A Non-Neuroleptic Treatment for Schizophrenia: Analysis of the Two-Year Postdischarge Risk of Relapse*

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Abstract

The efficacy of antipsychotic drug maintenance in reducing the risk of relapse among previously hospitalized schizophrenic patients has been well documented. However, data from an ongoing study comparing two cohorts of young first admission schizophrenics—one receiving neuroleptic-oriented treatment on the wards of a community mental health center (CMHC), the other an intensive interpersonal approach in a small homelike facility in the community (Soteria House)—raise questions about the routine use of neuroleptics with this population. Our questioning of this practice is based on data analyzed from these two cohorts by means of the life table, a statistical technique appropriate for longitudinal studies. Data are presented in two ways: (1) The overall effectiveness of the two independent treatment programs (Soteria, N = 32, vs. CMHC, N = 36) is compared in terms of the probabilities of not being readmitted over the 2-year postdischarge interval. (2) Analyses that look at the influence of the original treatment setting and postdischarge antipsychotic drug status on readmission rates are presented. Program comparisons reveal Soteria patients to have a consistently higher survival rate than CMHC patients throughout 2 years postdischarge. At 12 months postdischarge, the cumulative probability of remaining well (no readmissions) significantly favors the Soteria patients ($p < .05$, Mantel χ^2). The overall results of the Soteria program were achieved despite the fact that all CMHC patients received neuroleptics during their original inpatient stays and about 50 percent were maintained on neuroleptics up to the point of readmission or study termination, whereas only 10 percent of Soteria subjects were treated with or maintained on neuroleptics. The survival rates by postdischarge drug status and program affiliation show the Soteria no-drug group to have the highest proportion of survivors at almost every interval throughout 24 months, the CMHC drug-maintained group to have the lowest survival rate, and the CMHC unmaintained group to be surviving at a rate generally comparable to the Soteria no-drug group.

Studies examining the efficacy of antipsychotic drug maintenance in reducing the risk of relapse among previously hospitalized psychiatric patients have flourished during the past decade. The general findings are that neuroleptics provide the potential for truly preventive psychiatry. In a review of 24 controlled studies comparing relapse rates for schizophrenics on placebo and maintenance neuroleptics, Davis (1975) consistently found placebo patients to relapse more often than drug-treated patients. Hogarty and Ulrich (1977) found that although the risk of relapse declines with the passage of time, it is almost twice as high for placebo-treated patients (80 percent) as for drug-maintained patients (48 percent) after 2 years of treatment. Overall, relapse rates for schizophrenia, regardless of drug status, are 30-40 percent at 6 months, 35-50 percent at 1 year, and 65-75 percent at 3-5 years (Anthony, Cohen, and Vitalo 1978). Anthony, Cohen,

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and Vitalo (1978, p. 367) point out in their recent review of followup studies, "Despite the variety in populations, institutions, and geographical regions, the recidivism data continue to show remarkable consistency." Thus, although undeniably helpful, neuroleptics have not proved curative. Fewer schizophrenic patients are now chronically institutionalized, but multiple readmissions—about 50 percent in the 2 years postdischarge—are a serious public health problem. Furthermore, it has been estimated that only 15 to 20 percent of schizophrenics living in the community achieve an average level of adjustment (i.e., being self-supporting or successfully functioning as a housewife) (Mosher and Keinsilver 1971).

Despite the demonstrated ameliorative effects of neuroleptic drugs, there are compelling reasons to search for alternative forms of treatment. It is clear that the use of neuroleptic drugs entails increased risk of serious, sometimes irreversible toxicities (Crane 1973), and the Food and Drug Administration has recently requested drug manufacturers to include a statement in the package insert noting that neuroleptics may possibly encourage the growth of breast tumors in women. There are also suggestions in the literature that recovery in at least some schizophrenics may be impaired by treatment with neuroleptics (Crane 1973; Klein 1970; Rappaport et al. 1967). In addition, recent studies have shown relapse rates for depot phenothiazine fluphenazine to be nearly equal in the first year postdischarge, indicating that drug nonadherence does not adequately explain early relapse (Hogarty et al., in press; Schooler et al. 1979). These findings would seem to run counter to overwhelming evidence in the literature that drug compliance is a crucial factor in reducing relapse.

