

1995 National Nursing Home Survey (NNHS)

Description

INTRODUCTION--The micro-data tape comprises data collected in the 1995 National Nursing Home Survey (NNHS). This nationwide sample survey of nursing homes and their current residents was conducted by the National Center for Health Statistics from July through December 1995. The survey was conducted via a combination of personal interviews and self-enumerated forms. Data on nursing home characteristics were obtained by personal interview with the administrator, data on the financial characteristics of the facility were self-enumerated by the nursing home's accountant or bookkeeper. Data on a sample of residents currently residing in the facility were obtained by interviewing a staff person most familiar with the medical records. Responses are for 8,056 current residents from the 1,409 nursing homes that participated in the survey. For a description of the sample design and data collection methods, see below.

HISTORY--The 1995 NNHS, a segment of the Long-Term Care Component of the National Health Care Survey (1), is the fourth survey of nursing home facilities and their current residents. The first NNHS was conducted between August 1973 and April 1974; the second from May through December 1977; and the third survey was conducted from August 1985 through January 1986. Prior to the creation of this continuing data collection system, NCHS conducted a series of three ad hoc sample surveys of nursing and personal care homes called the Resident Places Surveys (RPS 1, 2, 3). These surveys provided much of the background information and experience used to develop the first NNHS. These surveys were conducted during April-June 1963, May-June 1964, and June-August 1969, respectively. RPS-1, the first of these surveys, collected data on nursing homes, chronic disease and geriatric hospitals, and nursing home units and chronic disease wards of general and mental hospitals.

RPS-3, the last ad hoc survey, sampled nursing and personal care homes in the conterminous United States.

Sampling Frame and Size of Sample

The sample for the 1995 NNHS was taken from a frame that consisted of all nursing home facilities identified in the 1991 National Health Provider Inventory (NHPI) (2) and updated list. The updated list of facilities was obtained from the facilities that came from the Agency Reporting System (ARS) as of September, 1993 (3). The ARS is a system where organizations routinely send their most recent listings/directories to NCHS. The sampling frame was further updated using the ARS as of September, 1994. Therefore, the final sampling frame consisted of lists of nursing homes from 1991 NHPI and the updated lists from the 1993 and 1994 ARS.

The universe for the 1995 NNHS consisted of about 17,500 nursing and related care homes in the United States. Places that only provide room and board are excluded. Places are also excluded if they have fewer than three beds set up for use by persons not related to the owner. Facilities in the universe are freestanding or are nursing care units of hospitals, retirement centers, or similar institutions where the unit maintains financial and resident records separate from those of the larger institution.

The sample consisted of 1,500 nursing and related care homes. Of these facilities, 44 refused to participate and 47 were out-of-scope for one or more of the following reasons: the nursing home had gone out of business, it failed to meet the definition of a nursing home as used in this survey, or it did not maintain separate financial records. A total of 1,409 nursing homes participated in the survey.

Sample Design

The sampling was basically a stratified two-stage probability design. The first-stage was the selection of facilities and the second-stage was the selection of residents. The primary sampling strata of facilities were defined by bed size and certification status. The strata of certified facilities consist of facilities which according to data in the sampling frame were certified by either Medicare or Medicaid as a skilled nursing or intermediate care facility. Within primary strata, facilities were arrayed by ownership, geographic region, metropolitan status, State, and county. Facilities were then selected using systematic sampling with probability proportional to their bed size.

The number of nursing homes estimated by the survey (16,700) is less than the universe figure (17,500) for several reasons. Some facilities went out of business or became ineligible for the scope of the survey between the time universe was frozen and the survey was conducted. A facility was considered out-of-scope if it did not provide nursing, personal or domiciliary care services e.g., facilities providing only room and board.

The second-stage sampling of residents was carried out by the interviewers at the time of their visits to the facilities in accordance with specific instructions given for each sample facility. The sample frame for residents was the total number of residents on the register of the facility as of midnight of the day prior to the day of the survey. Residents who were physically absent from the facility due to overnight leave or a hospital visit but had a bed maintained for them at the facility were included in the sample frame. A sample of up to six current residents per facility was selected.

