# GRAPHIC MEASURES OF RESOURCE ABSORPTION IN ALCOHOLISM TREATMENT PROGRAMS

Alex Richman

Department of Psychiatry, Beth Israel Medical Center (307 Second Avenue, New York, N.Y. 10003) and the Mount Sinai School of Medicine of the City University of New York.

Quantification is essential in the planning, management and evaluation of health services; estimating cost effectiveness, and allocating resources. Alcoholism is a disorder for which quantification is particularly difficult.

"...we have been employing rather nebulous variables to characterize a non-defined population of subjects treated by an ineffable process to produce a rather fuzzy outcome."

#### Ludwig

Resource absorption refers to inequity in the use of clinical services wherein a minority of patients uses a disproportionately large volume of treatment. Such inequity, when recognized, is rarely quantified. This paper describes some graphic measures which will assist in quantifying and comparing resource absorption in alcoholism treatment programs.

### CLINICAL PERSPECTIVES

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The number of male mental hospital first admissions with alcoholic disorders increased 64% between 1962 and 1969. One-fifth of all male admissions to psychiatric facilities were alcoholic disorders in 1970. Nearly one-half of mental hospital male admissions aged 35-64 were diagnosed as alcoholic. (Redick) Since the significance of alcoholic disorders in hospital programs is increasing, we must review how hospitalization, the most costly form of treatment is being used.

What data do we have on initial outcome, relapse or recidivism in hospital programs for alcoholics? Baekeland, et al concluded that, despite the introduction of new treatment methods, the effec-tiveness of hospital treatment for alcoholism seemed no better from 1960 to 1973 than it was from 1953 to 1963, and no differences were found in the effectiveness of different kinds of treatment regimens. Detoxification programs, the most frequent type of treatment regimen, often care for persons who are drinking or drunk, but not in need of detoxification; intensive medical treatment is provided for some alcoholics who do not require intensive medical hospitalization; and some detoxification programs fail to provide <u>alcoholism</u> treatment. (Pattison) Nevertheless, established

in-patient detoxification programs continue and acute-care hospitals are developing more in-patient detoxification programs resembling those which some already recognize as unsatisfactory.

"The same alcoholics will repeatedly appear time after time in medical crises, the staff becomes demoralized and nothing effective is accomplished. It is a "revolving door".

### Pattison

# SCARCITY OF DATA ON READMISSIONS

Patients with numerous readmissions are a major problem for alcohol treatment programs. New treatment programs rapidly accumulate readmissions (Richman and Smart); accomodation for new patients is reduced (Richman); and staff morale and therapeutic optimism is lowered (Richman and Dunham). However, little attention has been given to the biometrics of readmission and there are few reports of the readmission experience of specific programs against which detailed comparisons can be made.

Assessment of resource absorption is often resisted, as being in conflict with treatment philosophy; a problem that will not occur in well planned programs, or irrelevant to current models of alcoholism. Few statistical reports analyze the treatment events accumulated by a cohort over a period of time. Sophisticated statisticians are often reluctant to embark on descriptive studies which suffer from incomplete data, do not assess outcome in the community or treatment in other settings.

#### QUANTIFICATION OF READMISSIONS

Trends in readmissions are assessed by:

- The percentage of readmissions among admissions,
  - The numerical distribution of previous hospitalizations for individuals; and
  - Actuarial rates of readmission, specific for number of previous admissions.

The percentage of readmissions among admissions is affected by changes in the absolute number of first admissions and, as well, the denominator does not include all those who are exposed to the risk of the occurence. (Moon and Patton) An increasing percentage of readmissions among admissions is often alleged to be accounted for by the increasing number of former patients at risk of readmission from the community. It is sometimes rationalized that readmissions reflect the patients' satisfaction or confidence in the treatment program. Data analysis rarely substantiates these claims.

<u>The numerical distribution of pre-</u> vious hospitalizations is sometimes tabulated. Usually such tabulations include persons with varying time-intervals of observation. In relatively new or expanding programs, the proportion of first admissions is particularly exaggerated.