In the present report, we will focus on the 2-year postdischarge risk of relapse in two relatively small groups of newly diagnosed, young, first admission schizophrenics: one initially treated with neuroleptics on the wards of a community mental health center (comparison group); the other without neuroleptic drugs in a small, homelike facility in the community, Soteria House (experimental group). Half of the comparison group patients were maintained on neuroleptics postdischarge (a clinical decision), whereas less than 10 percent of patients in the experimental group received maintenance drug therapy. Our study is not a controlled clinical drug trial, but rather a presentation of data for two groups representing contrasting treatment approaches to schizophrenia. We will attempt to identify predictors of relapse for our sample both by program affiliation and the combined influence of treatment program and postdischarge drug status.

Program Descriptions

Soteria. Soteria House is a 1915-vintage, 12-room residence located on a busy street in a "transitional" neighborhood of a San Francisco Bay Area city. Due primarily to licensing laws, the house can accommodate only six patients at a time. One or two patients are admitted each month. The staff consists of six paid nonprofessional therapists, a project director, and a quarter-time project psychiatrist. In general, two regular staff members, a man and a woman, are on duty at any given time. The guiding philosophy at Soteria is that the schizophrenic reaction is an altered state of consciousness in an individual who is experiencing a crisis in living. The disruptive psychotic experience is believed to have potential for reintegration and reconstitution, resulting in a more stable sense of self if the process is not prematurely aborted by neuroleptic drug use. By design, no neuroleptics are given during the subjects' first 6 weeks in the program. If there is no change in psychopathology by that time, drugs may then be prescribed. However, in the experimental samples reported here, only 3 percent received neuroleptics during their initial episodes of treatment. We have more completely described the research design (Mosher 1972), staff (Mosher, Reifman, and Menn 1973), milieu characteristics (Wendt et al., in press), and 1-year (Mosher, Menn, and Matthews 1975) and 2-year (Mosher and Menn 1978) followup results elsewhere.

Community Mental Health Center. The inpatient service of the community mental health center (CMHC) consists of one open and one locked ward of 30 beds each. About 250 patients are admitted each month. It is a well-staffed (1.5:1 staff-patient ratio) active treatment facility, which is oriented toward crisis intervention. High doses of neuroleptics are used, and rapid placement of patients in other parts of this relatively well-endowed county's treatment network is an immediate goal. Clinical decisions about neuroleptic drug use both during inpatient care and postdischarge are made by the individual psychiatrists responsible for the patient's care. The Soteria research team has no role in these decisions.

Research Methods

Sample Selection. All subjects are obtained from a screening facility, which is part of the CMHC complex containing our control wards. Ap-

proximately 600 new patients are seen there per month, of whom about 250 are hospitalized. Anyone meeting the following basic criteria is a potential study candidate:

- Clearly schizophrenic
- Deemed in need of hospitalization
- No more than one previous hospitalization for 2 weeks or less with a diagnosis of schizophrenia
- Age 16-30 (either sex)
- Unmarried, separated, widowed or divorced.

The selection criteria are designed to provide us with a relatively homogeneous sample of individuals diagnosed schizophrenic, but a group at risk for prolonged hospitalization or chronic disability. Early onset and being unmarried both predispose to chronic care (Strauss et al. 1977).

Treatment Assignment. Subjects meeting study selection criteria are *identified* without knowledge of the group to which they will ultimately be assigned. Study requirements are explained, and informed consent is obtained from the patient and his family, or significant other, if available. As only six residents can be accommodated in the experimental setting, intake is limited by bed availability. Therefore, consenting subjects are admitted to the experimental program if a bed is available. If no experimental bed is available, eligible consenting subjects are admitted to the comparison treatment group. Basically, this procedure results in treatment group assignment on a consecutively admitted, space-available basis. It should be emphasized that our samples are remarkably similar on demographic and baseline psychiatric symptomatology variables.

Research Assessment. The measures below are a partial list of those completed at baseline (admission to the study) and at followup (6, 12, 18, and 24 months postadmission). All assessments are conducted by an independent research team that has no direct treatment responsibilities in either setting.