Data Collection Procedures

The 1995 NNHS utilized four questionnaires: Facility Questionnaire, Expense Questionnaire and Definition Booklet, Current Resident Sampling List, and Current Resident Questionnaire. Data were collected according to the following procedures: (I) A letter was sent to the administrators of sample facilities informing them of the survey and the fact that interviewers would contact them for appointments. Letters of endorsement by the American College of Health Care Administrators, American Association of Homes and Services for the Aging, and American Health Care Association were sent with the introductory letter to urge the administrator of the facility to participate in the survey. Also included with this introductory letter was one of the reports from the last survey to illustrate how the data would be displayed. (II) After the mailing of the letters, the interviewer telephoned the sample facility and made an appointment with the administrator. (III) At the time of the appointment, the following procedures were followed: The Facility Questionnaire was completed by the interviewer who interviewed the administrator or designee. After completing this form, the interviewer secured the administrator's permission to send the Expense Questionnaire to the facility's accountant. The interviewer then completed the Current Resident Sampling List (a list of all residents in the facility on the night before the day of the survey), selected the sample of residents from it, and completed a Current Resident Questionnaire for each sample person by interviewing the member of the nursing staff familiar with care provided to the resident. The nurse referred to the resident's medical records. No resident was interviewed directly.

Estimation Procedures

The statistics contained on the micro-data tape reflect data concerning only a sample of nursing homes, and their residents. Because these data are based on a sample and not a complete count, an inflation factor or "record weight" is assigned to each record. By aggregating the "record weight", an estimated complete count for National data can be obtained for nursing homes, residents and related characteristics. In general, each data file has only one record weight. The facility file, however, has two different weights: facility home weight (positions 453-460), and facility bed weight (positions 461-468). The facility home weight is used to estimate the number of nursing homes. The facility bed weight is used to estimate all characteristics related to bed size such as number of beds, and admissions. The major reason for these different weights is that the best estimator for facility characteristics related to size included a bed ratio adjustment, while the best estimator for number of facilities does not. A discussion of the estimation procedures follows:

The weights used to inflate sample data on these data files are derived by a ratio estimating procedure. The purpose of ratio estimation is to take into account all relevant information in the estimation process, thereby reducing the variability of the estimate. The estimation of number of facilities and facility data not related to size are inflated by the reciprocal of the probability of selecting the sample facilities and adjusted for the nonresponding facilities within primary strata. Two ratio adjustments, one at each stage of sample selection, were also used in the estimation process. The first-stage ratio adjustment (along with the preceding inflation factors) was included in the estimation of facility data related to size, and of all resident data for all primary types of strata. The numerator was the total beds according to data in the universe, for all

facilities in each stratum. The denominator was the estimate of the total beds obtained through a simple inflation of the data in the universe for the sample facilities in each stratum. The effect of the first-stage ratio adjustments was to bring the sample in closer agreement with the known universe of beds. The second-stage ratio adjustment was included in the estimation of all resident data. It is the product of two fractions: the first is the inverse of the sampling fraction for residents upon which the selection is based; the second is the ratio of the number of sample residents in the facility to the number of residents for whom questionnaires were completed within the facility.

Reliability of estimates

Because the data presented on this tape are based on a sample, they will differ somewhat from data that would have been obtained if a complete census had been taken using the same schedules, instructions, and procedures. As in any sample survey, the results are subject to both sampling and nonsampling errors. Nonsampling errors include errors due to response bias, questionnaire and item nonresponse, recording, and processing errors. To the extent possible, the latter types of errors are kept to a minimum by methods built into survey procedures. Because survey results are subject to both sampling and nonsampling errors, the total error is larger than errors due to sampling variability alone. The standard error is primarily a measure of the variability that occurs by chance because only a sample, rather than the entire universe, is surveyed. The standard error also reflects part of the measurement error, but it does not measure any systematic biases in the data. It is inversely proportional to the square root of the number of observations in the sample. Thus, as the sample size increases, the standard error generally decreases. The chances are about 68 in 100 that an estimate from the sample differs by less than the standard error from the value that would be obtained from a complete census. The chances are about 95 in 100 that the

