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Nursing Home Characteristics Preliminary Data From the 1985 National Nursing Home Survey

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Introduction

The National Nursing Home Survey (NNHS) is a nationwide (excluding Alaska and Hawaii) sample survey of nursing and related care homes, their residents, their discharges and their staff conducted periodically by the National Center for Health Statistics. Preliminary data on nursing home characteristics from the 1985 NNHS are presented in this report. Because the estimates in this report are preliminary, they may differ slightly from estimates published in future 1985 NNHS reports due to further editing of the data. The 1985 NNHS is the third in a series of periodic surveys conducted between August 1985 and January 1986. The first NNHS survey was conducted between August 1973 and April 1974; the second survey was conducted from May through December 1977. For convenience, this report will use the terms "nursing and related care homes," "nursing homes," and "facilities" interchangeably.

The focus of this report is facility characteristics and will include trend data about the characteristics of facilities from all three surveys and national estimates on the following topics from the 1985 survey:

- Facility characteristics (number of homes and beds by ownership, certification, bed size, region, and affiliation).
- Utilization data (number of current residents, discharges, admissions, admissions per bed, and occupancy rates).
- Employees (number and rates per 100 beds of full-time equivalent employees by occupational category according to selected facility characteristics).
- Nursing home per diem rates (data on basic amount charged private pay patients by level of care and per diem rates for medicare/medicaid patients by certification status according to ownership and location of the facility).

Background

The foundation for the 1985 NNHS sampling frame was the 1982 National Master Facility Inventory (NMFI) Survey.[1] Facilities in the NMFI are homes with three beds or more and with available nursing or personal care to the residents. Added to this 1982 NMFI list of over 17,000 nursing and related care homes were homes identified by the Agency Reporting System[2] as having opened between the time of the 1982 NMFI Survey and June 1, 1984 (the cutoff date for the sampling frame), homes located by the 1982 Complement Survey,[3] and hospital-based nursing facilities certified by the Health Care Financing Administration. The final sampling frame consisted of about 20,500 nursing and related care homes in the conterminous United States.

The 1985 NNHS is similar in scope to that of the 1977 survey that included nursing care homes, personal care homes (with and without nursing), and domiciliary care homes. The two later surveys represent a broadening in scope over that of the 1973–74 survey, which excluded facilities providing only personal care or domiciliary care. Because personal and domiciliary care homes constitute such a small proportion of the 1977 and 1985 surveys, no special adjustments will be made when comparing the three surveys.

The sample design[4] for the 1985 NNHS was a stratified two-stage probability design. The first stage was the selection of 1,220 facilities. The second stage allowed for a maximum selection of five current residents, six discharges, and four registered nurses from each of the 1,220 facilities.

Six questionnaires were used to collect data in the 1985 survey. Data on characteristics of the facility were collected on the Facility Questionnaire by interviewing the administrator. With the permission of the administrator, cost data were col-

lected on the self-administered Expense Questionnaire returned by mail from the facility's accountant or bookkeeper. A recent financial statement, if available, was acceptable as a replacement for the completed expense questionnaire. Information to complete the Current Resident Questionnaire and Discharged Resident Questionnaire was obtained by interviewing the staff person most familiar with the medical records of the resident. Additional information about the residents was obtained in a telephone interview using a Next-of-Kin Questionnaire. Registered nurses were asked to complete a self-administered Nursing Staff Questionnaire and return it to the interviewer or mail it to the data processing headquarters. Additional employee data were collected on the Facility Questionnaire for all categories of full-time and part-time workers.

Estimates of admissions, admissions per 100 beds, and occupancy are for 1984. Discharge estimates cover 1 year prior to the day of the survey. Because all estimates are based on a sample of nursing homes rather than a complete enumeration, they are subject to sampling variability. Information on sampling variability is presented in the Technical notes.

Separate Advance Data reports on current residents and discharges are planned for publication this year.

Facility characteristics

Survey estimates for 1985 indicate that there were 19,100 nursing homes with 1,624,200 beds. This represents a 22-percent increase in the number of nursing homes since the 1973–74 survey and a 38-percent increase in the number of beds (table 1).

