National Human Exposure Assessment Survey (NHEXAS)

Arizona Study

Quality Systems and Implementation Plan for Human Exposure Assessment

The University of Arizona
Tucson, Arizona 85721

Cooperative Agreement CR 821560

Standard Operating Procedure   **SOP-UA-D-14.0**

Title: Coding and Coding Verification (Hand Entry)

Source: The University of Arizona

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

Coding and Coding Verification

1.0 Purpose and Applicability

The purpose of this procedure is to define the steps involved in coding and coding review or verification. It applies to the coding of all physical forms generated by the NHEXAS Arizona Project, but particularly to those coded at Keypunch.

2.0 Definitions

2.1 CODE, GLOBAL: A set of standard codes used in data within the Respiratory Sciences Center designating the status of a data field in three cases: datum refused, datum non-applicable, and datum missing. It can also be a standard approach to coding questions with the same response structures.

2.2 CODE: (n): A value assigned to a data field that represents data information on a physical data form. It is often a way of representing physical data in shorthand. (v): The process of assigning a code to a data field.

2.3 CODE REVIEW: A review, performed by a second Student Data Input Assistant, of each code assigned to field(s) on a physical data form by a first Student Data Input Assistant. The aim of the review is to detect and correct any coding error(s) or problem(s) made or encountered by the first Student Data Input Assistant. This is also referred to as coding verification.

2.4 DATA, PHYSICAL: A datum or data written on a physical data form.

2.5 DATA PROCESSING BATCH (DP BATCH): A number or alphanumeric code assigned to either a collection of household packets, or to a collection of one or more site or lab sheets within a site/lab packet.

2.6 FIELD: An area on a data entry form (i.e., screen) where a datum from a physical form is entered (see FORM, DATA ENTRY below); or an area on a physical form from which a physical datum is entered.

2.7 FIRST STUDENT DATA INPUT ASSISTANT: A Student Data Input Assistant who codes a stack, but who cannot review the coding of the same stack; or, a Student Data Input Assistant who does data entry of a stack, but who cannot do data verification of the same stack.

2.8 FORM, DATA ENTRY = A computer screen representation of a physical data form. The data on the physical form is entered into the computer database via the data entry form.

2.9 FORM, PHYSICAL = The paper or "hard copy" version of a data form. This is also referred to as a "physical data form."

2.10 KEYPUNCH: The primary area in which data entry and data verification of

NHEXAS Arizona field data takes place. It is located in the Respiratory Sciences Center, Room 2329; Arizona Health Sciences Center (AHSC); 1501 N. Campbell Avenue; University of Arizona; Tucson, AZ 85724.

2.11 NHEXAS Arizona: Acronym for **N**ational **H**uman **EX**posure **A**ssessment **S**urvey, a research project conducted in Arizona by the University of Arizona/Battelle/Illinois Institute of Technology consortium.

2.12 OWNERSHIP CARD: A large (6" x 4" or larger) index card placed atop a stack designating who is responsible for the stack, as well as the data processing status of the stack. The card contains a keypunch staff member's name followed by "coding," "reviewing," "data entry," or "data verification." For example, Pat Smith's owner- ship cards would read "Pat's Coding," "Pat's Reviewing," "Pat's Data Entry," and "Pat's Data Verification."

2.13 PACKET: A sturdy, envelope-like container that can be fully closed and is large enough to hold the physical data form(s) generated by a study household, laboratory, research site, or data processing batch. One type of packet is used for one type of physical data forms (eg., manila envelopes would be used for all lab forms processed at the HRP site). Packets are either color coded, labeled according to their contents, or both. What are referred to as "household packets" are relevant to this SOP (see PACKET, HOUSEHOLD below).

2.14 PACKET, HOUSEHOLD: A packet containing the physical data forms for a study household.

2.15 SECOND STUDENT DATA INPUT ASSISTANT: A Student Data Input Assistant who reviews the coding of a stack, but who did not do the original coding of the stack; or, a Student Data Input Assistant who does data verification of a stack, but who did not do the original data entry of the stack.

2.16 STACK: A pile of physical forms representing only *one* type of form ob- tained from the packets of *one* data processing batch. A stack is sorted in ascending, numerical order by key variable(s), is secured by a large rubber band, and is identified by an ownership card at all times when not in process.

3.0 References

None

4.0 Discussion

By the time a physical form is fully processed through the field, keypunch, data processing, and data analysis, many different people may have written information on it. Distinct colors of ink are used by the different groups of NHEXAS Arizona staff in order to distinguish who has written what.

Purple ink is used for the coding of all NHEXAS Arizona forms and questionnaires. This is readily distinguishable from the black ink used by field technicians.

5.0 Responsibilities

5.1 The Project Data Coordinator is responsible for (a) answering any questions about coding instructions and (b) defining or approving additional codes.

5.2 The Data Input Operator Supervisor is responsible for (a) supervising Student Data Input Operators in coding and coding reviews, (b) consulting with the Project Data Coordinator regarding ambiguities in coding instructions, (c) consulting with the Project Data Coordinator regarding additional codes, (d) ensuring that the coding instructions for each physical form are followed, and (e) ensuring that the coding and entry log form is filled out properly after each stack is coded and reviewed. The Data Input Operator Supervisor may delegate any of her or his responsibilities.

5.3 The Student Data Input Assistant is responsible to the Data Input Operator Supervisor, and for (a) coding stacks, (b) reviewing the coding of stacks, and (c) keeping custody of the stacks during coding and coding review.