difference is less than twice the standard error and about 99 in 100 that it is less than 2-1/2 times as large. The standard errors used in this report were approximated using SUDAAN software. SUDAAN computes standard errors by using a first-order Taylor approximation of the deviation of estimates from their expected values. A description of the software and the approach it uses has been published (4). To derive error estimates that would be applicable to a wide variety of statistics and could be prepared at moderate cost, several approximations were required. Rather than calculate standard errors for particular estimates $S_{\underline{x}}$, the calculated variances for a wide variety of estimates were fitted into curves using the empirically determined relationship between the size of an estimate \underline{X} and its relative variance (rel var \underline{X}). This relationship is expressed as:

$$rel\ var\ X = \frac{S_{\underline{x}}^2}{X^2} = \underline{a} + \frac{\underline{b}}{X}$$

where a and b are regression estimates determined by an iterative procedure.

The relative standard error is then derived by determining the square root of the relative variance curve. The relative standard error estimates for estimated number of admissions; beds; total full-time equivalent staff and nurse's aides; full-time equivalent administrative, medical, and therapeutic staff; and facilities are shown in figure I. Figure II shows the relative standard errors for estimated number of resident days of care, residents and registered nurses, respectively. The relative standard error (RSE(X)) of an estimate X may be read directly from the curves

$$RSE(X) = \sqrt{A + \frac{B}{X}}$$

in figures I and II or, alternatively, may be calculated by the formula: where the appropriate constants A and B for the estimate X are defined in Table 1.

Table 1

Parameters used to compute relative standard errors by type of estimate

| Type of Estimate | Parameters | |
|--------------------|------------|------------|
| | A | B |
| Current residents | -0.000139 | 321.778954 |
| Facilities | -0.001982 | 24.781718 |
| Admissions | 0.013441 | 534.797538 |
| Bed size | -0.000538 | 862.978462 |
| Full time employee | -0.000492 | 888.770235 |

To approximate the relative standard error (RSE(p)) and the standard error (SE(p)) of a percent p, the appropriate values of parameter B from table I are used in the following equations:

$$RSE(\underline{p}) = \sqrt{\frac{(B \cdot (100 - \underline{p}))}{\underline{p} \cdot Y}}$$

$$SE(\underline{p}) = \underline{p} \cdot RSE(\underline{p})$$

where \underline{x} = the numerator of the estimated percent, \underline{y} = the denominator, and \underline{p} = 100 · X/Y.

The approximation of the relative standard error or the standard error of a percent is valid only when one of the following conditions is satisfied: the relative standard error of the denominator is 5 percent or less (5) or the relative standard errors of the numerator and the denominators are both 10 percent or less (6).

Presentation of Estimates

Publication of estimates for the NNHS is based on the relative standard error of the estimate and the number of sample records on which the estimate is based (referred to as the sample size). Estimates are not presented in NCHS reports unless a reasonable assumption regarding the probability distribution of the sampling error is possible.

Based on consideration of the complex sample design of the NNHS, the following guidelines are used for presenting NNHS estimates:

If the sample size is less than 30, the value of the estimate is not reported.

If the sample size is 30-59, the value of the estimate is reported but should not be assumed reliable.

If the sample size is 60 or more and the relative standard error is less than 30 percent, the estimate is reported.

If the sample size is 60 or more but the relative standard error is over 30 percent, the estimate is reported but should not be assumed reliable.

Questions concerning data on this tape should be directed to:

Center for Disease Control
National Center of Health Statistics
Division of Health Care Statistics
Long-Term Care Statistics Branch
Chief, Lauren Harris-Kojetin, Ph.D.
3311 Toledo Road
Hyattsville, Maryland 20782
(301)458-4747

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