There continue to be significantly more proprietary homes than nonprofit or government-owned nursing homes. Proprietary homes accounted for an overwhelming 75 percent of all nursing homes in the 1985 NNHS. Homes owned by nonprofit organizations made up 20 percent of the total while the remaining 5 percent were operated by Federal, State, and local governments. As would be expected, homes operated for profit had the largest proportion of beds (69 percent). Nonprofit and government homes were larger in size than proprietary homes by 24 and 68 percent, respectively (table 2).

An important classification of nursing homes is according to certification status. Nursing homes are classified as follows by Social Security's medicare and medicaid programs:

- Skilled nursing facilities (SNF's) by medicare (Title XVIII).
- Skilled nursing facilities (SNF's) by medicaid (Title XIX).
- Intermediate care facilities (ICF's) by medicaid (Title XIX).

Since SNF regulations are identical under medicare and medicaid, a skilled nursing home may have dual certification status. In addition, a nursing home could be certified as both an SNF and an ICF. This is accomplished by allocating a specific number of beds to each certification status. The proportion of homes certified as both an SNF and an ICF increased significantly from 24.3 percent of the total homes in 1977 to 29.8 percent of total homes in 1985.

A nursing home may not meet certification criteria or may choose not to participate in the program and therefore be classified as not certified.

More than 75 percent of all nursing homes in the 1985 NNHS were certified as an SNF by medicare or medicaid, an ICF by medicaid, or certified as both an SNF and an ICF. Although homes that were not certified made up 25 percent of the total number of homes, they had only 11 percent of the total beds and averaged only 39 beds per home (table 2).

Of a total 14,400 homes with some form of certification, about 40 percent were certified as both SNF's and ICF's. Homes certified as both SNF's and ICF's had the largest proportion of beds (50.2 percent) and had the largest average bed size (127 beds per home). Homes providing intermediate care only constituted 37 percent of all certified homes, had 28.4 percent of the total beds and an average bed size of 77 beds. The "SNF's only" group of certified homes constituted 24 percent of all certified homes, 21 percent of the beds, and had an average bed size of 88 beds per home. The majority (73 percent) of the 14,400 certified homes were operated for profit (table 3).

Chain affiliation describes those homes that are members of a group of facilities operating under one general authority or general ownership. Fewer homes were operated as part of a chain in 1985 than were operated independently. However,

Table 1. Facility characteristics and measures of utilization for nursing homes: United States, 1973–74, 1977, and 1985

	Facility characteristics				*Measures of utilization*				
Survey year	*Homes*	*Beds*	*Full-time equivalent employees (FTE's)*[1]	*FTE's*[1] *per 100 beds*	*Current residents*	*Discharges*	*Admissions*	*Admissions per 100 beds*	*Occupancy*
	Number								Rate[2]
1985	19,100	1,624,200	793,600	48.9	1,491,400	1,223,500	1,299,200	80.5	91.6
1977	18,900	1,402,400	647,700	46.2	1,303,100	1,117,500	1,367,400	98.4	89.0
1973–74	15,700	1,177,300	485,400	41.2	1,075,800	1,077,500	1,110,800	95.3	86.5

[1]Includes only those providing direct patient care: Administrative, medical, and therapeutic staff; registered nurses; licensed practical nurses; nurse's aides; and orderlies. The FTE's are calculated by dividing part-time hours by 35 and adding the results to full-time employees.

[2]Occupancy rate $= \frac{\sum \text{Aggregate number of days of care provided to residents in year prior to survey year} \times 100}{\sum \text{Estimated number of beds in year prior to survey year} \times 366}$

NOTE: Admissions, admissions per 100 beds, and the occupancy rates are for the calendar year prior to the survey year.

