MENTAL HEALTH Statistical Note No. 140

Admission Rates to State and County Psychiatric Hospitals by Age, Sex, and Race, United States, 1975

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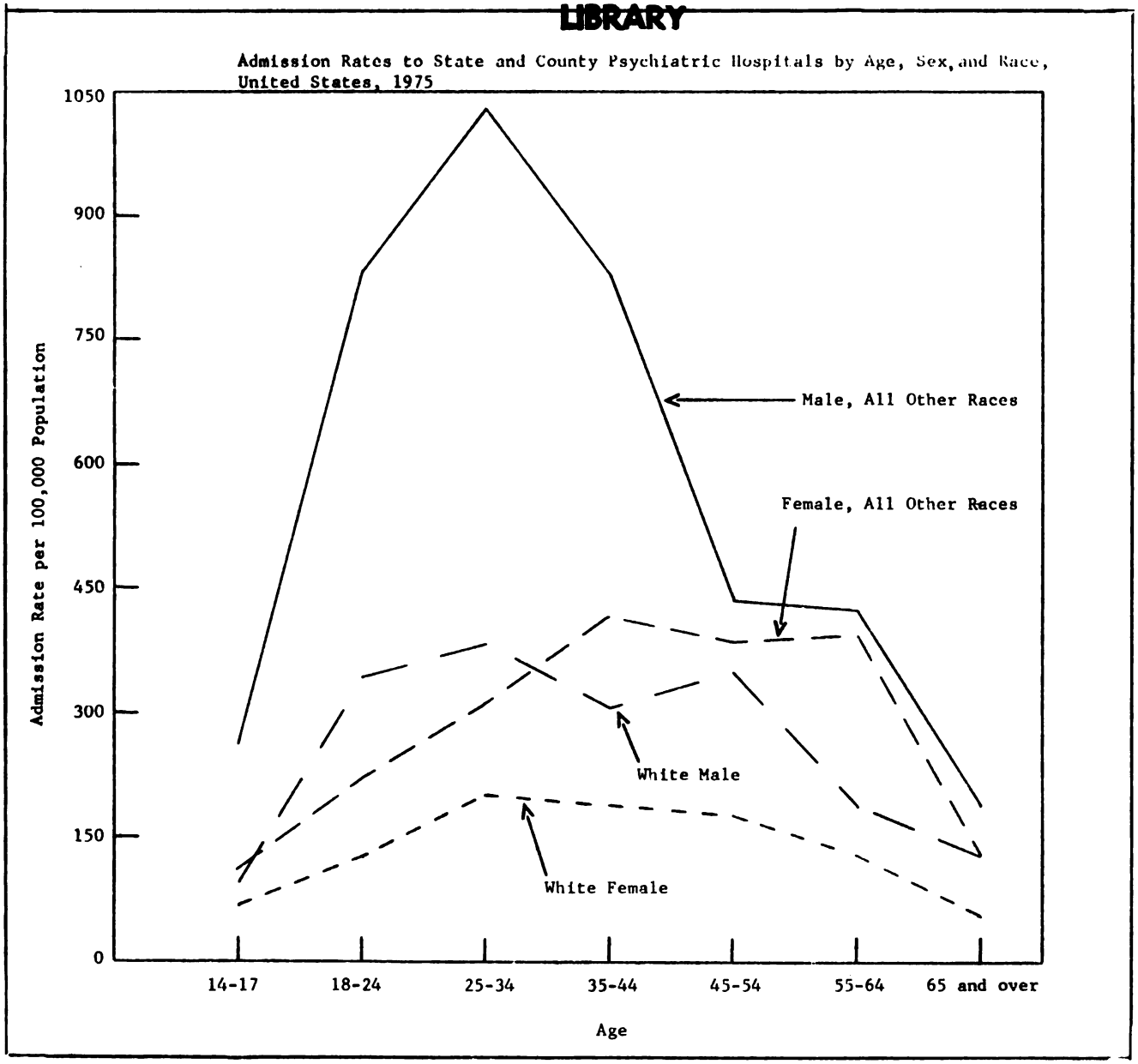

U.S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE / Public Health Service / Alcohol, Drug Abuse and Mental Health Administration
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The differential utilization of mental health inpatient services by specific subgroups of the population is generally reflected by the number and rate of admissions to these inpatient facilities. This Note focuses on the admission rates to State and county psychiatric hospitals during 1975 by age, sex, and race groups. Table A below presents the age-adjusted admission rates by sex and race. As this table shows, the age-adjusted admission rate for males is about twice the female rate for both race groups. Also, the age-adjusted rate of admission for races other than white is more than twice the rate for white admissions; this difference holds true for both sexes. For example, the rate for males of races other than white (477) is more than twice the rate for white males (213).