1. Baseline.

- Diagnosis—As per *DSM-II* (American Psychiatric Association 1968). For a subject to be included in the study, three independent diagnoses of schizophrenia must be in agreement.
- Diagnostic symptoms—A checklist of seven symptoms. Four of seven symptoms are required for inclusion in the study (Cole, Klerman, and Goldberg 1964).
- Certainty of diagnosis—A 7-point scale (Mosher, Pollin, and Stabenau 1971).
- Mode of onset—Assesses acute/insidious onset types (Vaillant 1964).
- Paranoid/nonparanoid status—A short scale for rating paranoid schizophrenia (Venables and O'Connor 1959).
- Inpatient Multidimensional Psychiatric Scale—A widely used symptom rating scale producing scores on 10 psychotic syndromes (Lorr, Klett, and McNair 1963).
- Global severity—An overall measure of psychopathology.
- Brief social history form—A detailed description of a patient's and family's psychiatric and social history (Boothe, Schooler, and Goldberg 1972).

2. Followup.

- Patient progress report—For each 6-monthly interval, information on the subject's medication history, use of other treatment, living arrangements (including any hospital readmissions), work status, social contacts, global severity, and improvement is obtained.

Methods of Analysis

Life Table Method. Widely used to study survivorship in various medical conditions, the life table method was first used in the psychiatric literature in studies of affective disorders by Fleiss et al. (1976) and Klerman et al. (1974). It has since been applied to schizophrenia outpatient data by Hogarty and Ulrich (1977) and Hogarty et al. (in press). The life table provides a useful means of displaying longitudinal data for psychiatric patients. The subsequent application of various mathematical models allows the clinical questions related to change in the risk of relapse over *N* months, and the continuing advantages of program affiliation, to be approached directly. The life table bases its estimates of risk on data from the total number of subjects in a study, including subjects administratively withdrawn and clinically relapsed, and provides data on the number of subjects at risk for a given interval of study, the proportion relapsed within an interval of time, and the cumulative proportion surviving throughout the study. Not only can the probability of surviving on a given treatment at a given interval of time be calculated, but the probability of ultimately surviving through subsequent periods of time can be determined as well. The pattern of relapse suggested by the life table contains the data that permits the "risk of relapse" to be disentangled from similar, but potentially confounding, criteria such as "cumulative percent relapsed" or "months in the community." These issues are discussed in detail by Hogarty and Ulrich (1977). A complete description of the analytic

methods we used is available in Fleiss et al. (1976).

The life table method was used in this study to compare the probabilities of not being readmitted to residential care first between the two programs, Soteria and the CMHC, and then among three treatment subgroups from these programs, defined by *postdischarge* usage of major tranquilizers: subjects never-treated with neuroleptics (Soteria only); those withdrawn from neuroleptics (CMHC only); and subjects continuously maintained on neuroleptics (CMHC only). A patient's discharge from his original stay in the experimental/control facility is defined as the common starting point in the life table analyses. Although discharge varies considerably between the two programs in terms of length of time from patient's initial admission to the study, it is the most appropriate starting point as we are simply concerned with assessing the efficacy of two treatment programs, each incorporating its own treatment modality, including short or long lengths of stays, rapid tranquilization with neuroleptics or minimal drug use, and high patient/staff ratio. All patients were followed up from discharge until the occurrence of a *failure* (defined as a readmission), *termination well* (no readmissions through 24 months postdischarge), or *dropping out* (lost to followup) at which point the elapsed time was calculated.

For the overall program comparison, all cases were included in which at least one followup evaluation was available after discharge, regardless of drug status, yielding a total of 32 experimental and 36 control cases. For the program by drug status comparison, six of the 32 experimental cases were excluded because of postdischarge neuroleptic use, leaving 26 cases available for the "never drug treated" group. The CMHC group of 36 split into 18 cases each for the "withdrawn" and "continuous" drug groups.

Statistical comparisons of the various groups in the life table analyses were made at all points in time simultaneously by means of a chi-square procedure developed by Mantel (1966). We will specifically focus our comparisons of cumulative probabilities of remaining continuously well at 6, 12, 18, and 24 months.

Characteristics Associated With Relapse. A traditional approach to predicting number of months to relapse, defined here as actual readmission to residential care, is to select the best possible subset of variables from a large pool of baseline psychopathological variables as well as social history and demographic variables, and relate this subset to time to relapse in a linear regression model. The problem that arises with this approach is that the dependent variable, number of months to relapse in this case, in linear regression should be normally distributed in order to obtain accurate results from the regression technique.