Table 2. Number and percent distribution of nursing homes and beds and beds per nursing home by selected nursing home characteristics: United States, 1985

Facility characteristic	Nursing homes		Nursing home beds		
	Number	Percent distribution	Number	Percent distribution	Beds per nursing home
Total	19,100	100.0	1,624,200	100.0	85.0
Ownership					
Proprietary	14,300	74.9	1,121,500	69.0	78.4
Voluntary nonprofit	3,800	19.9	370,700	22.8	97.6
Government	1,000	5.2	131,900	8.1	131.9
Certification					
Certified facilities	14,400	75.8	1,441,300	88.8	99.4
Skilled nursing facility only	3,500	18.3	307,900	19.0	88.0
Skilled nursing facility and intermediate care facility	5,700	29.8	724,000	44.6	127.0
Intermediate care facility only	5,300	27.7	409,400	25.2	77.2
Not certified	4,700	24.6	182,900	11.3	38.9
Bed size					
Less than 50 beds	6,300	33.0	151,100	9.3	23.9
50–99 beds	6,200	32.5	444,300	27.4	71.7
100–199 beds	5,400	28.3	702,100	43.2	130.0
200 beds or more	1,200	6.3	326,700	20.1	272.3
Census region					
Northeast	4,400	23.0	371,100	22.8	84.4
North Central	5,600	29.3	531,700	32.7	94.9
South	6,100	31.9	488,300	30.1	80.0
West	3,000	15.7	233,100	14.4	78.6
Affiliation					
Chain	7,900	41.4	800,000	49.3	101.5
Independent	10,000	52.4	680,700	41.9	68.1
Government	1,000	5.2	131,900	8.1	131.9
Unknown	*100	*0.5	11,600	0.7	116.0

NOTE: Figures may not add to totals due to rounding.

Table 3. Certification status of nursing homes by ownership and affiliation: United States, 1985

Ownership and affiliation	Total	Certified homes				Not certified
		Total	Skilled nursing facility only	Skilled nursing facility and intermediate care facility	Intermediate care facility only	
	Number					
Total	19,100	14,400	3,500	5,700	5,300	4,700
Ownership						
Proprietary	14,300	10,500	2,800	3,900	3,800	3,800
Voluntary nonprofit	3,800	3,000	500	1,400	1,100	700
Government	1,000	900	200	400	300	100
Affiliation						
Chain	7,900	7,400	1,300	3,200	2,900	500
Independent	10,000	6,000	2,000	2,100	1,900	4,000
Government	1,000	900	200	400	300	100
Unknown	*100	-	-	-	-	100

NOTE: Figures may not add to totals due to rounding.

chain homes had a larger share of the total number of beds and a larger average bed size of 101.5 beds per home compared with 68.1 beds per home for independently owned facilities (table 2). There has also been a significant increase in the number of chain homes since the 1977 NNHS survey. Chain homes increased from 28 percent of total homes in 1977 to 41 percent of total homes in 1985.

Significantly more chain homes have some form of certification than do independently operated homes. Almost 94 percent of the total chain homes were certified in 1985 while 60 percent of the total independently operated were certified (table 3).

Table 2 also shows homes and beds and beds per home by bed size and U.S. Bureau of the Census region.

Utilization

The procedures for collecting certain measures of utilization differed by method and time period. The reader should consider these differences, as explained in the text that follows, when making comparisons.

Probably the single most important measure of nursing home utilization is occupancy rate, which estimates that nursing homes operated at about 92 percent of capacity in 1984. The rate for 1984 represents a significant increase over the 1972 rate of 85.6 percent. The 1.5 million residents served in 1985 were counts for the night before the survey. The number of residents in 1985 had increased 14 percent since the 1977 survey and 39 percent since the 1973–74 survey. The ratio of residents 65 years and over in nursing homes to those in the general population has remained virtually unchanged. Over the past 12 years, nearly 50 of every 1,000 persons 65 years and over continue to reside in nursing homes. In other words, nursing home usage by residents in the 65 years and over age group has kept pace with the increase in the elderly population.

There was a significant decrease of 2.8 beds per 1,000 population 65 years and over between 1977 and 1985 (table 4). Although there is much discussion about the ratio of beds per 1,000 elderly, no consensus exists on the appropriate number. Hence, it is difficult to interpret what this decrease in number of beds means in terms of availability of nursing home beds to potential elderly residents.