Table A. Age-adjusted[1/] admission rates to State and county psychiatric hospitals by sex and race, United States, 1975

Race	Both sexes	Males	Females
Total white and all other races	182.2	245.0	124.1
White.....	159.7	213.2	110.0
All other races	340.4	477.3	225.6

1/ Adjusted to the U.S. population of July 1975

Table 1 shows the number of admissions and rate per 100,000 population[1/] for specific age, sex, and race groups. Here, the data further reveal that within each age-race group, with two exceptions, the male rate of admission is higher than the female rate; for races other than white in the 45-54 and 55-64 year age groups, no significant difference in rate of admission exists between the sexes. Also, within each age-sex group, the rate of admission for races other than white is significantly higher than the rate for whites. For example, in the under 14 year age group, the rate for females of races other than white (27) is three times the rate for white females (8).

The highest rate of admission (1,026) is found among males of races other than white in the 25-34 year age group. The lowest rate of admission (8) is found among white females under 14 years of age.

As illustrated by the cover chart, the greatest differences in admission rates between white males and males of races other than white exist in the 18-44 year age groups. For females, the greatest differences in rates are seen to exist in the 35-64 year age groups.

The percent distribution of admissions by age is also shown in table 1. As can be seen by examining this table, 55 percent of all female admissions are 35 years of age and over, while 55 percent of all male admissions are under 35 years of age. This difference between the sexes is more clearly visible in a comparison of their median ages (table 1). Here it can be seen that female admissions of both race groups are older than their male counterparts.

Among males, white admissions are older than admissions of races other than white. The median age of white males is 34.3 years compared to 30.5 years for males of races other than white. Among females, no significant difference in median age exists by race.

Table B below shows the sex ratio of admissions by age and race. Males outnumber females in each age-race group with two exceptions-- in the age groups between 45 and 64, females slightly outnumber males of races other than white. The greatest ratio of males to females is found within the 18-24 year age group for both the whites (253) and races other than white (318).

Table B. Sex ratio (males per 100 females) of admissions to State and county psychiatric hospitals by age and race, United States, 1975

Age	Race		
	Total	White	All other races
All ages..	183	181	188
Under 14	208	241	159
14-17...	171	150	240
18-24...	268	253	318
25-34...	203	186	271
35-44...	156	154	160
45-54...	166	185	98
55-64...	120	128	93
65+.....	156	167	108

The data presented in this Note are based on the results of a sample survey of inpatient admissions to State and county psychiatric hospitals conducted in 1975. The survey design, data source, and the various statistical procedures employed are presented in the appendix to this Note.

Footnote

1/ The calculation of the admission rates in this report was based on data of the general population obtained from the "U.S. Civilian Population - July 1, 1975" --- Current Population Reports, Series P-25, No. 614, U. S. Bureau of the Census, Department of Commerce.

APPENDIX I

1975 Sample Survey of State and County Mental Hospital Inpatient Admissions: Survey Design and Procedures

Sampling Frame

This survey was conducted during the period April 1975 to July 1975 by the National Institute of Mental Health (NIMH) in cooperation with State mental health authorities. The survey covered inpatient services of all State and county mental hospitals. Other public psychiatric inpatient facilities such as Veterans Administration (VA) hospitals, military hospitals, Public Health Service hospitals, and territorial hospitals were not included. Data on psychiatric patients in VA hospitals are available in VA publications and in other NIMH publications.

Total additions to State and county mental hospitals consist of admissions (new and readmissions) and returns from long-term leave. Data from another NIMH study show that for fiscal year 1975 there were 435,136 additions: 382,920 admissions and 52,216 returns from long-term leave. (See Statistical Note 132, Provisional Patient Movement and Administrative Data, State and County Psychiatric Inpatient Services July 1, 1974–June 30, 1975.) This sample study included only admissions and did not include returns from long-term leave. Since the sample was selected during only 1 month (April 1975) of the year, the data have been inflated to represent a year interval centering on the sample month.

Source of Data

The universe of State and county mental hospitals was identified in the 1974 annual Preliminary Survey of State and County Mental Hospitals (conducted in July) and by the 1975 annual Inventory of Mental Health Facilities (conducted in January) by the NIMH in cooperation with State mental health authorities. For the annual surveys, data are collected on caseload, staffing, and expenditure patterns for the previous fiscal year. The caseload data collected formed the basis for the stratification of the universe of inpatient psychiatric services described below.

