don't trip over hoses or wires.

- What to do if something seems to go wrong with equipment. (Respondents will be given instructions and a telephone number.)

7.5 Air sampling, personal

7.5.1 PEM (Personal Exposure Monitor)

- Preparation, setup, operation, disassembly, etc.
- Sample labeling and handling.

7.5.2 Instructing respondent on use of PEM

- Child/adult, right/left-handed person, day/night procedures, sports, bathing.
- What to do if something seems to go wrong with PEM.
- Safety precautions: keep hair away, don't block holes, don't crimp hose.

7.6 House dust

7.6.1 Preparation of equipment & containers.

7.6.2 How to instruct respondents.

7.6.3 Sampling location: walk-through of residence with respondent, selecting sampling location, making sketch of residence showing sampling location.

7.6.4 Preparing catch bottles and vacuum apparatus; placing template; adjusting vacuum pressure; taking sample; sample labeling and handling.

7.7 Soil

7.7.1 Preparation of equipment & container.

7.7.2 Sampling locations:

- Asking respondents about play areas, garden, etc.
- Selection of sampling locations, sketch of yard with sampling locations.
- Describing soil type (humus, sand, clay) and moisture (wet or dry).

7.7.3 Collection of samples, including measuring and marking; handling of samples.

7.8 Mini-market basket

7.8.1 Selection of grocery stores

7.8.2 How to do the shopping.

7.8.3 Sample handling, e.g., labeling, refrigeration.

7.8.4 Sample preparation.

8. Quality Assurance Procedures

8.1 Testing

8.1.1 During training

- Trainees will be tested on skills such as assembling a sampling kit and explaining how to use the PEM.

- At end of training, trainees will be evaluated while performing actual field sampling at the residence of a Harvard or Westat staff member.

8.1.2 During survey

- During the early weeks of the survey, instructors will accompany field staff, evaluate their performance, and provide any help needed.

8.2 Audits

During the 15-month survey period, the following audits will be performed:

- internal audits every six months by HSPH, JHU, and/or Westat personnel [when?]
- one performance audit by an independent entity [when?]

9. References

Harvard University/Johns Hopkins University Standard Operating Procedures:

G02 Confidentiality Assurance
G03 Identification Numbers for Samples and Forms
G04 Chain-of-Custody and Sample Tracking
G05 Storage and Shipping of Samples
G06 Problem Management
G08 Training of Interviewers
G09 Training of Laboratory Technicians
G10 Training of Phlebotomists
G11 Training of Field Coordination Center Staff
F01 Field Sampling -- General Information
F02 Collection, Storage, and Shipment of Indoor and Outdoor Air Samples for Metal, Pesticide, and PAH Analysis
F03 Collection, Storage, and Shipment of Personal Air Samples for Metal Analysis
F04 Collection, Storage, and Shipment of House Dust Samples for Metal, Pesticide, and PAH Analysis
F05 Collection, Storage, and Shipment of Soil Samples for Metal, Pesticide, and PAH Analysis
F09 Administration and Analysis of Food Checklist and Purchase of Mini-Market Basket Food
F12 Duplicate Sampling
D01 Data Flow Procedures