The number of admissions was determined by directly asking the administrator for this information for calendar year 1984. Admissions were down from the 1.4 million in 1977 to 1.3 million in 1985. The admissions per 100 beds rate in 1985 was also down significantly from 1977 (98.4 to 80.5, table 1).

The 1.2 million discharges were estimated from a sample of all events in which a person was discharged alive or dead during the 12 months ending on the day prior to the facility's survey date (table 1).

Employees

Employee data presented in this report are in terms of full-time equivalent (FTE) employees. The FTE's are computed to neutralize the variations between facilities that hire part-time workers to cover the number of hours of a full-time worker. Thirty-five hours of part-time work are taken to equal that of one full-time employee. Full-time employees and part-time hours are converted to FTE employees by dividing part-time hours by 35 and adding the result to full-time employees. The procedure used to collect employee data differed slightly in each of the survey years. In 1973–74, all employees were listed for each sample facility, and a sample was taken from each listed category. However, in the 1977 survey, estimates were based on a sample of employees from each sample facility. In the 1985 survey, total counts for employee categories were asked of the facility's administrator. These differences should be considered when comparing FTE's for different survey years.

The 1985 survey included individuals employed full time and part time along with the number of part-time hours worked for each category of part-time workers. All employees providing direct or indirect services to nursing home residents were included in the survey. Unlike previous surveys, clerical, food service, housekeeper, and maintenance personnel, as well as other employees providing indirect services to residents, were included in the 1985 survey. However, to provide a credible comparison of FTE's in previous surveys with 1985, FTE's presented in table 1 for 1985 exclude those FTE's providing indirect patient care.

Table 4. Beds per 1,000 population 65 years and over, residents 65 years and over per 1,000 population, total population, and standard errors of the rates: United States, 1973–74, 1977, and 1985

Survey year	*Beds per 1,000 population 65 years and over*		*Residents 65 years and over per 1,000 population 65 years and over*		
	Number	*Standard error*	*Number*	*Standard error*	*Total U.S. resident population*
					Number in thousands
1985	56.9	0.70	46.0	1.00	28,530[1]
1977	59.7	0.48	47.9	0.71	23,494[2]
1973–74	55.2	0.33	45.1	0.38	21,329[2]

[1]U.S. Bureau of the Census: Estimates of the population of the United States, by age, sex, and race, 1980 to 1985. *Current Population Reports.* Series P–25, No. 985. Washington. U.S. Government Printing Office, 1986.
[2]U.S. Bureau of the Census: Estimates of the population of the United States, by age, sex, and race, 1970 to 1977. *Current Population Reports.* Series P–25, No. 721. Washington. U.S. Government Printing Office, 1978.

The total number of FTE's and selected groups of FTE's working in nursing homes are presented in table 5. In 1985 almost 1.2 million FTE's were providing direct and indirect services to nursing home residents. Those employees providing some form of nursing or personal care accounted for over 700,000 of the total FTE's, averaging about 43 FTE's per 100 beds. Nurse's aides and orderlies were by far the largest group (71 percent) of those employees providing nursing care or personal care. This group also accounted for over 40 percent of the total FTE's.

There is a direct relationship between certification status of the nursing home and FTE's per 100 beds. SNF's (medicare and medicaid) and facilities with both SNF and ICF certification had significantly more FTE's per 100 beds than facilities certified as ICF's only or those not certified. The facilities certified SNF only had a rate of total 80.4 FTE's per 100 beds, and those facilities certified as both SNF and ICF had an FTE rate per 100 beds of 76.8. These two rates compare with 64.1 for ICF's and 51.2 for not-certified facilities. The greatest difference in FTE's per 100 beds by certification is in registered nurses (RN's). The ICF's and not-certified facilities employ fewer than one-half the number of FTE RN's per 100 beds than the other two certification groups (table 5).

Information on RN's was collected as a separate component of the NNHS. Estimates of RN's were made from a maximum sample of four RN's selected from each sample facility. Future statistical reports will present more detailed information on RN's working in nursing homes.