Sample design: The sampling for this survey was based on a stratified probability design selected in two stages. In the first stage, a sample of hospitals was selected from within four primary size strata. The primary strata were based on the annual number of inpatient admissions (table I). Sampling of hospitals was systematic within each of these primary strata. Within each primary stratum, the sequence of the listing of hospitals was by State.

In the second stage, a sample of inpatient admissions was selected from each hospital selected in the first stage. The second stage sample was completed by a systematic selection scheme built into the questionnaire. Each hospital was asked to list in a booklet all admissions to their inpatient service(s) during the month of April 1975 and to complete individual questionnaires for each admission appearing on one of the predetermined sample lines. These sample admissions were followed for a 3-month period and a second form for each was completed at the time of discharge, placement on long-term leave, death, or at the end of the followup period if the patient was continuously hospitalized during the study interval.

Nonresponse and Imputation of Missing Data: Table I shows the distribution of State and county mental hospitals in the universe and in the sample by primary strata and the final disposition of the sample hospitals with regard to their response status.

As in any survey, there were three types of missing data: (1) failure of a sample hospital to participate in the survey; (2) failure to obtain data on an admission designated as a sample case, and (3) failure to obtain specific items of information (such as age, previous psychiatric care, etc.) for individual sample cases. Adjustments in the estimates have been made for all three types of nonresponse.

Statistics presented in this report were adjusted for the failure of a sample hospital to respond (type 1 above) by the use of a separate nonresponse ad-

justment factor for each size stratum. The factor was the ratio of all sample hospitals to the responding sample hospitals.

Data were adjusted for nonresponse of sample cases within a sample hospital (type 2 above) by a procedure which imputed to admissions for whom no data were obtained the characteristics of responding admissions within the same hospital. Adjustment for this type of nonresponse was minimal; data for 15 sample cases, or 0.3 percent of the designated sample, were imputed in this way.

Data were adjusted for nonresponse to specific items (such as age, marital status, etc., type 3 above) as follows. Sample cases were sorted into categories within each of which the characteristics of the admissions were expected to be similar. Those sample cases with a missing value for a particular item were then completed with a value randomly selected from within the category. For any given variable, the percent of cases for which some or all items were unknown was less than 5 percent, unless otherwise noted in the footnotes to the table.

Estimation: Statistics reported in this publication are essentially the result of two stages of ratio adjustment, one at each stage of selection. 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 first-stage ratio adjustment was included in the estimation of data for all primary size strata from which a sample of inpatient services was drawn. This factor was a ratio calculated for each stratum. The numerator was the total number of admissions according to the 1974 Preliminary Survey of State and County Mental Hospitals for sample hospitals in the stratum. The denominator of this ratio was the estimated number of admissions for the inpatient services in each stratum. This estimate was obtained through a simple inflation of the 1974 Preliminary Survey data for the sample inpatient services in each stratum. The effect of this first ratio adjustment was to bring the sample into closer agreement with the known universe of admissions.

The second-stage ratio adjustment was included in the estimation of patient data for all primary size strata. This second-stage ratio adjustment factor was the product of two fractions: the first was the ratio of the total number of admissions to the inpatient services to the number of admissions designated as sample cases by the systematic selection scheme: the second was the sampling fraction for admissions upon which the systematic selection was based. This second-stage adjustment corrected the sample for over- or under-representation of admissions in the particular sample selected within each inpatient service. In addition, since the sample was based on 1 month (April 1975) of the year, a factor based on the seasonal index for admissions for this month was used to inflate to a 1-year interval. Seasonal or monthly variation is not accounted for in the estimation or variation calculations.

Reliability of Estimates: Since statistics presented in this report are estimates based on a sample, they will differ from the figures that would have been obtained from a complete enumeration of all inpatient services in the universe using the same schedule and survey procedures. As in any survey, in addition to sampling errors, the results are also subject to measurement errors. To the extent possible, these latter types of errors were kept to a minimum by methods built into the survey procedures.

The sampling error (or standard error) of a statistic is inversely proportional to the square root of the number of observations in the sample. Thus, as the sample size increases, the standard error decreases. 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. As calculated for this report, the standard error also reflects part of the measurement error, but does not measure any systematic biases in the data. The chances are about two out of three that an estimate from the sample differs from the value which would be obtained from a complete census by less than the standard error. The chances are about 95 out of 100 that the difference is less than twice the standard error and about 99 out of 100 that it is less than 3 times as large.