6.0 Materials and Reagents

6.1 Materials

6.1.1 Stack(s)
6.1.2 "Coding, Entry, and Verification Record" form (referred to as coding and entry log form in this SOP) [Figure 1]
6.1.3 Ownership cards labeled appropriately
6.1.4 Purple pen
6.1.5 SOP# UA-D-5.0: Global Coding Used by NHEXAS Arizona
6.1.6 Coding instructions appropriate to the physical form being coded

6.2 Reagents

None

7.0 Procedure

7.1 The Data Input Operator Supervisor assigns each stack to a *first* Student Data Input Assistant for coding. Ownership cards are attached to the stacks appropriately.

7.2 The Student Data Input Assistant codes the stack(s) according to SOP# UA-D-5.0: Global Coding Used by NHEXAS Arizona, and according to any specific coding instructions for the physical form being coded.

7.2.1 The Student Data Input Assistant "marks" any coding problems or ambiguities by attaching a paper clip to the problematic page and

also attaches post-its if necessary to clarify the location of the problem(s).

7.2.2 Upon completion, the Student Data Input Assistant submits the coded stack(s) to the Data Input Operator Supervisor.

7.3 The Data Input Operator Supervisor assigns each coded stack of forms to a *second* Student Data Input Assistant for coding review. Ownership cards are attached to the stacks appropriately.

7.4 The Student Data Input Assistant reviews the coding of the stack(s) according to SOP# UA-D-5.0: Global Coding Used by NHEXAS Arizona, and according to any specific coding instructions for the physical form being coded.

7.4.1 The Student Data Input Assistant locates any pages that were "marked" because of coding problem(s) and resolves the problem(s) either with the Project Data Coordinator or through another qualified source.

7.2.2 Upon completion, the Student Data Input Assistant submits the stack(s) to the Data Input Operator Supervisor.

7.5 Quality Control

7.5.1 Tolerance Limits

For each physical form in a stack, the coding is 100% reviewed for errors. This quality control measure has been shown to produce a 99% accuracy rate in coding.

7.5.2 Detection Limits

All errors in coding are detectable via the coding review.

7.5.3 Corrective Actions

Any coding errors discovered during the coding review will be corrected.

8.0 Records

8.1 Data to Be Recorded from This Procedure

None

8.2 Record Forms (Attached)

8.2.1 Figure 1: "Coding, Entry, and Verification Record" form

8.3 Location of Record Forms

8.3.1 The batch tracking forms are returned to the Project Data Coordinator after the batch is cleaned. They are then stored in the "Data Processing Batch Sheets" notebook in room 128c of the HRP site.

8.3.2 The "Coding, Entry, and Verification Record" form is retained at Keypunch and stored in the "Coding and Entry Log" notebook.

8.3.3 All coding protocols are stored in the "Coding: NHEXAS Phase" notebook.

Figure 1: "Coding, Entry, and Verification Record" form

CODING, ENTRY, AND VERIFICATION RECORD

FORM NAME:_____   Form ID: UA-C6.0-2.0

DP BATCH	CODING		DATA ENTRY			COMMENTS
	Init Date		Method	Init Date		
	Cod:____ __/__/__ Rev:____ __/__/__		[ ]scan [ ]keyp	Ent:____ Ver:____	__/__/__ __/__/__	
	Cod:____ __/__/__ Rev:____ __/__/__		[ ]scan [ ]keyp	Ent:____ Ver:____	__/__/__ __/__/__	
	Cod:____ __/__/__ Rev:____ __/__/__		[ ]scan [ ]keyp	Ent:____ Ver:____	__/__/__ __/__/__	
	Cod:____ __/__/__ Rev:____ __/__/__		[ ]scan [ ]keyp	Ent:____ Ver:____	__/__/__ __/__/__	
	Cod:____ __/__/__ Rev:____ __/__/__		[ ]scan [ ]keyp	Ent:____ Ver:____	__/__/__ __/__/__	
	Cod:____ __/__/__ Rev:____ __/__/__		[ ]scan [ ]keyp	Ent:____ Ver:____	__/__/__ __/__/__	
	Cod:____ __/__/__ Rev:____ __/__/__		[ ]scan [ ]keyp	Ent:____ Ver:____	__/__/__ __/__/__	
	Cod:____ __/__/__ Rev:____ __/__/__		[ ]scan [ ]keyp	Ent:____ Ver:____	__/__/__ __/__/__	
	Cod:____ __/__/__ Rev:____ __/__/__		[ ]scan [ ]keyp	Ent:____ Ver:____	__/__/__ __/__/__	
	Cod:____ __/__/__ Rev:____ __/__/__		[ ]scan [ ]keyp	Ent:____ Ver:____	__/__/__ __/__/__	
	Cod:____ __/__/__ Rev:____ __/__/__		[ ]scan [ ]keyp	Ent:____ Ver:____	__/__/__ __/__/__	
	Cod:____ __/__/__ Rev:____ __/__/__		[ ]scan [ ]keyp	Ent:____ Ver:____	__/__/__ __/__/__	
	Cod:____ __/__/__ Rev:____ __/__/__		[ ]scan [ ]keyp	Ent:____ Ver:____	__/__/__ __/__/__	
	Cod:____ __/__/__ Rev:____ __/__/__		[ ]scan [ ]keyp	Ent:____ Ver:____	__/__/__ __/__/__	
	Cod:____ __/__/__ Rev:____ __/__/__		[ ]scan [ ]keyp	Ent:____ Ver:____	__/__/__ __/__/__	
	Cod:____ __/__/__ Rev:____ __/__/__		[ ]scan [ ]keyp	Ent:____ Ver:____	__/__/__ __/__/__	
	Cod:____ __/__/__ Rev:____ __/__/__		[ ]scan [ ]keyp	Ent:____ Ver:____	__/__/__ __/__/__	