Nursing home per diem rates

In 1985, for the first time, the NNHS was designed to collect data on per diem rates set by the nursing homes for routine care. Rates were collected for private pay residents and for medicare and medicaid residents. Rates differ because of different services provided, especially to medicare/medicaid patients. These rates are not to be confused with charges to residents after care has been received. Charges include the per diem rate plus fees for additional services not covered in per diem rate.

- *Private pay*—The average daily rates for private pay increased as would be expected as the level of care increased. Skilled care had the highest average daily rate of $61 per day. The average rates decreased to $48 for intermediate care and down to $31 per day for residential care. By region, homes in the Northeast tend to have higher rates than the other regions for skilled and intermediate levels of care but about the same rates for residential care (table 6).
- *Medicare and medicaid*—A nursing home's certification status directly affects the per diem rates that are set for routine care. Skilled care has a requirement, for instance, that an RN be on duty 24 hours per day. Rates for medicare and medicaid skilled homes are higher than rates for medicaid intermediate. Table 6 shows the average per diem rate for each certification status of homes in the 1985 survey by ownership of the home and region.

Nursing home rates by ownership are also presented in table 6. Further analysis by other facility characteristics of per diem rates for private pay and medicare and medicaid residents will be presented in a future publication from the 1985 NNHS.

Table 5. Number and rate per 100 beds of full-time equivalent employees by occupational category and selected nursing home characteristics: United States, 1985

Facility characteristic	All full-time equivalent employees		Occupational category											
			Administrative, medical, and therapeutic		Nursing								All other staff	
					Total		Registered nurse		Licensed practical nurse		Nurse's aide and orderly			
	Number	Rate per 100 beds	Number	Rate per 100 beds	Number	Rate per 100 beds	Number	Rate per 100 beds	Number	Rate per 100 beds	Number	Rate per 100 beds	Number	Rate per 100 beds
Total	1,159,700	71.4	89,400	5.5	704,300	43.4	83,300	5.1	120,000	7.4	501,000	30.8	366,100	22.5
Ownership														
Proprietary	733,300	65.4	55,700	5.0	461,000	41.1	48,600	4.3	80,100	7.1	332,300	29.6	216,600	19.3
Voluntary nonprofit	310,800	83.8	25,100	6.8	175,100	47.2	24,900	6.7	28,500	7.7	121,700	32.8	110,600	29.8
Government	115,600	87.6	8,500	6.5	68,100	51.6	9,800	7.4	11,300	8.6	47,100	35.7	38,900	29.5
Certification														
Skilled nursing facility only	247,400	80.4	19,200	6.2	152,800	49.6	21,900	7.1	24,600	8.0	106,200	34.5	75,500	24.5
Skilled nursing facility and intermediate care facility	556,100	76.8	38,900	5.4	344,000	47.5	45,500	6.3	58,500	8.1	240,000	33.1	173,200	23.9
Intermediate care facility only	262,500	64.1	19,700	4.8	160,900	39.3	11,000	2.7	30,500	7.4	119,300	29.2	82,000	20.0
Not certified	93,700	51.2	11,600	6.3	46,600	25.5	4,900	2.7	6,300	3.4	35,500	19.4	35,400	19.4
Bed size														
Less than 50 beds	92,400	61.1	14,500	9.6	48,600	32.1	5,100	3.4	7,900	5.3	35,500	23.5	29,300	19.4
50–99 beds	317,700	71.5	24,500	5.5	194,700	43.8	20,500	4.6	33,000	7.4	141,200	31.8	98,500	22.2
100–199 beds	489,800	69.8	32,300	4.6	307,400	43.8	35,700	5.1	53,100	7.6	218,600	31.1	150,100	21.4
200 beds or more	259,800	79.5	18,100	5.5	153,600	47.0	22,000	6.7	25,900	7.9	105,700	32.4	88,100	27.0
Census region														
Northeast	286,100	77.1	22,800	6.1	166,500	44.9	26,800	7.2	26,700	7.2	113,000	30.5	96,800	26.1
North Central	380,000	71.5	28,700	5.4	231,300	43.5	28,300	5.3	35,200	6.6	167,800	31.6	120,000	22.6
South	323,900	66.3	24,600	5.0	200,200	41.0	14,700	3.0	41,000	8.4	144,500	29.6	99,100	20.3
West	169,800	72.8	13,300	5.7	106,300	45.6	13,500	5.8	17,100	7.3	75,700	32.5	50,200	21.5

Note: Figures may not add to totals due to rounding.