Relative standard errors of aggregates shown in this report can be determined from table II of this section. The relative standard error of an estimate is obtained by dividing the standard error of the estimate by the estimate itself and is expressed as a percent of the estimate. An example of how to convert the relative error into a standard error is given with table II. Linear interpolation in this table may be used to obtain standard errors for intermediate values not shown or, alternately, the following formula from which the table is derived may be used directly to compute the standard error; direct computation will give more precise results than linear interpolation.

$$S_x = \sqrt{a + \frac{b}{x}}$$

In this formula, x is the size of the estimate and a and b are the parameters listed at the bottom of the table.

Standard errors of estimated percentages are shown in table III. Again, linear interpolation in this table may be used to obtain standard errors for intermediate values of x and p or the following formula from which the table is derived may be used directly; direct computation gives more accurate results than interpolation.

$$S_p = \sqrt{\frac{b}{x} \cdot p(100-p)}$$

In this formula, x is the size of the subclass of the population which is the base of percentage p (that is, the numerator) and b is the parameter listed at the bottom of the table.

To determine the standard error of a median value, of the difference between two statistics, or of a ratio, the following rules may be used.

Standard error of a median: The medians shown in this report were calculated from grouped data. Approximate confidence intervals for these estimated medians can be computed as follows:

a. Determine the standard error of a 50 percent characteristic whose denominator is equal to the estimated number of persons in the frequency distribution on which the median is based.
b. Add to and subtract from 50 percent the standard error determined in step a.
c. Using this distribution of the characteristic, calculate the confidence interval corresponding to the two points established in step b.

A two standard error confidence interval may be determined by finding the values corresponding to 50 percent plus and minus twice the standard error determined in step a.

It is possible to investigate whether an observed difference between two estimated medians can be attributed to sampling error alone by obtaining the upper 68 percent confidence limit, U'_1, of the smaller observed median, M'_1, and the lower 68 percent confidence limit, L'_2, of the larger median, M'_2. These limits may be found by using the method outlined by using one standard error. The square root of the sum of the squared differences between M'_1, and U'_1 and M'_2 and L'_2 is the standard error of the difference between M'_1 and M'_2; that is

$$S_{(M'_1 - M'_2)} = \sqrt{(M'_1 - U'_1)^2 + (M'_2 - L'_2)^2}.$$

For the purpose of this report, any difference between M'_1 and M'_2 greater than $2S_{(M'_1 - M'_2)}$ is considered statistically significant.

Standard error of a difference between two estimates: The standard error of a difference is approximately the square root of the sum of the squares of each of the standard errors considered separately. This formula will represent the actual standard error quite accurately for the difference between separate and uncorrelated characteristics although it is only a rough approximation in most other cases. A formula for the standard error of a difference, $d = x_1 - x_2$ is:

$$S_d = \sqrt{\left(S_{x_1}^2\right)^2 + \left(S_{x_2}^2\right)^2}$$

where x_1 is the estimate for characteristic 1, x_2 is the estimate for characteristic 2, and S_{x_1} and S_{x_2} are the relative standard errors of x_1 and x_2, respectively.

Standard error of a ratio: The standard error of a ratio, where the numerator and denominator are both sample estimates but the numerator is not a subset of the denominator cannot be obtained directly from the tables but may be approximated by the following formula:

$$S_{(x/y)} = \sqrt{\left(\frac{x}{y}\right)^2 \left[\left(\frac{S_x}{x}\right)^2 + \left(\frac{S_y}{y}\right)^2\right]}$$

The ratio, x/y, can be a ratio of two estimated numbers, for example, total female schizophrenics divided by total male schizophrenics, or a percent change where x is the new value and y is the old value or it can be a ratio of percents or of medians.

Table I. Distribution of State and county psychiatric hospitals in the universe and in the sample survey of primary strata and by response status to the sample survey.

Primary size strata (number of annual admissions)	Number of hospitals in the universe	Number of hospitals in the sample		
		Total	Non-responding	Responding
0-999	176	87	1	86
1,000-2,499	89	29	3	26
2,500-4,999	35	5	—	5
5,000+	6	6	—	6
Total, All Strata	306	127	4	123

Table II. Relative standard error of estimated rates or numbers

Size of estimate (or numerator of rate)	Relative standard error
500	10.3
1,000	7.6
5,000	4.4
10,000	3.8
25,000	3.4
50,000	3.3
100,000	3.2
250,000	3.2
400,000	3.1

Example of use of table II: An estimate of 10,000 white female admissions, for example, has a relative standard error of 3.8 percent as read from table II above. This estimate, therefore, has a standard error of 380 (3.8% of 10,000). Standard errors of estimates which fall between the values found in this table must be interpolated.

