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MEMORANDUM FOR

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From:

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Subject:

Sampling Specifications for the 1994 Long-Term Care Survey (LTC): Longitudinal Portion and Longitudinal Portion of the Healthy Supplement (Step 2)

This memorandum describes the second step in the sample selection for the longitudinal portion of the 1994 LTC. In the first step, the Health Care Financing Administration updated the longitudinal file. The first step is documented in the May 6, 1994 memorandum from Preston Jay Waite to Sherry L. Courtland, "The File for Selection of the Longitudinal Portion and Longitudinal Portion of the Healthy Supplement for the 1994 Long-Term Care Survey (LTC) (Step 1)." The second step gives instructions for selecting the 1994 longitudinal sample and for assigning persons from the longitudinal sample to be in the healthy supplement.

The 1994 LTC sample will consist of 19,171 persons. Five-thousand of these persons will be selected from persons on the Medicare files who turned 65 since April 1, 1988 (the aged-in sample). Five hundred-forty persons will be selected from persons on the Medicare files who turned 95 on or before March 31, 1994 (the 95+ supplement). The above mentioned persons are not part of the longitudinal sample. The longitudinal portion of the 1994 LTC consists of 13,631 persons from the following groups based on their outcome in the 1989 LTC.

Numeric
Code

Description

- | | |
|-----|--|
| (1) | All persons assigned a detailed community interview in the 1989 LTC. There are 2,701 such persons. |
| (4) | All persons assigned a detailed institutional interview in the 1989 LTC. There are 395 such persons. |
| (5) | A sample of 4,500 persons unimpaired in the 1989 LTC (not assigned a detailed community or institutional interview). |
| (7) | All persons 75+ before April 1, 1994; unimpaired in the 1989 LTC (not assigned a detailed community or |

institutional interview); and not already selected for (5) above. There are 2,528 such persons.

- (8) All persons unimpaired in 1984 and not selected for the 1989 LTC. There are 3,507 such persons.

Persons in groups (1), (4), (7), and (8) defined above do not need to be sampled since all persons in these groups will be selected for the longitudinal sample.

I. Selection of a Sample of the 1989 Unimpaired for the 1994 LTC (Group (5))

A. The Sort

Before these people can be sampled their records need to be sorted in the following order:

1. 1984 Sample Identification Code (SIC)

These are given in the third digit of a person's 1989 control number.

4	=	Institutional
1	=	Impaired
5 or 7	=	Unimpaired
6	=	Aged-in (turned 65 on or after April 1, 1984 and before April 1, 1988)

2. By Stratum Number within 1984 SIC

These should have been assigned as a code for the 1989 sample. It is based on each person's original reason for entitlement.

- i) Stratum 1-all persons originally entitled due to age
- ii) Stratum 2-all persons originally entitled due to disability

3. By Current Survey (CS) PSU within stratum within SIC.

4. By race (white, black, other, unknown) within CS PSUs within stratum within SIC.

5. By age as of April 1, 1988 within race within CS PSUs within stratum within SIC.

B. The Sampling Interval and Random Start

First count the number of nondeceased persons on the file.

Let N = the total number of unimpaired nondeceased persons from the 1989 LTC, then

$$SI = \frac{N}{4500} \text{ rounded to 4 decimal places.}$$

To start the selection of the sample a random start (RS) should be chosen so that $1 \leq RS \leq SI$.

C. Selection of the Sample

Determine the sequence of number $RS, RS + SI, RS + 2SI, RS + 3SI, \dots$ until the absolute difference between N and the last number of the sequence is less than SI . Next, round each number of the sequence up to the next integer (e.g., 6.0487 is rounded up to 7. Note that 5.0000 is rounded to 5). Consider the record for each unimpaired person as numbered consecutively from 1 to N ; then those persons with numbers corresponding to those in the above sequence are the sample of 1989 LTC unimpaired persons included in the 1994 LTC. After the sample is selected, determine the total number of persons in the sample.