Because our data were bimodally distributed (i.e., into early relapsers and survivors), a different method, as suggested by Schooler et al. (1978), and described below, was used to investigate possible relationships between time to relapse and the group of baseline variables specified before. Our data were divided into three groupings of relapsers, omitting all administrative dropouts ($N = 4$): (1) those who relapsed within the first 3 months after discharge ($N = 20$); (2) those who relapsed between 4 months and 16 months after discharge ($N = 16$); and (3) those who survived in the community for 17 months or more ($N = 28$). Sixteen months was chosen because there was a 7-month gap after 16 months before another patient relapsed, and the number of cases lost due to administrative reasons was minimized.

For continuous baseline variables, we ran analyses of variance (ANOVAs), in the form of a 3 × 2 factorial model, i.e., three groupings of relapsers by two treatment groups, with the baseline variables as the dependent variable. We defined the treatment groups to be (1) the Soteria cases ($N = 32$) regardless of drug usage postdischarge and CMHC cases ($N = 36$) and (2) the Soteria cases minus the patients who used drugs postdischarge ($N = 26$) and CMHC cases ($N = 36$). The first definition we will refer to as the program comparison and the second as the program by drug status comparison. The CMHC group in the program by drug status comparison could not be further broken down into the "withdrawn" and "continuous" groups as we did in the life table analyses because of the small number of cases in each cell. These analyses allow us to determine if there are differences among the three groupings by relapse in general, or differentially by treatment group, for each of the continuous variables in our pool of baseline variables.

For the categorical baseline variables, contingency tables were computed and significant relationships determined by chi-square or exact probabilities. For example, using the variable sex, a 3 × 2 table (relapse groupings by treatment groups) was computed for males, and then another for females.

Results

Data will be reported in two ways: (1) by program comparisons without regard to what specific postdischarge treatment modality individual clients

received (drugs or not); (2) by program by drug status, which includes only Soteria subjects who received no drugs postdischarge and CMHC subjects who were either withdrawn (i.e., not on drugs continuously postdischarge) or maintained continuously on drugs postdischarge.

Baseline Program Comparisons. As shown in table 1, subjects in the two programs are remarkably similar on most demographic and admission psychiatric variables. However, the CMHC sample is significantly older by about 2 years ($p \leqslant .05$) than the Soteria sample; and the CMHC sample stayed a significantly shorter duration of time in the hospital ($p \leqslant .0001$) during their original stay (a difference expected because of the treatment orientation in each facility).

Baseline Program by Drug Status Comparisons. The Soteria nondrug, CMHC "withdrawn," and CMHC "continuous" drug groups are quite comparable on all demographic and admission psychiatric variables as shown in table 2. The expected Soteria/CMHC length of stay difference is found, but, in addition, the CMHC withdrawn subjects stayed significantly longer on the CMHC wards than did continuous drug subjects.

Life Table: Program Comparisons. As shown in figure 1, consistently more Soteria-treated patients survived over 24 months postdischarge. Although fluctuating somewhat, Soteria patients had about a 20 percent better chance than CMHC patients of having never been rehospitalized at each point in time. At 12 months postdischarge, the cumulative probability of having not been rehospitalized significantly favors ($p \leqslant .05$)

Table 1. Comparison of demographic and baseline psychiatric variables: Program comparisons

	Soteria (N = 32)	CMHC (N = 36)
Demographic data		
Age: Mean ± SD	20.9 ± 3.3	22.9 ± 4.3[1]
Sex: Male	16 (50%)	21 (58%)
Female	16 (50%)	15 (42%)
Marital status:		
Never married	26 (81%)	28 (83%)
Widowed, divorced, separated	6 (19%)	6 (17%)
Education:		
Postgraduate	—	2 (6%)
Completed college	1 (3%)	2 (6%)
Some college	17 (53%)	17 (53%)
Completed high school	5 (16%)	6 (19%)
Some high school	9 (28%)	5 (16%)
Father's social class:		
Mean ± SD	3.0 ± 1.1	3.0 ± 1.1
Number of days in original stay:		
Mean ± SD	159.4 ± 139	24.4 ± 30.0[2]
Median	120	15
Admission psychiatric data		
Diagnosis	All schizophrenic	All schizophrenic
Number of symptoms:		
Mean ± SD	5.4 ± 1.0	5.3 ± .8
Acute/insidious score:		
Mean ± SD	2.4 ± 1.2	2.7 ± .9
Acute	15 (50%)	17 (59%)
Insidious	15 (50%)	17 (59%)
Paranoid score:		
Mean ± SD	12.7 ± 5.1	12.1 ± 5.5
Paranoid	15 (47%)	10 (36%)
Nonparanoid	17 (53%)	18 (64%)
Global severity:		
Mean ± SD	5.3 ± 1.2	5.3 ± .8
Global improvement (prediction of outcome):		
Mean ± SD	2.6 ± .9	2.9 ± 1.0