Table 6. Average per diem rates for private pay patients by level of care and for medicare/medicaid patients by certification status, ownership, and region: United States, 1985

Ownership and region	Level of care			Certification status		
	Skilled	*Intermediate*	*Residential*	*Medicare*	*Medicaid skilled*	*Medicaid intermediate*
	Per diem rate					
Total	$61.01	$48.09	$30.71	$62.02	$49.93	$39.57
Ownership						
Proprietary	58.67	47.28	28.69	60.76	47.54	38.58
Voluntary nonprofit	66.37	50.57	35.82	63.97	55.18	41.88
Government	68.27	48.25	41.51	71.64	57.87	42.50
Census region						
Northeast	79.85	63.33	29.73	58.24	63.93	48.87
North Central	57.06	46.01	35.84	63.89	47.70	38.33
South	53.19	43.83	29.63	58.13	42.95	35.47
West	58.22	47.44	28.52	68.41	46.49	43.02

References

[1]National Center for Health Statistics: Development and maintenance of a national inventory of hospitals and institutions. *Vital and Health Statistics.* Series 1, No. 3. PHS Pub. No. 1000. Public Health Service. Washington. U.S. Government Printing Office, Feb. 1965.

[2]National Center for Health Statistics: The Agency Reporting System for Maintaining the National Inventory of Hospitals and Institutions. *Vital and Health Statistics.* Series 1, No. 6. PHS Pub. No. 1000. Public Health Service. Washington. U.S. Government Printing Office, Apr. 1968.

[3]I. M. Shimizu: Identifying and obtaining the Yellow Pages for a national area sample. *Proceedings of the Survey Research Section.* American Statistical Association, 1983, pp. 558–562.

[4]I. M. Shimizu: The National Nursing Home Survey Design. Paper presented at the 1986 Annual Meeting of the American Statistical Association. Chicago, 1986.

[5]National Center for Health Statistics, P. J. McCarthy: Replication, an approach to the analysis of data from complex surveys. *Vital and Health Statistics.* Series 2, No. 14. PHS Pub. No. 1000. Public Health Service. Washington. U.S. Government Printing Office, Apr. 1966.

[6]National Center for Health Statistics, P. J. McCarthy: Pseudoreplication, further evaluation and application of the balanced half-sample technique. *Vital and Health Statistics.* Series 2, No. 31. DHEW Pub. No. (HSM) 73–1270. Health Services and Mental Health Administration. Washington. U.S. Government Printing Office, Jan. 1969.

Technical notes

Because the statistics presented in this report are based on a sample, they will differ somewhat from figures that would have been obtained if a complete census had been taken using the same schedules, instructions, and procedures. 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. The chances are about 95 out of 100 that an estimate from the sample differs from the value which would be obtained from a complete census by less than twice the standard error.

Standard errors used in this report are approximated using the balanced repeated replicated procedure. This method yields overall variability through observation of variability among random subsamples of the total sample. A description of the development and evaluation of the replication technique for error estimation has been published.[5,6]

Although exact standard error estimates were used in tests of significance for this report, it is impractical to present exact estimates of every standard error for statistics used in this report. Hence, a generalized variance function was produced for each class of aggregate statistic by fitting the data presented in this report into curves using the empirically determined relationship between the size of an estimate X and its relative variance (rel var X). This relationship is expressed as

$$\text{rel var } X = \frac{S_X^2}{X^2}$$

$$= a + \frac{b}{X}$$

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

Preliminary estimates of relative standard errors are presented in figure I for estimated numbers of beds; total full-time equivalent (FTE) employees; administrative, medical, and therapeutic FTE employees; registered nurse FTE employees; licensed practical nurse FTE employees; nurse's aide FTE employees; and facilities. Preliminary standard errors for per diem rates are presented in table I.

