Relationship of Methods of Admission to Length of Stay in State Hospitals

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DURING the last 15 years considerable interest has developed in statistical analysis of mental hospital population movement for better understanding of patterns of hospitalization and, less frequently, for assessing local administrative practices and methods of treatment. Among the various biostatistical techniques which have been applied to this problem, life-table methodology, in the form of cohort followup analysis, has proved especially useful in studies such as the analysis of 40 years of population movement in a State hospital for the mentally ill (*1*), the analysis and comparison of population movement for 11 different State hospital systems (*2*), the measurement of long-term trends in the release rate of schizophrenic patients (*3*), and the analysis of population movement in a hospital for the mentally retarded (*4*), to mention only a few of the large number of such investigations which have been published. Specific techniques vary, depending on the question under investigation; some of these were described and evaluated in a recent paper on cohort followup methodology (*5*).

The typical cohort followup study analyzes the population movement of a large group of patients admitted for the first time over a fixed calendar period ranging from a few months to several years. The group is first stratified into relatively homogeneous subgroups or cohorts by such omnipresent criteria as age, sex, and clinical diagnosis. Each patient in each cohort is then classified according to the length of time elapsing from date of admission to the date of each significant change in his hospitalization status, such as placement on convalescent leave, return from leave, direct discharge, readmission, or death. With this information the different cohorts can be compared with respect to the percentage of each starting cohort still in the hospital or, alternatively, the percentage released at stated intervals after the first admission. The usual practice has been to follow each first admission only to the point of his first significant release from the hospital.

This paper differs from the typical study in two important respects. First, stratification of each sex group of first admissions is based on legal classification, the method of admission under which the patient first entered the California State mental hospital system, rather than on some of the more customary parameters. Second, each patient is followed as an individual for a period of 24 months from date of first admission, irrespective of the number of movements in and out of the hospital which have occurred during that time and irrespective of changes in his case number. (In the California State mental hospital system as in many other State systems, each readmission is assigned a new case number, a practice which complicates the followup of an individual through one or more readmissions.)

Within this framework there are many possible lines of investigation. For example, for a cohort of patients first admitted on a volun-

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tary basis, what is the percentage likelihood of discharge and readmission by court commitment within 24 months? What is the likelihood of placement in extramural family care within 12 months? Within 18 months? What is the age-sex specific likelihood of death in the hospital during the first 12 months for voluntary patients compared with court-committed patients?

In this paper, however, the data are selected to answer only one question; what is the likelihood that a patient first admitted under a given legal classification or method of admission will be in the hospital at each of several selected points of time within the 24-month period of followup? To put it another way, what percentage of the starting cohort are in the hospital on the *n*th day after first admission? A patient may have changed his hospital and also his legal classification one or more times during the 24 months, but, so long as he is on the *n*th day in one of the State hospitals for general psychiatry within the system, he is counted as resident on that day and identified as a member of the cohort of his original legal classification.

The Data

During the 1958 fiscal year, from a State civilian population of 14 million there were approximately 20,000 admissions for inpatient care to the 10 California State hospitals for

Table 1. Number of patients in hospital at successive points of time after first admission in fiscal 1958, by sex and legal classification

Interval from date of first admission	Patients hospitalized on last day of interval											
	Brief observation only	Total, all other first admissions	Admissions for mental illness				Commitment for related conditions				Juvenile observation	
			Voluntary	Health officer's application	Civil commitment	Criminal commitment	Alcoholism	Drug addiction		Sexual psychopathy	Juvenile court	Youth authority
								Habit forming	Narcotic			
Male cohorts												
0 days	355	8,176	953	121	3,962	113	1,974	23	126	704	161	39
10 days	118	7,884	813	112	3,850	113	1,945	23	124	704	161	39
20 days	56	7,564	706	107	3,691	113	1,905	23	121	701	159	38
30 days	9	7,191	627	102	3,533	113	1,780	22	117	702	157	38
2 months	3	5,926	456	79	3,030	108	1,258	21	116	670	152	36
3 months	0	3,860	347	64	2,480	101	402	5	32	337	69	23
6 months	0	2,402	166	34	1,563	79	178	3	7	330	28	14
9 months	0	1,936	123	21	1,247	60	140	3	4	309	19	10
12 months	0	1,712	105	16	1,100	53	107	2	3	298	17	11
15 months	0	1,586	100	17	1,012	44	94	1	2	293	11	12
18 months	1	1,289	87	15	967	43	94	0	3	57	14	9
24 months	0	1,109	82	13	845	31	79	1	2	31	17	8
Female cohorts												
0 days	143	6,151	1,392	231	3,758	14	575	35	59	1	80	6
10 days	46	5,927	1,230	224	3,713	14	567	35	58	1	79	6
20 days	23	5,712	1,129	217	3,617	14	559	33	57	1	79	6
30 days	7	5,476	1,031	204	3,522	14	532	32	57	1	77	6
2 months	0	4,710	821	160	3,145	14	403	27	57	1	77	5
3 months	0	3,502	569	143	2,584	13	130	10	9	0	41	3
6 months	0	2,048	290	79	1,583	9	64	4	4	0	13	2
9 months	0	1,610	198	64	1,292	6	34	3	1	0	11	1
12 months	0	1,436	169	60	1,163	6	28	0	0	0	8	2
15 months	0	1,349	160	51	1,090	5	30	1	2	0	8	2
18 months	0	1,268	159	49	1,020	4	26	0	1	0	7	2
24 months	0	1,147	133	44	934	4	23	3	2	0	3	1

general psychiatry and the inpatient department of the Langley Porter Neuropsychiatric Institute. About one-fourth of this total is accounted for by readmissions, a group which includes not only those patients who are rehospitalized in the usual sense but also those whose legal classification was changed (from voluntary to committed status, for example) during hospitalization. The first admissions totaled 14,825 patients, including 498 whose hospitalization was limited to a few days of observation, following which these cases were permanently closed and the patients returned to the community. Since in the more populous counties this observation function is carried out by the psychiatric unit of the county general hospital, the number of such cases depends entirely on the availability of alternate local resources for observation. For this reason, and also because of their minimal period of hospitalization, these cases have been excluded from the study except for brief mention in tables 1 and 2.

