FOLLOWING MENTAL PATIENTS THROUGH A LARGE COMPUTER FILE: PHASE I

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January 1971

LOS ANGELES DEPARTMENT OF MENTAL HEALTH

INTRODUCTION

The new Community Mental Health Services Law of July 1, 1969 requires, among other things, that the cost effectiveness of local mental health programs be demonstrated; thus, evaluation is mandated and the evaluation must include the program cost as part of the cost/benefit ratio.

In Los Angeles County, the local mental health program services are delivered at 64 separate units throughout the county to over 50,000 individuals yearly. The county itself consists of over 4,000 square miles and has a total population of over 7,000,000. If Los Angeles County was a State, it would be the seventh most populous in the Nation. This makes the mental health program one of the largest in the United States and an evaluation of such a program, if it is carried out according to the law, the largest mental health research endeavor on record.

Program evaluations within any mental health delivery system are dependent upon follow-up or longitudinal studies; this is especially true if cost analysis is a part of the evaluation because both the patient's present and future costs must be considered when comparing various programs.

Unfortunately longitudinal research is oppressively expensive and can usually be done only with large research grants and these are usually made by Federal Agencies or philanthropic organizations. Many such grants have been made in the past and will probably be made in the future. However, these are always for prescribed periods of time for the study of specific action programs—usually of a one-time design.

It is impractical and perhaps unreasonable for agencies responsible for very large programs to depend upon special research funds from granting institutions. The programs offered by large public agencies are of such diversity and numbers that it is impossible and even wasteful to select only one or two programs for research purposes.

Because of this, the Los Angeles County Department of Mental Health made the decision in 1968 to develop a patient file so that the records of all patients receiving care from the mental health system could be kept in a longitudinal and systematic way. This decision was made because it was recognized that knowing the full histories of patients within a public mental health system is a minimal requirement for the evaluation of that system. Much more is needed if valid research findings are to be made—but at the very least it is necessary to know if the person is helped sufficiently by a public program so that his future needs from that public mental health care delivery system are minimal. Using such a file makes it possible on an ongoing basis, to conduct patient follow-up studies of the various County programs so that the programs can be expanded, modified or discontinued depending upon the evaluation outcomes.

The easiest part of the patient file was the decision to establish it—subsequent frustrations have been the most difficult part. Although Los Angeles County is not the only large agency to establish a patient file, its file is the largest under construction and entails complexities not found in Maryland[1] or Hawaii's patient registry. The 7.0 million population of this County, compared to Maryland's 3.9 million and Hawaii's .8 million has been a factor but more important has been the diversity of Los Angeles County's "Reporting Units." The Los Angeles County Department of Mental Health is dependent on other county, state and private agencies for the delivery of the services for which it pays. These are autonomous agencies that are completely independent and operate with their own patient numbering systems and are not directly under the control of the Local Mental Health Program Director.

Identifying unique patients, therefore, became the first priority and has remained the ongoing problem which only recently has been solved satisfactorily. (The technical details of the patient file are available but they are not a part of this report.) After many trial and error approaches, it became apparent that the computer could not do it all but that the human clerk in the proverbial green eye shade and pencil had to play a major role.

When a patient enters the mental health delivery system, certain demographic information is obtained from him at the point of entry. Part of this information includes "identifiers" which can be used to help link records of unique patients. Unfortunately these "identifiers" are not consistent; names are misspelled, over 13% of birthdates are inconsistent and sometimes even the sex of the patient is miscoded.

Experience has shown that no matter how sophisticated the programming and data are that are fed into the computer, there is no possible way in which certain errors can be caught by the computer; at the same time it is physically impossible for the human eyeball to deal with yearly intake of 80,000 admissions and 50,000 different patients. An example of a successful computer link that would be impossible for the human arose in the case of Patient X. At one clinic his name was spelled with the reversal of the "i" and "e." In the alphabetic listing, there were 55 pages or 1320 lines between the two names. However, the computer, using the soundex coding method, correctly linked the two names. This would have been impossible by sight alone. In other instances, where birthdates have been substantially in error, the linking of unique patients has only been possible by visually inspecting the records.