D. Persons Unimpaired and 75+

All persons who are 75+, were unimpaired in the 1989 LTC, and have not been selected in I.C. above should be included as part of the 1994 longitudinal sample. These persons are referred to as group (7) on page 1 of this memorandum.

II. Designating Which Longitudinal Persons are Eligible for the Healthy Supplement

A. Overview

A sample of persons from all groups of the longitudinal sample defined on pages 1 and 2 of this memorandum except for the institutional component (group (4)) need to be selected for the healthy supplement. If these persons screen in as healthy, they will be interviewed with the LTC-3, Community Questionnaire, at the time of their LTC interview. This section describes the systematic selection of sample persons from the longitudinal sample. Section III.A. describes how an H will be assigned to the control number for these persons.

B. Sorting the Longitudinal Sample

Before selecting the healthy supplement from the longitudinal sample, sort the records within each group in the following order (Sort the institutional sample, group (4), as well. They won't be selected for the healthy supplement, but they need to be sorted in the same order.):

1. By longitudinal sample
2. By stratum number within longitudinal sample
3. By LTC PSU number within stratum within longitudinal sample
4. By race (white, black, other, unknown) within LTC PSUs within stratum within longitudinal sample
5. By age within races within LTC PSUs within stratum within longitudinal sample

C. Random Start and Sampling Interval

1. The sampling interval (SI) for selecting the healthy supplement is 10.3605.
2. The random start (RS) is $(.1762 * 10.3605) = 1.8255$

D. Applying the Random Start and Sampling Interval

Select the sample of persons for the healthy supplement from groups (1), (5), (7), and (8) as follows:

1. First determine the sequence of numbers
 $RS, RS + SI, RS + 2*SI, RS + 3*SI...$, until the absolute difference between the number of persons selected for the longitudinal sample (n) and the last member of the sequence is less than SI .
2. Next round each number of the sequence up to the next integer (e.g., 6.0487 is rounded to 7). Note a number such as 5.0000 is rounded to 5.
3. Consider the longitudinal sample as numbered consecutively from 1 to n . Those persons with numbers corresponding to those in the above

rounded sequence are the persons from the longitudinal sample that are in the healthy supplement.

E. Designating Persons from the Longitudinal Sample to Receive the Healthy Supplement if They Screen in as Healthy

The records of persons selected for the longitudinal sample and the healthy supplement will be designated with an H in their control numbers according to the specifications given in section III.A.

III. Sample File

Following the selection of the 1989 unimpaired and the healthy supplement (sections I. and II. above), create a sample file for the longitudinal sample (groups (1), (4), (5), (7), and (8)) consisting of the entire compressed record (see Attachment B), plus the LTC PSU number and all sample identifiers and parameters listed in III.A. below. The records of this file should be sorted by LTC PSU in numerical order as specified in Attachment A, then by control number within LTC PSU.

A. Sample Identification Codes and Parameters

Several codes and parameter values are to be assigned to each person on the sample file. Some codes are to be applied in a systematic fashion; it is important that these codes are applied to sample persons in the prescribed order. Such ordering is specified below for the codes which are to be applied systematically.

Assign the following codes and parameter values to the sample persons:

1. LTC Control Number

Each sample person is to be assigned a 14-digit LTC control number. The control number has the following form:

Digit 1:	screeener or nonscreeener code
Digit 2:	zero-filled pad
Digit 3:	sample identification code 1 (based on status in 1982, also referred to as the 1984 sample component)

- Digit 4: sample identification code 2 (based on status in 1984, also referred to as the 1989 sample component)
- Digit 5: sample identification code 3 (based on status in 1989, also referred to as the 1994 sample component)
- Digits 6-8: CS PSU number (listed in Attachment A)
- Digits 9-12: sequential numbers within CS PSUs
- Digit 13: healthy supplement code (identifies persons selected to receive the healthy supplement if they are determined to be healthy)
- Digit 14: check digit

The 1994 LTC control number is exactly the same as the 1989 LTC control number except for the addition and deletion of the following digits: the addition of the zero-filled pad (digit 2), the addition of the sample identification code 3 (digit 5), the addition of the healthy supplement code (digit 13), and the deletion of the caregiver code.