The remaining 14,327 patients comprised all individuals admitted for the first time to the State mental hospital system for hospitalization other than merely for brief observation. This total corresponds to a first-admission rate of 100 per 100,000 population of all ages. About two-thirds of these first admissions entered a State mental hospital for the treatment of men-

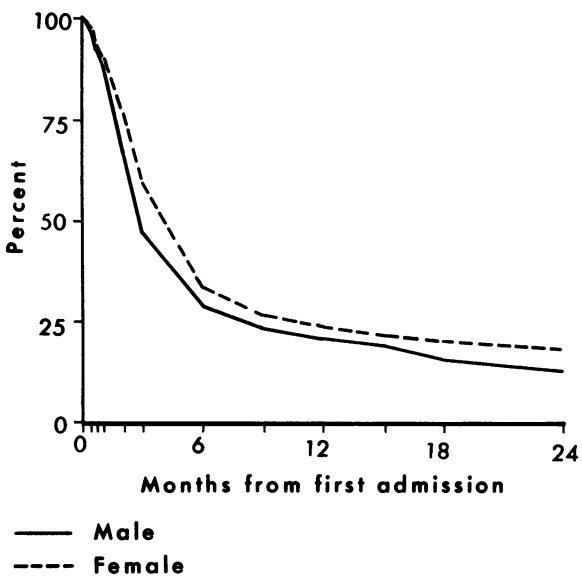
Table 2. Percent of each cohort in hospital at successive points of time after first admission in fiscal 1958

Interval from date of first admission	Brief observation only	Total, all other first admissions	Admissions for mental illness				Comitment for related conditions				Juvenile observation	
			Voluntary	Health officer's application	Civil commitment	Criminal commitment	Alcoholism	Drug addiction		Sexual psychopathy	Juvenile court	Youth authority
								Habit forming	Narcotic			
Male cohorts												
Number of patients	355	8,176	953	121	3,962	113	1,974	23	126	704	161	39
0 days	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
10 days	33.2	96.4	85.3	92.6	97.2	100.0	98.5	100.0	98.4	100.0	100.0	100.0
20 days	15.8	92.5	74.1	88.4	93.2	100.0	96.5	100.0	96.0	99.6	98.8	97.4
30 days	2.5	88.0	65.8	84.3	89.2	100.0	90.2	95.6	92.9	99.7	97.5	97.4
2 months	.8	72.5	47.8	65.3	76.5	95.6	63.7	91.3	92.1	95.2	94.4	92.3
3 months	------	47.2	36.4	52.9	62.6	89.4	20.4	21.7	25.4	47.9	42.9	59.0
6 months	------	29.4	17.4	28.1	39.4	69.9	9.0	13.0	5.6	46.9	17.4	35.9
9 months	------	23.7	12.9	17.4	31.5	53.1	7.1	13.0	3.2	43.9	11.8	25.6
12 months	------	20.9	11.0	13.2	27.8	46.9	5.4	8.7	2.4	42.3	10.6	28.2
15 months	------	19.4	10.5	14.0	25.5	38.9	4.8	4.4	1.6	41.6	6.8	30.8
18 months	.3	15.8	9.1	12.4	24.4	38.0	4.8	------	2.4	8.1	8.7	23.1
24 months	------	13.6	8.6	10.7	21.3	27.4	4.0	4.4	1.6	4.4	10.6	20.5
Female cohorts												
Number of patients	143	6,151	1,392	231	3,758	14	575	35	59	1	80	6
0 days	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
10 days	32.2	96.4	88.4	97.0	98.8	100.0	98.6	100.0	98.3	100.0	98.8	100.0
20 days	16.1	92.9	81.1	93.9	96.2	100.0	97.2	94.3	96.6	100.0	98.8	100.0
30 days	4.9	89.0	74.1	88.3	93.7	100.0	92.5	91.4	96.6	100.0	96.2	100.0
2 months	------	76.6	59.0	69.3	83.7	100.0	70.1	77.1	96.6	100.0	96.2	83.3
3 months	------	56.9	40.9	61.9	68.8	92.9	22.6	28.6	15.2	------	51.2	50.0
6 months	------	33.3	20.8	34.2	42.1	64.3	11.1	11.4	6.8	------	16.2	33.3
9 months	------	26.2	14.2	27.7	34.4	42.9	5.9	8.6	1.7	------	13.8	16.7
12 months	------	23.4	12.1	26.0	31.0	42.9	4.9	------	------	------	10.0	33.3
15 months	------	21.9	11.5	22.1	29.0	35.7	5.2	2.9	3.4	------	10.0	33.3
18 months	------	20.6	11.4	21.2	27.1	28.6	4.5	------	1.7	------	8.8	33.3
24 months	------	18.6	9.6	19.0	24.8	28.6	4.0	8.6	3.4	------	3.8	16.7

tal illness, either voluntarily, on the application of the county health officer and certification by two physicians, or by court commitment with or without a preliminary observation. The remainder were admitted for the treatment of related conditions (alcoholism, drug addiction, or sexual psychopathy) or for 90-day observation as wards of the county juvenile courts or the California State Youth Authority (table 1). The three tables and eight figures of this paper present data for 10 male and 10 female cohorts categorized by legal classification, showing for each cohort the number of patients actually in the hospitals at successive points of time measured from first admission. The nature of these data can best be explained by reference to specific items in table 1.