Another major problem has been that of confidentiality; some clinics, for example, refuse to give the full name of their clients. The state hospitals and one county hospital insists that only the first five letters of each name be given. This has caused a major problem as all of the truncated names must be inspected by hand to make sure that the person isn't actually someone else identified with a full name. However, these errors are now all being caught and a patient file is now in the process of being completed that will have minimal errors.

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[1] Maryland Psychiatric Case Register: Description of History, Current Status and Future Uses, Maryland Department of Mental Hygiene and the National Institute of Mental Health, December 1967.

It should be noted that short of fingerprints, a perfect file is impossible. There is no way, for instance, of catching the person who uses an alias at the different service units. It is also impossible to follow the patient through the private sector as practitioners in this area do not report their patients to the Local Mental Health Program.

The study presented here is the first of many that has as its basis the new patient file. It demonstrates the ease of follow-up studies once a systematic file is established. Longitudinal studies become possible at minimal cost.

This example shows only one of the many kinds of information that can be distilled from such a patient file.

EXAMPLE

Subjects: All of the patients discharged from the three county psychiatric hospitals during July, August and September 1969 are the subjects of this study. A total of 1504 individuals left the hospitals during this period; 1122 from hospital A, 342 from hospital B and 40 from hospital C. The characteristics of the patients at each of three hospitals varied as did the number of patient days. These differences are shown in Tables 1-6 and include the following:

1. Legal status of patient at time of admission
2. Race
3. Diagnostic categories
4. Sex
5. Marital status
6. Income

One of the major differences between the hospitals was the length of stay before being discharged. Hospital A had an average stay of 9.3 days, hospital B a stay of 25.8 days and hospital C a stay of 29.3 days. The total cost for the original stays was $2,095,182 or an average of $1,394 per person.

Follow-up Results: In the twelve months following their discharge, 56% of the patients returned for some kind of further treatment and 28% were readmitted to inpatient facilities. Those patients who returned to the County inpatient facilities were readmitted an average of 1.6 times, and those who returned to the State hospitals were readmitted an average of 1.2 times. From Table 8 it can be seen that $1,456,823 of service was subsequently rendered by the County hospitals and $323,868 of service was given by the State hospitals. Thus, the total after inpatient care for only 12 months amounts to $1,780,691 for these patients. The inpatient costs for these 1504 patients during a 14 month period comes to a total of $3,875,873 or $2,577 per person.

There was some difference among the three hospitals patient return rates. Hospital A had a return rate of 32%, Hospital B had a return rate of 29% and Hospital C had a 25% return rate. Although patients from Hospital A returned slightly more often than the other two hospitals and its cost per patient day was higher, its average total inpatient cost was still less than that of the other two hospitals.

This finding takes on more significance when selected patient characteristics, associated with hospital readmission, are analyzed in depth. Three such characteristics related to readmission are (see Tables 17-19):

1. Age (under 35)
2. Ethnic Origin (black)
3. Marital Status (unmarried)

All of these variables were found more often in Hospital A's patients. Also, Hospital A had the highest percentage of patients diagnosed as psychotic, 58.4%; this compares with 49.2% and 30.8% for Hospitals B and C respectively. Considering all of these factors, it could not have been unexpected to find the average total cost per patient at Hospital A to far exceed that of the two other hospitals.

More patients from Hospital A went to outpatient clinics. However, their average number of outpatient visits was substantially less than the other two hospitals. The total outpatient cost was $57,078. Only 61 of the 1405 patients went to day treatment and rehabilitation centers and $122,549 additional costs were accrued.

The average total cost of the patient discharged from Hospital A was $2660, which is $200 less than the average cost of the patient from Hospital B ($2873) and $1200 less per Hospital C patient.

This is a great deal of money and service and, hopefully, each patient was treated according to need. However, there is some hint that the length of hospital stay and treatment is a function of something other than clinical need. Information in Tables 12-15 indicate that the ethnic origin may be a major variable that is a function of treatment received. In every instance the amount of treatment received by the patient is associated with this background variable. The average inpatient days at the original hospital was less for the Black person as was the subsequent days in both the County and State Hospitals. Also the average number of outpatient interviews and average day treatment days was less for the Black patient.

SUMMARY AND CONCLUSIONS

The value of a computerized patient file system that has the ability to facilitate patient follow-up studies has been demonstrated. It is both economically feasible and even necessary for longitudinal studies. The evaluation study used to demonstrate the value of the system revealed several questions and information that need to be probed in greater depth.