Table 1 shows the distribution of events reported for alcoholics in two large-scale information systems; the Alcoholism Program Monitoring System operated by National Institute on Alcohol Abuse and Alcoholism (NIAAA), and that operated by the Missouri Department of Mental Health. The NIAAA data show the number of times detoxification services were received by 62,873 persons reported since 1973 by 42 NIAAA funded Alcoholism Treatment Centers. The Missouri data show the number of in-patient admissions between Jan. 1970-Nov. 1974 for 15,577 individuals who had received a diagnosis of alcoholic disorder on at least one discharge. In both systems, the majority of individuals had only one event repor-However, in NIAAA there were 1.5 ted. detoxifications reported per patient, and in Missouri there were 1.9 hospitalizations per patient. The proportion of first admissions is exaggerated in both sources because the patients recently admitted for the first time have had less opportunity for readmission than those with longer periods of observation.

Lorenz-type curves can be constructed from these data to show the cumulative percentage of treatment events accounted for by various percentiles of the population ordered according to number of events. Disparities in the utilization of treatment by individuals thus become visually more apparent (Siegel and Goodman); in both treatment systems about 4 per cent of the alcoholics account for 24% of the events. (Fig. I)

Fig. I also shows inequity in the distribution of out-patient attendances by a group of alcoholics during 21-24 months following first admission. One quarter of the patients attended less than five times, half attended less than 12 times, one quarter attended more than 52 times and one-eighth attended 100 or more times; 13% of the patients accounted for 57% of the total attendances. Actuarial analyses of readmission probabilities are needed to assess "recidivism". Recidivism, as defined by criminologists, is the progressive advance in readmission rates for persons with increasing numbers of previous admissions (Wilkins). Few such analyses of time-specific readmission rates have been reported for alcoholics with various numbers of previous hospitalizations.

Fig. II shows the time-specific readmission rates for alcoholic disorders discharged from one of the New York State Mental Hospital alcoholic units. These data, supplied by A. Weinstein, were part of a large scale analysis by the New York State Department of Mental Hygiene which collated treatment events reported for individuals. The time-specific probability of readmission progressively advances for those with increasing numbers of previous hospitalizations.

Fig. III shows the estimated rates of readmission for patients discharged from Canadian psychiatric institutions with the diagnosis of alcoholic disorder during April-June 1973. These estimates were derived by "inferential linking" of readmission events for a cohort of discharges on the basis of dates of previous discharge and the number of previous hospitalizations (Richman). This method of estimation does not require a unique, personal, life-time identifier, and thus avoids the difficulties of machine matching or the problems of maintaining confidentiality in large scale information systems.

#### **RESOURCE ABSORPTION INDEX**

Time-specific rates of readmission have been shown to increase for patients with progressive numbers of previous hospitalizations. How can these data be summarized and their impact on resource absorption in treatment programs emphasized? The time-specific, event-specific rates of readmission can be applied to a hypothetical program with constant admission capacity and stable duration of stay and the proportion of readmissions among admissions projected for successive time periods following opening of the program. (The algorithm was developed and programmed on a Wang 2200-B by David Ross Richman)

The Resource Absorption Index (RAI) is the proportion of resources used by readmissions in the hypothetical treatment program. This index stabilizes between one and two years. The proportion of readmissions is shown in Fig. IV for programs subjected to the readmission rates of Figs. II and III. At the readmission rates inferred for Canadian psychiatric institutions, 19% of the resources would have been used by readmissions; at the New York State unit readmission rates, 28% of the resources would have been used by readmissions at the end of two years. These values of resource absorption are minimized since the readmission rates are truncated at 9 months and limited to 5 readmissions.

The increase in readmissions and the progressive reduction in accomodation (or "silting up") for first admissions can be graphed and readily communicated to clinicians and program administrators.

# DISCUSSION

It is clear that in-patient detoxification programs represent a form of treatment which is expensive; whose effectiveness is questionable; and whose potential benefits are markedly reduced by the small number of patients who frequently return. Resource absorption is critical for:

- a) clinical information systems
- b) cost-effectiveness estimates
- c) program evaluation

It must be emphasized that resource absorption can escape detection from many clinical information system reports. Discussion of resource absorption frequently evokes a defensive response from clinicians or administrators. There are two types of questions: one is whether the observed level of resource absorption conforms to clinical expectations or program goals; the second is how the level of resource absorption compares to other programs. By analyzing the utilization of treatment, statisticians can provide specific data which clinicians and program administrators can relate to expectations or goals; and the means by which the inter-program comparison can be made. Statistical assessments of treatment programs must consider the impact of readmissions on treatment programs in terms of the analyses described earlier.