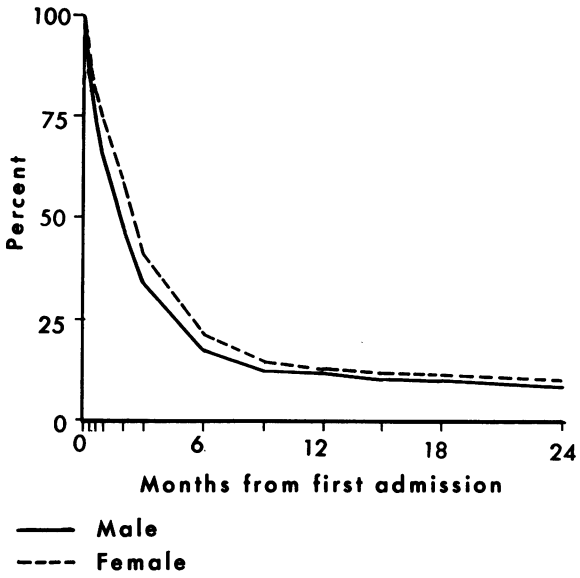
During the 1958 fiscal year 8,176 male patients were admitted for the first time to the State mental hospital system. Each patient's status in or out of the hospital was ascertained as of the last day of each of 12 intervals of increasing length, measured from the day of his first admission. At the end of 365 days 1,712 of the original group of 8,176 patients were hospitalized. This corresponds to 20.9 percent of the starting cohort (table 2). This same percentage appears as the ordinate of the hospital-residence curve for male patients at the 12-month point on figure 1.

Figure 1. Percent of all admissions in hospital during 24 months after first admission



NOTE: Excludes 498 patients admitted only for brief observation.

Figure 2. Percent of voluntary admissions in hospital during 24 months after first admission



For a second example, of the 8,176 male first admissions, 953 were first admitted as voluntary patients (table 1). Of this cohort 105 patients, or 11.0 percent, were hospitalized on the last day of the 12th month following first admission (table 2, fig. 2). Also, this group of 105 patients accounts for 6.1 percent of the total of 1,712 male patients in all legal classifications who were hospitalized at the end of 12 months from first admission (table 3).

These 105 patients were not necessarily hospitalized continuously from the moment they first entered the hospital. Some may have left and returned to the hospital several times in the interim on leave of absence and return from leave or were discharged and readmitted, but all 105 were hospital residents on the 365th day following first admission. Most of the 105 patients were in the hospital of their first admission, but some had been readmitted or transferred to another hospital within the State system. Legal classification also may have changed one or more times during the 24-month followup; such changes, however, have been ignored, and each patient has been continuously categorized in terms of his first legal classification.

Almost half of the admissions by civil commitment were preceded by brief court observation (table 1). Most of these patients were admitted from counties which do not offer this service locally in the county hospital. However, irrespective of whether the patient was admitted for observation followed by commitment or was admitted directly by commitment, his hospitalization was counted from the day he first entered a State hospital.

Findings

Most of our comments will be based on the eight figures, which have been designed primarily to facilitate the comparison of the hospital-residence curves for the several types of admission.

The residence curves for all legal classifications combined are compared for male and female patients in figure 1. Male patients show the lower likelihood of residence. The drop in the curve for male patients at the end of the third month is occasioned primarily by the release of alcoholic patients, predominantly male, at this point of time, and the drop from the 15th to the 18th month is brought about by a marked reduction in the percentage of male sexual psychopaths resident at the 18th month (table 2). Thus the high proportion of male patients in the total first admissions for alcoholism and for sexual psychopathy accounts almost entirely for the difference between the two curves in figure 1.

Figures 2, 3, and 4 show sex comparisons for the four cohorts of patients admitted for the treatment of mental illness. For criminal commitments the residence curve for male patients

Table 3. Patients in each cohort in percent of total, all cohorts, in hospital at successive points of time after first admission in fiscal 1958