First, there is no evidence that the short stay at A hospital is any less effective than the longer stays at the other hospitals. If any conclusion can be drawn, it may be in the opposite direction. Second, factors other than clinical seem to be involved in the selection of patients for treatment and how much service is given to each patient.

RR/dvs

TABLE 1

LEGAL STATUS OF PATIENTS AT TIME OF ORIGINAL ADMISSION BY HOSPITAL

LEGAL STATUS	HOSPITAL							
	A		B		C		Total	
	No.	%	No.	%	No.	%	No.	%
Voluntary	588	52.4	322	94.2	39	97.5	949	63.1
Involuntary	510	45.5	20	5.8	1	2.5	531	35.3
Judicial	24	21.1	0	0.0	0	0.0	24	1.6
Total	1122	100.0%	342	100.0%	40	100.0%	1504	100.0%

$X^2 = 256.05$
$P < .001$

TABLE 2

ETHNICITY AND HOSPITAL

ETHNIC GROUP	HOSPITAL							
	A		B		C		Total	
	No.	%	No.	%	No.	%	No.	%
White	770	68.6	303	88.6	31	77.4	1104	73.4
Black	294	26.2	13	3.8	5	12.5	312	20.7
Mex./Amer.	40	3.6	14	4.1	2	5.0	56	3.7
Other	18	1.6	12	3.5	2	5.0	32	2.1
Total	1122	100.0%	342	100.0%	40	100.0%	1504	100.0%

$X^2 = 85.52$
$P < .001$

TABLE 3

Psychiatric Diagnosis by Hospital

DIAGNOSTIC CATEGORY	HOSPITAL							
	A		B		C		TOTAL	
	N	%	N	%	N	%	N	%
Senile	4	.4	0	0.0	0	0.0	4	.3
Alcohol Psychosis	21	2.3	1	.3	0	0.0	22	1.7
Organic Psychosis	56	6.2	7	2.1	1	2.6	64	5.0
Schizophrenia	380	41.8	126	37.0	10	25.6	516	40.0
Affective Disorder	27	3.0	9	2.6	0	0.0	36	2.8
Paranoia	6	.7	4	1.2	1	2.6	11	.9
Other Psychosis	36	4.0	22	6.5	0	0.0	58	4.5
Neurosis	120	13.2	69	20.2	13	33.3	202	15.3
Personality Disorder	60	6.6	19	5.6	9	23.9	88	6.8
Sex Deviation	1	.1	2	.6	0	0.0	3	.2
Alcoholism	14	1.5	13	3.8	0	0.0	27	2.1
Drug	46	5.1	35	10.3	0	0.0	81	6.3
Psychosomatic	0	0.0	1	.3	0	0.0	1	.1
Special Symptoms	0	0.0	6	1.8	0	0.0	6	.5
Transient Disorders	78	8.6	12	3.5	4	10.3	94	7.3
Child & Adolescent Dis.	9	1.0	2	.6	0	0.0	11	.9
Organic (non psychotic)	35	3.8	10	2.9	0	0.0	45	3.5
Other	17	1.8	3	.9	1	2.6	21	1.6
Total	910*	100.0	341	100.0	39	100.0	1290	100.0

* Doesn't include patient without diagnosis

$X^2 = 124.101$

$P < .001$

TABLE 4

SEX OF PATIENT AND HOSPITAL

SEX	HOSPITAL							
	A		B		C		Total	
	No.	%	No.	%	No.	%	No.	%
Male	494	44.0	155	45.3	21	52.5	670	44.5
Female	628	56.0	187	54.7	19	47.5	834	55.0
Total	1122	100.0%	342	100.0%	40	100.0%	1504	100.0%

$X^2 = 1.23$
$P < .50$

TABLE 5

MARITAL STATUS OF PATIENT AND HOSPITAL

MARITAL STATUS	HOSPITAL							
	A		B		C		Total	
	No.	%	No.	%	No.	%	No.	%
Single	424	37.8	109	31.9	12	30.0	545	36.2
Married	282	25.1	108	31.6	17	42.5	407	27.1
Widowed	67	6.0	16	4.7	1	2.5	84	5.6
Divorced	156	13.9	52	15.2	5	12.5	213	14.2
Separated	121	10.8	43	12.6	4	10.0	168	11.2
Unknown	72	6.4	14	4.1	1	2.5	87	5.8
Total	1122	100.0%	342	100.0%	40	100.0%	1504	100.0%