Cost effectiveness estimates are also affected by the problem of multiple treatment events for individuals not being brought together. Schwartz and Epps have emphasized the implications for cost-effectiveness assessments, of easy readmission and involvement of individuals in multiple programs. During the course of an individual's illness, numerous, short contacts in diverse treatment services and programs can exaggerate cost-effectiveness. The patient load reported by individual programs increased while cost per "illnessepisode" decreased: when, in actual fact, there may have been no increase in program contacts with individuals during the year and no changes in costs per individual illness.

By itself, the Resource Absorption Index does not indicate the effectiveness of the treatment program. However, treatment may have a favorable outcome with a majority of patients while recidivism of a minority absorbs so much treatment resources that clinical attention is diverted from those who might benefit most.

## PROGRAM EFFECTIVENESS: OUTCOME FOR THE MAJORITY OF INDIVIDUALS

PROGRAM		FAVORABLE	UNFAVORABLE
RECIDIVISM	HIGH	A	C
(Repeated	LOW	В	D
episodes of care for a minority)			

Programs can be effective for the majority while recidivism is high (Cell A) or programs can be ineffective and recidivism be low (Cell D). Program evaluation, in addition to considering outcome, must also assess the extent of recidivism in the use of treatment resources.

Various quantitative methods can be used to show the existence of resource absorption; to measure its extent and to monitor changes which might result from modification of admission and treatment procedures. Measures of resource absorption are an essential part of statistical reports of utilization; of assessments of cost-effectiveness and evaluation of the effectiveness of alcoholism treatment programs.

#### SUMMARY

The use of treatment services is unevenly distributed among patients. A small number of patients use a disproportionately large amount of treatment resources. Another group of patients have relatively little contact with the treatment program. Resource absorption is a critical problem in treatment programs for alcoholism. This paper describes the application of two graphic displays of resource absorption to alcoholism treatment programs, the Lorenz curve and the Resource Absorption Index.

The Resource Absorption Index (RAI), projects the use of program resources by readmissions. This new measure is derived from time-specific rates of readmission for discharges with specific numbers of previous hospitalizations. The RAI measures the number of readmissions generated in a hypothetical new program over successive time periods, and, shows

the progressive reduction in accomodation (or "silting up") for first admissions. This index has been calculated for alcoholic disorders in specific treatment programs, and from national data for Canadian psychiatric institutions.

These statistical measures are gra-phic, readily"grasped" and relevant for policy making, program planning and program management.

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# DISTRIBUTION OF TREATMENT EVENTS

#### FOR INDIVIDUAL ALCOHOLICS

TABLE 1

NUMBER OF	ADMISSIONS	N L U.S. Number of peop detox services in 42 NIAAA fu	IMB Dier sin unded	EROF eceiving ce 1973 centers	PERS <u>MI</u> In-patient diagnosis Jan. 19	0 N SSO dis of a 970-N	S <u>URI</u> scharges with alcoholism Nov. 1974
ı		50,457	-	80.3%	10,340	=	66.4%
2		7,005	=	11.1%	2,556	=	16.4%
3		1,793	=	2.8%	1,139	=	7.3%
4		968	=	1.5%	565	=	3.6%
5		624	=	1.0%	332	=	2.1%
6		537	=	0.8%	183	=	1.2%
7	- 10	1,076	=	1.7%	308	=	2.0%
11	- 15	255	=	0.4%	93	=	0.6%
16	- 20	81	=	0.1%	23	=	0.1%
Gr	eater than 20	. 77	=	0.1%	37	=	0.2%
TO	TAL:	62,873	-	99.8%	15,577	=	99.9%

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The assistance of Tanya Dubrow, David Ross Richman and Drs. J.L. Hedlund, D.G. Patterson and Mr. A. Weinstein is acknowledged.

SOURCE: NIAAA - Program Analysis and Evaluation Branch, Dec. 1976.



PERCENTAGE OF PATIENTS



FIGURE IV



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