Interval from date of first admission	Total, all legal classifications		Admissions for mental illness					Commitment for related conditions			Juvenile observation	
	Number	Percent	Total	Voluntary	Health officer's application	Civil commitment	Criminal commitment	Alcoholism	Drug addiction	Sexual psychopathy	Juvenile court	Youth authority
Male cohorts												
0 days	8,176	100.0	63.0	11.6	1.5	48.5	1.4	24.1	1.8	8.6	2.0	0.5
10 days	7,884	100.0	62.0	10.3	1.4	48.9	1.4	24.7	1.9	8.9	2.0	.5
20 days	7,564	100.0	61.0	9.3	1.4	48.8	1.5	25.2	1.9	9.3	2.1	.5
30 days	7,191	100.0	60.8	8.7	1.4	49.1	1.6	24.8	1.9	9.8	2.2	.5
2 months	5,926	100.0	61.9	7.7	1.3	51.1	1.8	21.2	2.4	11.3	2.6	.6
3 months	3,860	100.0	77.5	9.0	1.7	64.2	2.6	10.4	.9	8.8	1.8	.6
6 months	2,402	100.0	76.7	6.9	1.4	65.1	3.3	7.4	.4	13.7	1.2	.6
9 months	1,936	100.0	74.9	6.3	1.1	64.4	3.1	7.2	.4	16.0	1.0	.5
12 months	1,712	100.0	74.4	6.1	.9	64.3	3.1	6.3	.3	17.4	1.0	.6
15 months	1,586	100.0	74.0	6.3	1.1	63.8	2.8	5.9	.2	18.5	.7	.7
18 months	1,289	100.0	86.2	6.7	1.2	75.0	3.3	7.3	.2	4.4	1.2	.7
24 months	1,109	100.0	87.6	7.4	1.2	76.2	2.8	7.1	.3	2.8	1.5	.7
Female cohorts												
0 days	6,151	100.0	87.7	22.6	3.8	61.1	.2	9.3	1.6	.0	1.3	.1
10 days	5,927	100.0	87.4	20.8	3.8	62.6	.2	9.6	1.6	.0	1.3	.1
20 days	5,712	100.0	87.1	19.8	3.8	63.3	.2	9.8	1.6	.0	1.4	.1
30 days	5,476	100.0	87.1	18.8	3.7	64.3	.3	9.7	1.7	.0	1.4	.1
2 months	4,710	100.0	87.9	17.4	3.4	66.8	.3	8.6	1.8	.0	1.6	.1
3 months	3,502	100.0	94.5	16.2	4.1	73.8	.4	3.7	.5	------	1.2	.1
6 months	2,048	100.0	95.8	14.2	3.9	77.3	.4	3.1	.4	------	.6	.1
9 months	1,610	100.0	96.9	12.3	4.0	80.3	.3	2.1	.3	------	.6	.1
12 months	1,436	100.0	97.4	11.8	4.2	81.0	.4	1.9	------	------	.6	.1
15 months	1,349	100.0	96.9	11.9	3.8	80.8	.4	2.2	.2	------	.6	.1
18 months	1,268	100.0	97.1	12.5	3.9	80.4	.3	2.0	.1	------	.6	.2
24 months	1,147	100.0	97.2	11.6	3.8	81.4	.4	2.0	.4	------	.3	.1

is noticeably higher than for female patients, but the difference may be merely an artifact of the small size of the female cohort (fig. 4). For the other three pairs of cohorts (voluntary admission, admission by health officer's application, and civil commitment) the female residence curve is the higher in each instance, the difference being particularly marked in the pair of cohorts comprising health officer's applications.

For each of the remaining pairs of cohorts (patients admitted for alcoholism and drug addiction, and for the 90-day observation of juvenile cases of mental disorder), the residence curve for female patients is almost identical with its male counterpart. For this reason the curves for these cohorts are presented only for male patients.

Figure 5 compares the residence curves for the four cohorts of male patients admitted for the treatment of mental illness. As might be expected, the cohort of voluntary patients has the lowest residence likelihood, less than 20 percent being hospitalized at the end of 6 months. The next lowest is the cohort of admissions by health officer's application on the certification of two physicians, with 28 percent hospitalized at the end of 6 months. Since the statute governing this type of admission includes the provision that hospitalization may not be effected if there is an objection by the patient or his family and since in actual practice a significant proportion of these patients are released from the hospital at their own request or the request of their families, this group as a whole shares many of the features of the voluntary group. If the patient is quite ill, however, the hospital superintendent may exercise his statutory authority to retain the patient in the hospital. In such instances the hospital superintendent takes into account the nature of the patient's mental disorder and his current degree of impairment as well as the family's attitude toward and resources for continuing the patient's convalescence away from the hospital.

Male civil commitments show a residence likelihood even higher than these two groups, with 40 percent hospitalized at the end of 6 months. These patients may be released from the hospital by leave of absence or direct discharge at the discretion of the hospital superintendent. The fourth cohort comprises the so-called criminal commitments, with 70 percent resident 6 months after admission. This group is made up of several small categories, mainly persons indicted for criminal action who have

Figure 3. Percent of admissions by health officer's application in hospital during 24 months after first admission

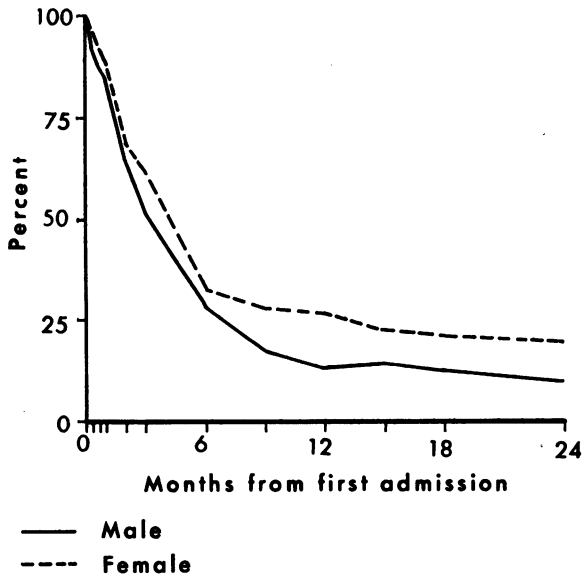
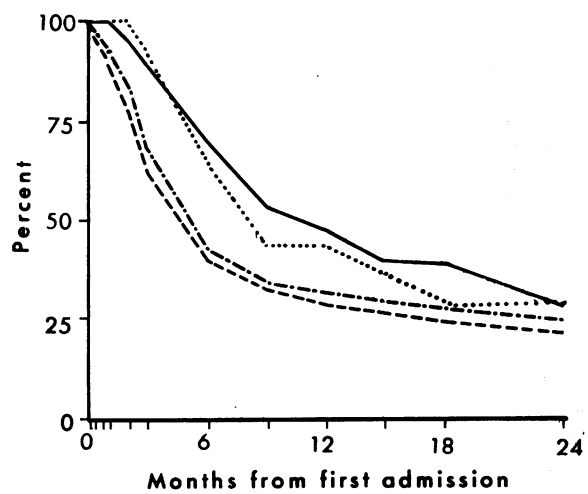