40

$X^2 = 16.51$
$P < .10$

TABLE 6

REPORTED INCOME OF PATIENT AND HOSPITAL

INCOME/MONTH	HOSPITAL							
	A		B		C *		Total	
	No.	%	No.	%	No.	%	No.	%
$1-200	253	47.8	12	26.6	1	14.3	256	45.7
$201-300	64	12.1	7	15.6	4	57.1	75	12.9
$301-400	47	8.9	7	15.6	0	0.0	54	9.3
$401-700	111	20.9	12	26.7	2	28.6	125	21.5
$701 +	55	10.4	7	15.5	0	0.0	62	10.6
Total	530	100.0%	45	100.0%	7*	100.0%	582	100.0%

$X^2 = 35.08$
$P < .01$

* N is too small for stable analysis

TABLE 7: ORIGINAL INPATIENT DAYS

Hospital	Cost/Day	Number	Mean Days	Total Days	Mean Cost	Total Cost
A	$133.72	1120	9.3	10,416.0	$1,243.60	$1,392,832.00
B	74.40	342	25.8	8,824.0	1,919.52	656,475.84
C	99.60	40	29.3	1,172.0	2,918.28	116,731.20
All		1503	13.6	20,412.0	1,394.00	2,095,182.00

TABLE 8: SUBSEQUENT INPATIENT DAYS (COUNTY)

Hospital	Cost/Day	Number	Mean Days	Total Days	Mean Cost	Total Cost
A	$133.72	281	35.1	9,863.1	$4,693.00	$1,318,893.00
B	74.40	45	36.2	1,629.0	2,693.00	121,197.00
C	99.60	4	42.0	168.0	4,183.00	16,733.00
All		330	35.3	11,649.0	4,415.00	1,456,823.00

TABLE 9: SUBSEQUENT INPATIENT DAYS (STATE)

Hospital	Cost/Day	Number	Mean Days	Total Days	Mean Cost	Total Cost
A	$30.00	74	71.2	5,268.8	$2,136.00	$158,064.00
B	30.00	57	89.6	5,107.2	2,688.00	153,216.00
C	30.00	6	70.2	421.2	2,106.00	12,636.00
All	30.00	137	78.8	10,795.6	2,364.00	323,868.00

TABLE 10: SUBSEQUENT OUTPATIENT VISITS

Hospital	Cost/Visit	Number	Mean Visits	Total Visits	Mean Cost	Total Cost
A	$15.00	475	5.6	2,660.0	$84.00	$39,900.00
B	15.00	117	8.6	1,006.2	129.00	15,093.00
C	15.00	12	14.2	170.4	213.00	2,556.00
All	15.00	604	6.3	3,805.2	94.50	57,078.00

TABLE 11: SUBSEQUENT DAY CARE DAYS

Hospital	Cost/Day	Number	Mean Days	Total Days	Mean Cost	Total Cost
A	30.00 $~~70.00~~	48	23.2	1,113.6	696 $~~1,624.00~~	33408.00 ~~$77,952.00~~
B	30.00 ~~70.00~~	11	51.3	564.3	1539 ~~3,591.00~~	16 929 ~~39,501.00~~
C	30.00 ~~70.00~~	2	36.0	72.0	1080 ~~2,520.00~~	2160 ~~5,040.00~~
All	30.00 ~~70.00~~	61	28.7	1,750.7	861 ~~2,009.00~~	52,521 ~~122,549.00~~

Isn't this way too high? 2x [illegible]

TABLE 12: ORIGINAL INPATIENT DAYS BY RACE

Race	Cost/Day	Number	Mean Days	Total Days	Mean Cost	Total Cost
White	$102.50	1104	14.9	16,450.0	$1,527.25	$1,686,125.00
Black	102.50	311	8.6	2,675.0	881.50	274,187.50
Mex./Amer.	102.50	56	13.4	750.0	1,373.50	76,875.00
Other	102.50	32	18.1	579.0	1,855.25	59,347.50

should use a weighted mean here, esp. since most blacks in Hosp. A. It would be better though to do separate analyses by hosp. for these tables