The relative standard error of an estimate is the standard error of the estimate divided by the estimate itself and is expressed as a percent of the estimate. In this report, an asterisk is shown for any estimate with more than a 30-percent relative standard error. Because of the relationship between the relative standard error and the estimate, the standard error of an estimate can be found by multiplying the estimate by its relative standard error. For example, curve A of figure I shows the relative standard error for beds. Table 2 gives the total number of beds in all facilities with less than 50 beds as 151,100. The relative standard error corresponding to this estimate on curve A of figure I is approximately 10 percent. The standard error is 151,100 (0.09) = 13,599.

The approximate standard error of ratios such as FTE employees per 100 beds can be calculated as in the following example: Suppose the standard error ($\sigma_{R'}$) for the ratio of total FTE employees per 100 beds is desired for nursing homes with less than 50 beds. In table 5 the total FTE employees per 100 beds for homes with less than 50 beds is 61.1, which is equal to a total of 92,400 FTE employees divided by 151,100 beds times 100. The relative standard error of 92,400 total FTE employees in homes with less than 50 beds is (from figure I, curve B) approximately 8.6 percent, and the relative standard error of 151,100 beds (from figure I, curve A) is approximately 10 percent. The square root of the sum of the squares of these two relative standard errors minus their covariance provides an approximation for the relative standard error of the ratio. In other words, if $V_{X'}$ is the relative standard error of number of total FTE employees, $V_{Y'}$ is the relative standard error of number of beds, r is the sample correlation coefficient between total FTE employees and beds (conservatively estimated to be 0.5), and $V_{R'}$ is the relative standard error of the ratio $R' = X'/Y'$, then

$$V_{R'}^2 = V_{X'}^2 + V_{Y'}^2 - 2rV_{X'}V_{Y'}$$

$$= (0.086)^2 + (0.1)^2 - 1.00\,(0.086 \times 0.1)$$

$$= 0.0074 + 0.01 - 0.0086$$

$$V_{R'} = \sqrt{0.0088}$$

$$= 0.0938$$

The approximate standard error of the ratio of total FTE employees per 100 beds may now be obtained by multiplying the relative standard error by the ratio as done below:

$$\sigma_{R'} = R' \times V_{R'}$$

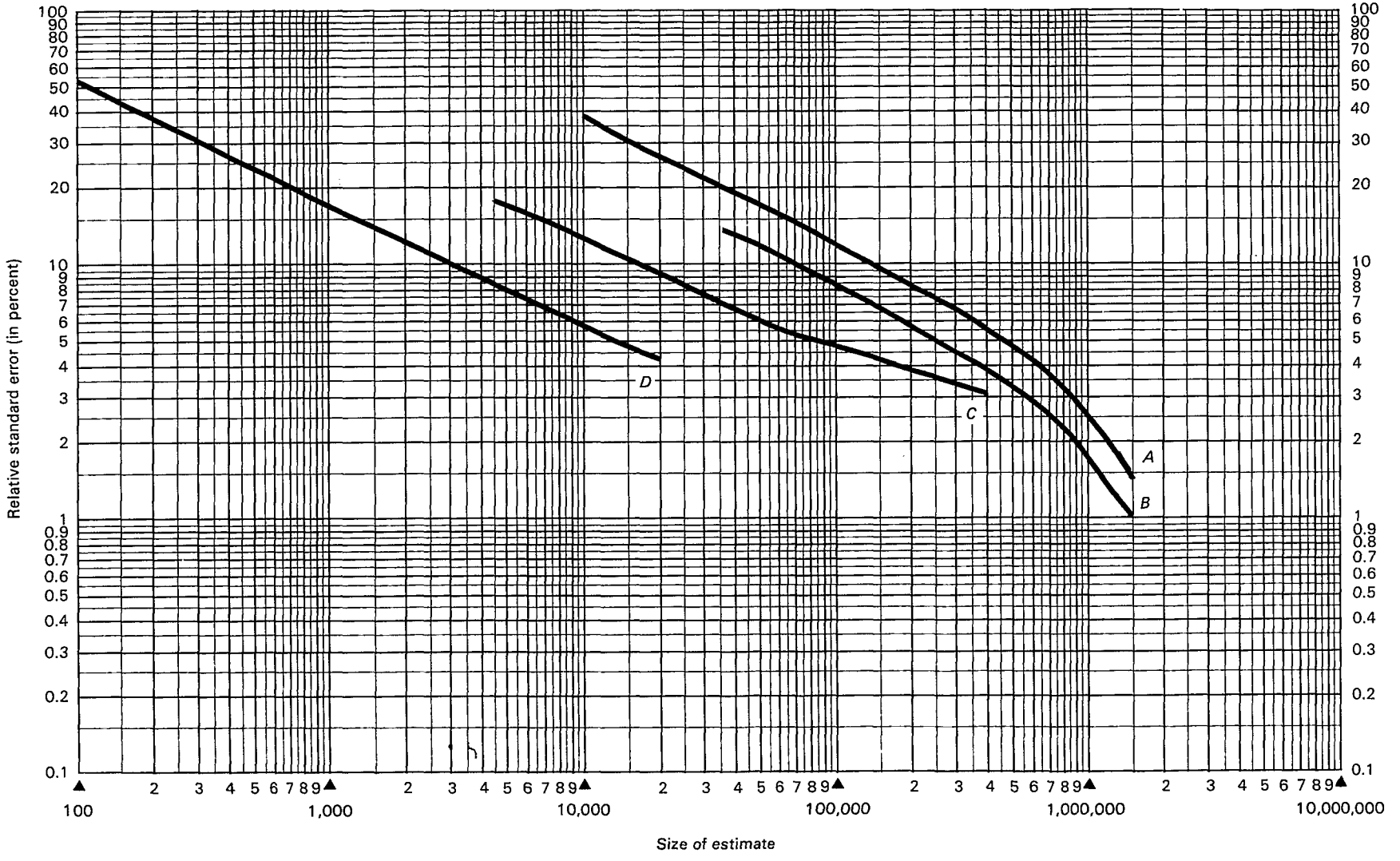
$$= 61.1 \times 0.0938$$

$$= 5.73$$

The sample correlation coefficient r for calculating the standard error estimates of the ratios presented in this report is assumed to be zero except in the cases of FTE employees per 100 beds and the occupancy rate estimates where the correlation coefficient used was 0.5.

The Z-test with a 0.05 level of significance was used to test all comparisons mentioned in this report. Because all observed differences were not tested, lack of comment in the text does not mean that the difference was not statistically significant.

NOTE: A list of references follows the text.



Curve *A:* Beds
Curve *B:* Total full-time equivalent (FTE) employees and nurse's aide FTE employees
Curve *C:* Administrative, medical, and therapeutic FTE employees; registered nurse FTE employees; licensed practical nurse FTE employees; and all other staff
Curve *D:* Facilities

Figure 1. Provisional relative standard errors for estimated numbers of beds, full-time equivalent employees, and facilities: United States, 1985

Table I. Preliminary standard errors of per diem rates for private pay and medicare/medicaid patients by ownership and region: United States, 1985

Ownership and region	Standard errors of per diem rates					
	Level of care for private pay patients			Certification status of facilities for routine services		
	Skilled	Intermediate	Residential	Medicare	Medicaid skilled	Medicaid intermediate
Total	0.92	0.59	1.16	1.93	2.13	1.98
Ownership						
Proprietary	1.00	0.81	1.46	2.48	2.26	2.51
Voluntary nonprofit	1.90	1.92	1.79	4.44	5.33	5.57
Government	5.08	3.30	9.35	6.99	6.65	8.33
Census region						
Northeast	2.18	1.94	3.08	6.40	6.24	6.38
North Central	1.05	0.61	3.38	3.28	3.17	5.08
South	1.13	0.71	2.20	2.85	3.48	6.51
West	2.86	2.80	4.96	6.81	10.29	7.78

Symbols

- - -	Data not available
. . .	Category not applicable
-	Quantity zero
0.0	Quantity more than zero but less than 0.05
Z	Quantity more than zero but less than 500 where numbers are rounded to thousands
*	Figure does not meet standards of reliability or precision
#	Figure suppressed to comply with confidentiality requirements

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