Figure 4. Percent of admissions by court commitment in hospital during 24 months after first admission



entered a plea of not guilty by reason of insanity and mentally ill inmates transferred from State prisons. The group pattern of these four curves suggests the possibility of their convergence at 5 or 6 percent of the starting number, at a point 3 or 4 years after first admission. The four cohorts of female patients display these same interrelationships (fig. 6).

Commitments for the treatment of chronic alcoholism and for narcotic or other habit-forming drug addiction are limited by State law to a maximum of 2 years; and, for narcotic commitments only, the statutory minimum is 3 months. Within these restrictions the patient may be released from the hospital at the discretion of the superintendent. As figure 7 shows, the great majority of these patients have left the hospital by the end of the third month from first admission.

An interesting sidelight on these data is the manner of release for each of the three cohorts. Alcoholics and habit-forming drug addicts have identical patterns; for every 20 patients out of the hospital at the end of the third month, 14 were released by direct discharge, 4 by convalescent leave, and 2 by unauthorized absence. The cohort of narcotic drug addicts, as might be expected, shows a different pattern; of every 20 releases, 18 were effected by direct discharge, 1 by convalescent leave, and 1 by unauthorized absence.

The rapid rate of release for these cohorts would suggest a zero resident population at the end of the 24th month. However, 4 percent of those committed for alcoholism and 3 percent of those committed for drug addiction were resident in the hospitals at that time, having been readmitted either under their former legal classification or by some other method of admission such as civil commitment for mental illness.

The residence curve for sexual psychopath commitments in figure 8 clearly shows the effect of certain statutory provisions and administrative practices which apply uniquely to this category of patients. The California State Welfare and Institutions Code requires that all first admissions of sexual psychopaths to hospitalization must be initiated with a 90-day period of observation. At the end of this time slightly over half of the patients in this cohort were remanded to the committing courts for further disposition. The remainder were committed and were continued in treatment for

Figure 5. Percent of male admissions for mental illness in hospital during 24 months after first admission

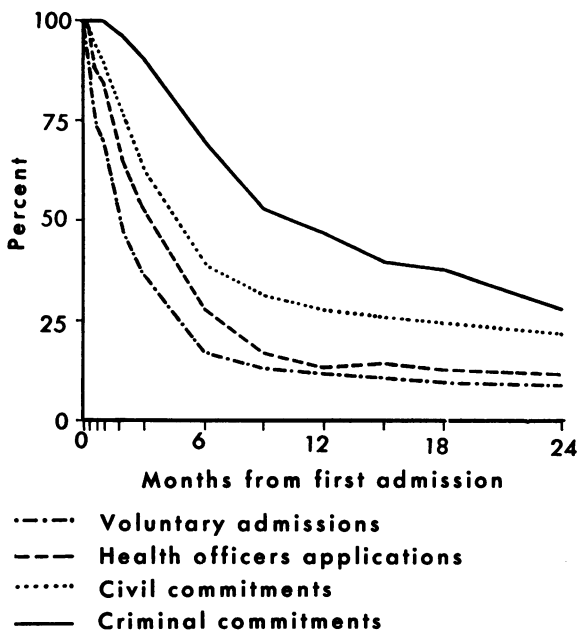
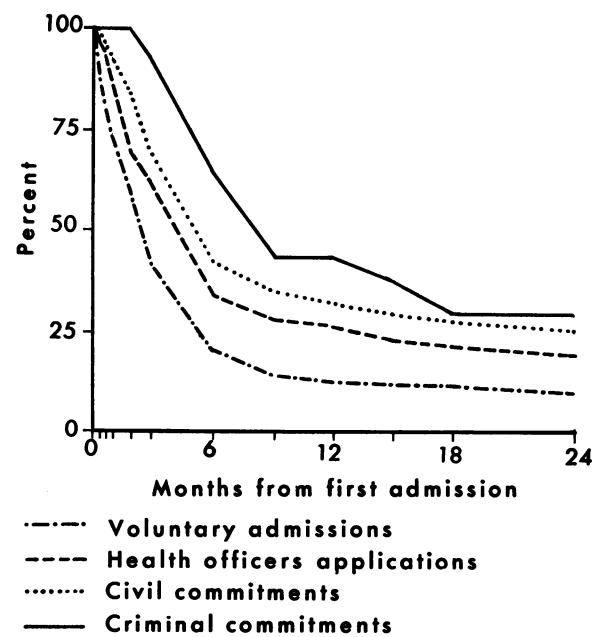


Figure 6. Percent of female admissions for mental illness in hospital during 24 months after first admission



another 15 months, at which time the cases were again reviewed and all but 8 percent were remanded to court.