Table III. Standard error (expressed in percentage points) of a percent

Size or denominator	Estimated percent									
	5 or 95	10 or 90	15 or 85	20 or 80	25 or 75	30 or 70	35 or 65	40 or 60	45 or 55	50
1,000	1.51	2.08	2.47	2.77	3.00	3.18	3.31	3.39	3.45	3.46
2,500	0.96	1.31	1.56	1.75	1.90	2.01	2.09	2.15	2.18	2.19
5,000	0.68	0.93	1.11	1.24	1.34	1.42	1.48	1.52	1.54	1.55
10,000	0.48	0.66	0.78	0.88	0.95	1.00	1.05	1.07	1.09	1.10
25,000	0.30	0.42	0.49	0.55	0.60	0.64	0.66	0.68	0.69	0.69
50,000	0.21	0.29	0.35	0.39	0.42	0.45	0.47	0.48	0.49	0.49
100,000	0.15	0.21	0.25	0.28	0.30	0.32	0.33	0.34	0.34	0.35
250,000	0.10	0.13	0.16	0.18	0.19	0.20	0.21	0.21	0.22	0.22
400,000	0.08	0.10	0.12	0.14	0.15	0.16	0.17	0.17	0.17	0.17

a= 0.000978 b= 4.801428

Table 1. Admissions to State and county psychiatric hospitals by age, sex, and race, United States, 1975: number, rate per 100,000 population[1/], and percent distribution

Age	Both sexes			Males			Females		
	Total	White	All other races	Total	White	All other races	Total	White	All other races
	Number of admissions								
All ages..	385,237	296,151	89,086	248,937	190,788	58,149	136,300	105,363	30,937
Under 14	8,504	5,663	2,841	5,746	4,001	1,745	2,758	1,662	1,096
14-17...	16,748	11,885	4,863	10,572	7,140	3,432	6,176	4,745	1,431
18-24...	71,841	53,158	18,683	52,323	38,108	14,215	19,518	15,050	4,468
25-34...	100,861	76,594	24,267	67,530	49,805	17,725	33,331	26,789	6,542
35-44...	65,109	48,222	16,887	39,637	29,237	10,400	25,472	18,985	6,487
45-54...	65,882	55,263	10,619	41,147	35,900	5,247	24,735	19,363	5,372
55-64...	35,733	27,983	7,750	19,469	15,736	3,733	16,264	12,247	4,017
65+.....	20,559	17,383	3,176	12,513	10,861	1,652	8,046	6,522	1,524
	Rate per 100,000 population[1/]								
All ages..	182.2	161.1	321.9	243.7	214.2	444.5	124.7	111.2	212.0
Under 14	17.2	13.8	34.7	22.8	19.0	42.4	11.4	8.3	27.0
14-17...	99.1	83.1	186.8	123.1	98.0	262.6	74.3	67.6	110.4
18-24...	271.8	234.0	502.6	409.0	343.9	830.3	143.1	129.4	222.8
25-34...	332.7	289.2	633.6	457.8	382.4	1026.3	214.1	199.0	311.1
35-44...	289.0	244.7	598.6	364.9	304.5	826.1	218.3	187.8	415.3
45-54...	277.6	261.4	409.1	359.2	350.3	435.4	201.4	177.8	386.5
55-64...	180.7	156.6	406.0	208.4	186.0	422.8	155.9	130.2	391.5
65+.....	91.8	85.3	157.3	136.4	130.9	189.2	60.8	54.0	133.0
	Percent distribution by age								
All ages..	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Under 14	2.2	1.9	3.2	2.3	2.1	3.0	2.0	1.6	3.5
14-17...	4.3	4.0	5.5	4.2	3.7	5.9	4.5	4.5	4.6
18-24...	18.6	17.9	21.0	21.0	20.0	24.4	14.3	14.3	14.4
25-34...	26.3	25.9	27.1	27.3	26.2	30.6	24.6	25.4	21.2
35-44...	16.9	16.3	19.0	15.9	15.3	17.9	18.7	18.0	21.0
45-54...	17.1	18.7	11.9	16.5	18.8	9.0	18.1	18.4	17.4
55-64...	9.3	9.4	8.7	7.8	8.2	6.4	11.9	11.6	13.0
65+.....	5.3	5.9	3.6	5.0	5.7	2.8	5.9	6.2	4.9
Median age	34.5	35.2	32.5	33.3	34.3	30.5	37.5	37.3	38.0

1/ See text footnote.

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