The 1994 LTC control number is exactly the same as the 1984 LTC control number except for the addition of five digits: the screener/nonscreener code (digit 1), the sample identification code 2 (digit 4), and digits 2, 5, and 13 as above.

Below are instructions for determining each component of the control number.

a. **Screener or Nonscreener Code (Digit 1)**

The first digit of a person's control number indicates whether the person receives a full or partial screener interview. An S indicates a full screener interview and an N indicates a partial screener interview.

All persons unimpaired in previous LTC surveys should have an S for digit 1. All persons impaired in the 1989 LTC survey should have an N for digit 1.

b. Zero-filled pad (Digit 2)

The zero-filled pad is 0 filled for all persons. The zero-filled pad makes the control number an even number of digits, which is a requirement for barcoding.

c. Sample Identification Code 1 (Digit 3)

The third digit of a person's control number designates a person's 1982 status group for the 1984 LTC. These are given below:

<u>Numeric Codes</u>	<u>Description</u>
(0)	A person who was not in the 1984 LTC, or a person who was unimpaired in the 1984 LTC but was not selected for the 1989 LTC.
(1)	A person who was given a detailed community interview in the 1982 LTC.
(2)	A person who was type A noninterview for their 1982 detailed community interview.
(3)	A person who was type A noninterview for their 1982 screener and who was institutionalized after April 1, 1982.
(4)	A person who was type C noninterview for their 1982 screener and who was institutionalized before April 1, 1982.
(5)	A person who was unimpaired in the 1982 LTC.
(6)	A person who aged into the 1984 sample (not in the 1982 population due to age).

d. Sample Identification Code 2 (Digit 4)

The fourth digit of a person's control number designates the person's 1984 status group for the 1989 LTC. These are given below:

<u>Numeric Codes</u>	<u>Description</u>
(0)	A person who was not in the 1989 LTC.
(1)	A person who was given a detailed community interview in the 1984 LTC. This includes Type A nondeceased persons in the 1984 LTC.
(4)	A person who was given a detailed institutional interview in the 1984 LTC. This includes Type A nondeceased persons in the 1984 LTC.
(5)	A person who was unimpaired in the 1984 LTC (not assigned a detailed community or institutional interview) and was in the sample chosen for the 1989 LTC.
(6)	A person who turned 65 on or after April 1, 1984 (aged-in for the 1989 LTC).
(7)	A person who was unimpaired in 1984, who is 75+ years in the 1989 LTC, and who was not selected for (5) above.

Assign persons unimpaired in 1984 but not selected for the 1989 LTC a 0 for digit 4.

e. **Sample Identification Code 3 (Digit 5)**

The fifth digit of a person's control number designates the person's 1989 status group (for the 1994 LTC). These are given below:

<u>Numeric Codes</u>	<u>Description</u>
(1)	A person who was given a detailed community interview in the 1989 LTC. This includes Type A nondeceased persons in the 1989 LTC.
(4)	A person who was given a detailed institutional interview in the 1989 LTC. This includes Type A nondeceased persons in the 1989 LTC.

- (5) A person who was unimpaired in the 1989 LTC (not assigned a detailed community or institutional interview) in the sample chosen for the 1994 LTC.
- (6) A person who turned 65 on or after April 1, 1988 (aged-in for the 1994 LTC).
- (7) A person who was unimpaired in the 1989 LTC, who is 75+ years in 1994, and who was not selected for (5) above.
- (8) A person who was unimpaired in the 1984 LTC but who was not selected for the 1989 LTC.

Example: A person unimpaired in 1982, selected for the unimpaired sample in 1984, and institutionalized in 1989 should have a 5 in digit 3, a 5 in digit 4, and a 4 in digit 5 of their control number.

f. CS PSU Number (Digits 6-8)

Persons in the longitudinal portion of LTC should use the same number they were assigned for the 1989 LTC.

g. Sequential Numbers Within CS PSUs (Digits 9-12)

Persons in the longitudinal portion of LTC should use the same number they were assigned for the 1989 LTC.

h. Healthy Supplement Code (Digit 13)

Assign all persons selected for the healthy supplement the letter H for digit 13 of their control number. Assign all other persons the letter O for digit 13 of their control number.

i. Check Digit (Digit 14)

The check digit is calculated from the first 11 digits after the screener/nonscreener code of the control number.