Wards of the county juvenile courts and of the California State Youth Authority may be referred to a State mental hospital for 90-day observation which is sometimes renewed for a second period of 90 days, as indicated by the curves for these two cohorts in figure 8. Here again, however, hospitalization either recurs or is prolonged after 24 months for 10 to 20 percent of these patients, in most instances by voluntary admission or by court commitment for mental illness.

Up to this point we have been examining the reduction over time in the resident portion of each cohort, expressed as a percentage of the initial total for that cohort. The same primary data, however, can be examined in a somewhat different way. The resident portion of each cohort can be expressed as a percentage of the total number of patients in all cohorts resident at this same point of time. An example will illustrate the difference in the two approaches. Table 1 indicates that 1,712 of 8,176 male patients were in the hospital on the last day of the 12th month after first admission and that these 8,176 admissions included 953 voluntary admissions, of whom 105 were similarly resident at the end of the 12th month. In table 2 these two 12-month figures are converted to percentages of the starting totals for the same two cohorts. In table 3, on the other hand, the starting number and the 12-month number for the voluntary cohort are expressed as percentages of the number in all cohorts who were hospitalized at each of these two points of time; the 953 voluntary male admissions comprised 11.6 percent of all male first admissions at time zero, and the 105 voluntary patients resident at the end of 12 months comprised 6.1 percent of all male first admissions resident at the end of 12 months.

Civil commitments constitute the largest single cohort and show a higher retention curve than any other large cohort. In consequence, with the passage of time, patients from this starting cohort can be expected to make up a larger and larger percentage of the total number hospitalized. For male patients this percentage increased from 48.5 percent at time of admission to 76.2 percent at the end of 24 months, and for female patients the percentage increased from 61.1 percent to 81.4 percent, while the percentages for other legal classifica-

Figure 7. Percent of male admissions for addiction in hospital during 24 months after first admission

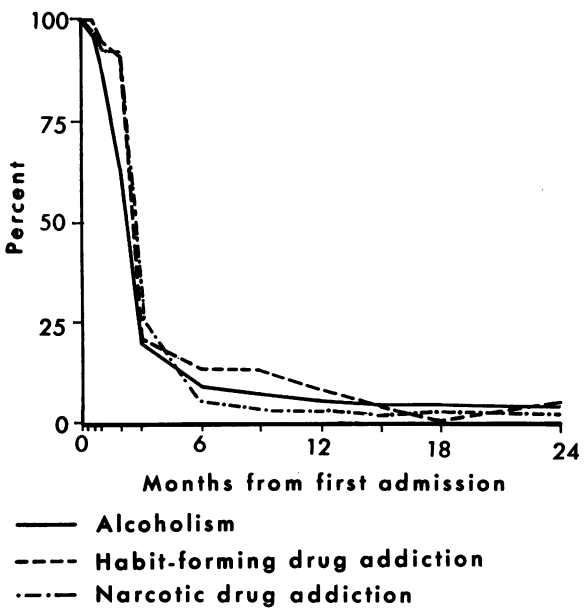
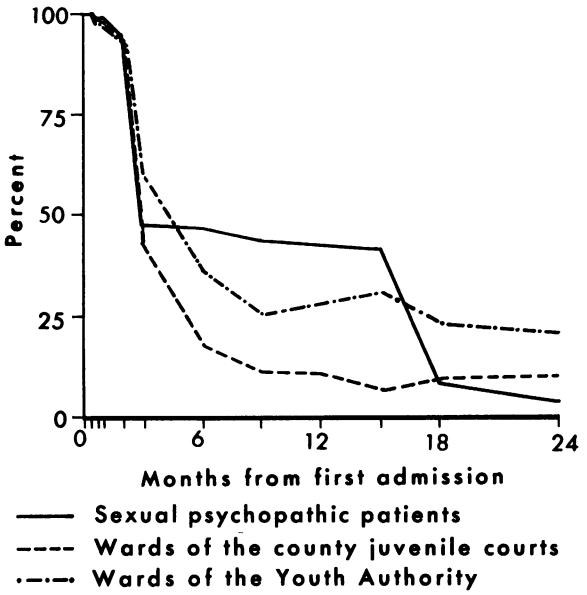


Figure 8. Percent of male admissions for 90-day observation, with or without commitment, in hospital during 24 months after first admission



tions showed compensatory decreases. Since the entire resident population of the hospitals at any given moment consists mainly of the residuals of successive groups of first admissions extending back over many years (*6*), the percentage distribution by legal classification within any one residual may be expected to approach, with the passage of time, the corresponding distribution of the entire resident population. Thus it is not surprising to find that 83 percent of the total male and 87 percent of the total female resident population on June 30, 1960, were classified as civil commitments for mental illness.

Discussion

It is not our intention to offer the data in these figures and tables as a definitive analysis of hospital population movement; on the contrary, it is expected that for the reader with experience in this field these data will raise more questions than they answer. Nevertheless they offer much information and accomplish several useful purposes.

For the statistical analyst or biometrician who is concerned with further development of practical and useful techniques for population analysis, this study illustrates an application of life-table methodology which differs in several respects from the usual approach and offers a more direct and explicit method for organizing and presenting certain aspects of population movement. The theoretical mathematician, on the other hand, may well be interested in exploring and extending life-table theory to cover the situation, unique to our study, wherein patients may repeatedly leave and return to resident status.