TABLE 13: SUBSEQUENT INPATIENT DAYS (COUNTY)

Race	Cost/Day	Number	Mean Days*	Total Days	Mean Cost	Total Cost
White	$102.50	220	39.5	8,690.0	$4,048.75	$890,725.00
Black	102.50	88	25.2	2,218.0	2,583.00	227,345.00
Mex./Amer.	102.50	17	32.2	547.0	3,300.00	56,067.00
Other	102.50	5	40.2	201.0	4,120.50	20,602.50

* ~~Includes total days~~ Mean days is of total days which involves more than one return.

TABLE 14: SUBSEQUENT INPATIENT DAYS (STATE)

Race	Cost/Day	Number	Mean Days*	Total Days	Mean Cost	Total Cost
White	$30.00	102	84.7	8,639.0	$2,541.00	$259,170.00
Black	30.00	24	46.6	1,118.0	1,398.00	33,540.00
Mex./Amer.	30.00	4	94.7	379.0	2,841.00	11,370.00
Other	30.00	8	83.4	667.0	2,502.00	20,010.00

* Mean days is of total days which involves more than one return

TABLE 15: SUBSEQUENT OUTPATIENT VISITS

Race	Cost/Day	Number	Mean Days	Total Days	Mean Cost	Total Cost
White	$15.00	430	6.5	2,795.0	$97.50	$41,925.00
Black	15.00	141	5.4	761.0	81.00	11,415.00
Mex./Amer.	15.00	25	4.7	118.0	70.50	1,770.00
Other	15.00	8	17.0	136.0	25.50	2,040.00

TABLE 16: SUBSEQUENT DAY CARE DAYS

Race	Cost/Day	Number	Mean Days	Total Days	Mean Cost	Total Cost
White	$30.00	48	31.6	1,517.0	948.13 ~~$2,212.00~~	45510 ~~$106,190.00~~
Black	30.00	10	18.6	186.0	558 ~~1,302.00~~	5580 ~~13,020.00~~
Mex./Amer.	30.00	3	4.7	14.0	140 329.00	420 ~~980.00~~
Other	30.00	*	*	*	*	*

* No Data Available

TABLE 17

AGE OF PATIENT AND RETURN TO INPATIENT STATUS

AGE	Subsequent Inpatient History					
	Readmitted		Not Readmitted		Total	
	N	%	N	%	N	%
1-17	33	7.6	52	4.9	85	5.7
18-20	29	6.7	108	10.1	137	9.1
21-24	62	14.3	145	13.5	207	13.8
25-34	144	33.3	289	27.0	433	28.8
35-44	69	15.9	205	19.1	274	18.2
45-64	84	19.4	208	19.4	292	19.4
65+	12	2.8	64	6.0	76	5.1
Total	433	100.0	1071	100.0	1504	100.0

χ = 20.47 61.9% Readmitted less than 35 years

P < .01 55.5% Non-readmitted less than 35 years

TABLE 18

RACE OF PATIENT AND RETURN TO INPATIENT STATUS

RACE	Subsequent Inpatient History					
	Readmitted		Not Readmitted		Total	
	N	%	N	%	N	%
White	297	68.6	807	75.4	1104	
Black	105	24.2	207	19.3	312	
Mex/Amer	19	4.4	37	3.5	56	
Other	12	2.8	20	1.9	32	
Total	433	100.0	1071	100.0	1504	

χ^2 = 7.42

P < .01

TABLE 19

MARITAL STATUS OF PATIENT AND RETURN TO INPATIENT STATUS

MARITAL STATUS	Subsequent Inpatient History					
	Readmitted		Not Readmitted		Total	
	N	%	N	%	N	%
Single	170	39.3	375	35.0	545	36.2
Married	96	22.2	311	29.0	407	27.1
Widowed	17	3.9	67	6.3	84	5.6
Divorced	76	17.6	137	12.8	213	14.2
Separated	52	12.0	116	10.8	168	11.2
Unknown	22	5.1	65	6.1	87	5.8
Total	433	100.0	1071	100.0	1504	100.0

$\chi^2 = 15.74$

$P < .01$