- 1) Write the first 11 digits after the screener/nonscreener code of the control number, A, as

$$A = C_2C_3C_4C_5C_6C_7C_8C_9C_{10}C_{11}C_{12}$$

2) Compute the products

$$\begin{aligned}
 B_2 &= 1 \times C_2 \\
 B_3 &= 2 \times C_3 \\
 B_4 &= 7 \times C_4 \\
 B_5 &= 8 \times C_5 \\
 B_6 &= 1 \times C_6 \\
 B_7 &= 2 \times C_7 \\
 B_8 &= 7 \times C_8 \\
 B_9 &= 8 \times C_9 \\
 B_{10} &= 1 \times C_{10} \\
 B_{11} &= 2 \times C_{11} \\
 B_{12} &= 7 \times C_{12}
 \end{aligned}$$

3) Let D = the sum of the digits of $B_2, B_3, B_4, B_5, B_6, B_7, B_8, B_9, B_{10}, B_{11},$ and B_{12} .

Note: if $B_5 = 24$ then digits 2 and 4 will be summed for D

4) The check digit is the units digit of D .

j. Always write the control number with dashes after the sample identification code 3, after the CS PSU number, and before the healthy supplement code and check digit, i.e.,

k. Example

Suppose that in LTC PSU 102, from CS PSU 105 there are ten sample persons selected for the unimpaired sample (group (5)). The tenth sample person in order of selection is designated for the healthy supplement, has CS PSU number 105, and has sequential number 0010. If this person were unimpaired in 1982 and 1984, then the first 11 digits after the screener/nonscreener code of this person's control number are 05551050010. The check digit is computed as follows:

$$A = C_2 C_3 C_4 C_5 C_6 C_7 C_8 C_9 C_{10} C_{11} C_{12}$$

$$\begin{array}{ll}
 B_2 = 1 \times 0 = 0 & B_8 = 7 \times 5 = 35 \\
 B_3 = 2 \times 5 = 10 & B_9 = 8 \times 0 = 0 \\
 B_4 = 7 \times 5 = 35 & B_{10} = 1 \times 0 = 0 \\
 B_5 = 8 \times 5 = 40 & B_{11} = 2 \times 1 = 2 \\
 B_6 = 1 \times 1 = 1 & B_{12} = 7 \times 0 = 0 \\
 B_7 = 2 \times 0 = 0 &
 \end{array}$$

$$D = 0+1+0+3+5+4+0+1+0+3+5+0+0+2+0 = 24$$

$$\text{Check digit} = 4$$

The control number is S0555-105-0010-H4.

2. Reduction Group Code

Reduction group codes are assigned in case a sample needs to be reduced in the future. A sample may need to be reduced because of budgetary problems. Sort the longitudinal sample as described in section II.B. Assign a three digit code to each sample person in the longitudinal sample. Assign a reduction group code to each person, beginning with 003 for the first sample person, increasing by one until a person is assigned reduction group code 101, then continuing with 001 through 101 as often as necessary.

3. Stratum Code

Retain each person's stratum code.

4. Quantities to be Used in Weighting the Sample

Retain each sample person's longitudinal record.

B. Output

Please provide the following data so that the sample selection can be verified:

1. A dump of 200 records: 20 records from the beginning and end of each longitudinal component
2. N = the total number of unimpaired nondeceased persons from the 1989 LTC (group (5))
3. SI = the sampling interval for selecting the sample of 4,500 unimpaired persons from the 1989 LTC

4. n_i = the number of persons in the sample of persons selected to be in the 1994 sample for each 1989 LTC status group. The 1989 LTC groups are defined on pp.1-2 of this memorandum.
5. h_i = the number of persons designated for the healthy supplement for each 1989 LTC status group (i.e., the number of persons who have an H in their control number).