For hospital administrative and treatment personnel, these data will substantiate and quantify a number of subjective impressions and may also disclose some new aspects of hospital population movement. For example, it is generally known that release rates differ among the various legal classifications; these data offer a quantitative measure of the differences. Seventy percent of all first admissions are out of the hospital within 6 months of their admission, and for some legal classifications such as voluntary admissions this number exceeds 80 percent. But this rate of release is not maintained; after the 12th month for most cohorts there is little change in the percentage resident. Although this residual percentage varies from cohort to cohort, for any one cohort it can be reliably predicted from the fraction released not merely during the first 12 months but even from the fraction released during the first 3 or 4 months after admission.

The data also may have some administrative applications. For example, the percentages in table 2 may be used as a reliable basis for estimating hospital resident population 1 or 2 years in advance for budget purposes if these percentages are applied to estimates of future admission rates by legal classification. (Our experience has shown that for the more populous classifications these rates can be estimated with some reliability.)

As a second example, the percentages in table 2 may provide additional guidance in the establishment of the patient's board rate at time of admission. Since this rate is set in accordance with the patient's ability to pay, in many instances the predicted length of hospitalization becomes a major factor. Needless to say, the patient's legal classification is only one of several important factors affecting his probable length of stay, and it would admittedly be desirable to refine this approach by the consideration of other relevant factors such as the patient's age, diagnosis, and marital status. Nevertheless, the residence percentages given for the various legal classifications in table 2 offer a more precise basis for prediction than do the percentages for all first admissions shown in this table, and they may prove to be a useful adjunct to the rate-setter's subjective judgment and experience in assessing a case until more precise criteria are available.

The data also evoke several hypotheses for research of a more general nature regarding treatment practices within the hospital, admistrative policies, commitment procedures, and the full utilization of family and community resources. For example, why do female patients in the three major cohorts of admissions for mental illness (figs. 2, 3, and 4) show a higher residence likelihood than male patients —slightly higher for patients admitted voluntarily or by civil commitment and markedly

higher for patients admitted by health officer's application? It can be shown that if all three types of admission are combined, the difference between the two curves is thereby reduced to only two or three percentage points, but nevertheless it persists.

There are several possible explanations for this sex difference in the residence curves. It may arise simply from differences in the age-diagnostic distribution of the two sex groups, a possibility which will be tested later when cohort data on these two parameters become available. Sex differences in the severity of illness at time of admission, arising, for example, from a differential delay in seeking treatment, may also be a factor; unfortunately, reliable measures of degree of impairment are difficult to obtain.

Social factors undoubtedly contribute to the difference. It may be that the relatively important role played by the woman within the family structure actually encourages a conservative attitude regarding her release from the hospital on the part of the hospital authorities and especially on the part of the family. The mental illness of a key figure can be a frightening experience and a threat to family structure if the nature of the illness is not well understood by the family, and to this extent the investment of additional staff time in counseling the families of patients might pay dividends in reducing the length of hospitalization for this large group. Finally, the difference may originate in part from the protective attitude toward women which is still characteristic of our culture, a possibility which may offer a useful point of departure for some general sociological investigations.

A similar question can be raised with respect to the difference in the residence curves for voluntary admissions compared with health officer's applications and with civil commitments, for either sex. The relatively short duration of voluntary hospitalization is well known and has been variously explained as the logical outcome of greater receptivity to treatment, more support and understanding on the part of the family, relatively less psychiatric impairment, and similar factors which are thought to be especially characteristic of voluntary admissions, plus, of course, the simple fact that voluntary patients can leave the hospital whenever they wish. This liberal release procedure also is available, although to a lesser degree, to patients admitted by health officer's application, and is relatively unavailable to civil commitments.

Thus it comes as no surprise to find a concomitant relationship among the residence curves for these three cohorts: a low curve for voluntary patients, intermediate for health officer's applications, and high for court commitments (figs. 5 and 6). Furthermore, from the diagnostic distributions of the three cohorts (not reported here) one would expect to find less disparity among the three curves, that is, a slightly higher residence curve for the voluntary cohort, and no difference between the curves for health officer's applications and for civil commitments. Thus the possibility exists that the residence curve for the large cohort of civil commitments might be reduced through the liberalization of current hospital policies governing the release of these patients on a selective basis. However, this question is one which properly should be evaluated on medical rather than statistical grounds.

We turn now to a different aspect of the data, the significance of the chronic residual segments of some cohorts. Consider, for example, the cohort of male commitments for alcoholism; as indicated in table 2 and figure 7, 5 percent were resident in the hospital at the end of the 12th month following first admission, and 4 percent at the end of the 24th month, a chronic residual segment which shows little likelihood of successful restoration to the community. The group undoubtedly includes some readmissions for alcoholism, patients for whom the adequacy of community supervision and the logic of repeated hospitalization as a method of treatment may well be questioned. It also includes some previous first admissions by alcoholic commitment of patients who have been readmitted by civil commitment for mental illness (for example, with a clinical diagnosis of chronic brain syndrome associated with alcoholism) for whom the appropriateness of the original method of admission may be questioned.

More generally, what factors contribute to the formation of the chronic residual segment which emerges in every category? In the co-

hort of male voluntary admissions, for example, 347 patients were in the hospital at the end of the 3d month and 82 at the end of the 24th month (table 1). These two groups must differ in some important respects, for the first group includes 265 patients who were able to leave the hospital during the interim period of 21 months (a few died in the hospital, but the majority were released). Did the remaining group of 82 patients simply lack the internal and external resources conducive to release? Or did some of these patients possess family and community resources which atrophied, so to speak, through staff failure to utilize them vigorously? In short, what factors characterize the formation as well as the composition of the chronic residual group?

There is another important use to which cohort analysis can be put as our data continue to accumulate; this is the establishment of benchmark data against which modifications of administrative and treatment programs may be evaluated. One application of this type has already been carried out (*7*). It demonstrated that the State department of mental hygiene has effectively reduced the net length of hospitalization for cohorts of first admissions of all types admitted in each successive year from 1949 through 1957 and also for a representative, relatively homogeneous cohort (schizophrenic patients aged 25–44 years, admitted by civil commitment). In general, to the extent that the effectiveness of a new or modified program can be validly measured in terms of changes in the net rate of population turnover, cohort analysis may prove to be a useful instrument for program evaluation.

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Science Communications

A new Operations Subcommittee of the Interagency Committee on Science Information (Federal Council for Science and Technology) has been charged with identifying methods by which the Government can achieve maximum compatibility among science information systems. The Department representative on the subcommittee is the Special Assistant to the Surgeon General for Science Communications, Dr. F. Ellis Kelsey. Other committee members represent the Atomic Energy Commission, Department of Defense, National Aeronautics and Space Administration, and Department of Commerce.

Program Notes

Symposiums on waste treatment by oxidation ponds and on public health engineering education will be held at Nagpur, India, October 29–31, 1963. Those intending to present papers should send two copies of abstracts to Dr. N. U. Rao, Central Public Health Engineering Research Institute, Nagpur, India, by July 31, 1963. Full papers should be submitted by September 15.

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The East Orange (N.J.) Health Department conducts courses leading to a merit badge in public health for Boy Scouts.

In Butte County, Calif., Boy Scouts work toward public health merit badges by spending a day with a health department sanitarian assisting him with his duties, or by developing and presenting an educational health program to the troop.

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"Health Districts of the Los Angeles City Health Department," a publication of the University of the City of Los Angeles School of Public Health dated March 1962, contains data from the 1960 Census of Population and Housing, assembled by health districts.

Designed for use in seminars, lectures, and field activities of the curriculum in public health administration, the document was prepared with the aid of a training grant from the Public Health Service.

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Following a 1-day syphilis seminar in Philadelphia in October 1961, requests from private practitioners for health department assistance and advice on syphilis increased notably, according to Dr. John William Lentz, chief, venereal disease control section, Philadelphia Department of Public Health. As one result, the staff of the municipal hospital where the seminar was held discovered so many new cases that the health department assigned a dermatosyphilologist, a disease control investigator, and a clerical assistant to the hospital, Dr. Lentz reported.

The seminar, sponsored by the county medical society, the local health department, the American Academy of General Practice, and the Public Health Service, followed a 5-year period during which syphilis morbidity in the Philadelphia area had doubled annually.

In response to 5,800 invitations, 217 attended, including 98 physicians (70, nonpublic health), 41 nurses (28 from private hospitals), 37 disease control investigators, 14 laboratory directors, and 4 social workers.

« »

More than 100 New Jersey retail pharmacies, designated as Community Health Information Centers, display informative pamphlets on health subjects, record the number and types of health questions asked by customers, and emphasize the danger of self-medication. Drug manufacturers, insurance companies, and health agencies provide the booklets for the project, which operates under auspices of the Rutgers University College of Pharmacy extension service.

« »

A new role for physical therapists in community health activities was emphasized at a pilot conference on restorative services sponsored by the Georgia Department of Public Health and the Public Health Service in September 1962. Functions and education of the community-oriented physical therapist were outlined, and suggestions offered for meeting the personnel shortage.

« »

Teenagers link drinking to adulthood and pleasant social activities, according to Paul C. Riddle, school health consultant, Minnesota Department of Health. Therefore, he says, it is not reasonable to assume that they accept abstinence as a self-evident, desirable goal. In the December 1962 issue of the *Minnesota Journal of Education*, he states also that emphasis on the bizarre aspects of alcoholism serves little purpose.

Estimates of the number of students who use alcohol to any extent range from 1 in 3 to as many as 8 in 10 students; estimates of frequent drinkers range from 1 in 50 to 1 in 16. The proportion of drinkers is greater in students at the high and low socioeconomic extremes than at the median level.

Many delinquents drink, and drinking may be characteristic of some hoodlums. However, Riddle asserts, delinquents drink because they are delinquent and not vice versa.

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The number of vehicles with seat belts in the United States increased from an estimated 1½ million in 1961 to an estimated 7 million in 1962, reports the Division of Accident Prevention, Public Health Service. Fourteen percent of 1962 automobiles and trucks were equipped with belts.

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The New York State Supreme Court has upheld the New York State Health Department's refusal to approve a subdivision map which did not show a public sewer system. Wherever the local health departments have adopted realty subdivision laws, they approve subdivision plans; otherwise they submit them to the State division of environmental health services.

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An institute on hospital safety and sanitation held at the University of Michigan's School of Public Health, in Ann Arbor, October 23–24, 1961, has published its proceedings. Speakers commented on such topics as the role of bed height in patient falls, prevention of Christmas tree fires, hospital liability for actions of personnel, hospital-acquired infections, and the use of statistical analysis in accident control.

Continued Education Service, 109 South Observatory Street, Ann Arbor, Mich., distributes the 208-page publication, price $3.