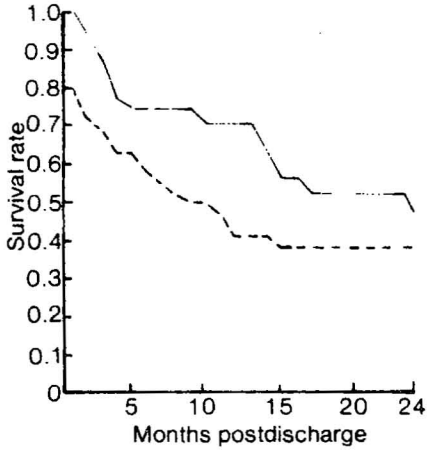
[1] $p < .04$.
[2] $p < .00001$.

Table 2. Comparison of demographic and baseline psychiatric variables: Program by drug status comparisons

	Soteria nondrug (*N* = 26)	CMHC unmaintained (*N* = 18)	CMHC continuous (*N* = 18)
Demographic data			
Age: Mean ± SD	21.3 ± 3.4	22.6 ± 3.6	23.1 ± 5.0
Sex: Male	13 (50%)	8 (44%)	13 (72%)
Female	13 (50%)	10 (56%)	5 (28%)
Marital status:			
Never married	21 (81%)	15 (83%)	15 (83%)
Widowed, divorced, separated	5 (19%)	3 (17%)	3 (17%)
Education:			
Postgraduate	—	2 (12%)	—
Completed college	1 (4%)	1 (6%)	1 (6%)
Some college	16 (62%)	9 (53%)	8 (53%)
Completed high school	4 (15%)	4 (24%)	2 (13%)
Some high school	5 (19%)	1 (6%)	4 (27%)
Father's social class:			
Mean ± SD	3.0 ± 1.1	2.7 ± 1.1	3.4 ± 1.1
Number of days in original stay:			
Mean ± SD	142.8 ± 100[1]	33.2 ± 40[2]	15.7 ± 10[3]
Median	115	18	10
Admission psychiatric data			
Diagnosis	Schizophrenic	Schizophrenic	Schizophrenic
Number of symptoms:			
Mean ± SD	5.3 ± 1.1	5.5 ± .8	5.1 ± .8
Acute/insidious score:			
Mean ± SD	2.3 ± 1.2	2.7 ± 1.1	2.6 ± .6
Acute	11 (46%)	10 (67%)	7 (50%)
Insidious	13 (54%)	5 (33%)	7 (50%)
Paranoid score:			
Mean ± SD	12.7 ± 5.4	12.6 ± 4.9	11.7 ± 6.1
Paranoid	13 (50%)	5 (36%)	5 (36%)
Nonparanoid	13 (50%)	9 (64%)	9 (64%)
Global severity:			
Mean ± SD	5.3 ± 1.2	5.3 ± .5	5.4 ± 1.1
Global improvement: (prediction of outcome)			
Mean ± SD	2.6 ± 1.0	3.0 ± 1.2	2.8 ± .8

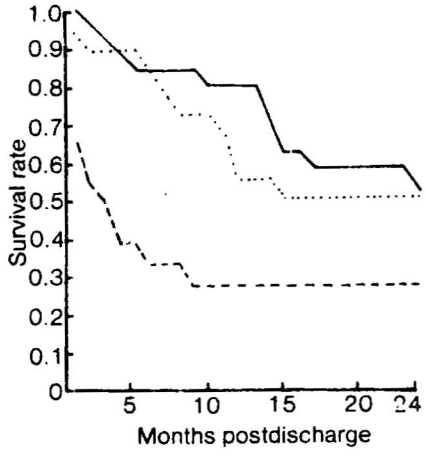
[1] Significant intergroup difference between Soteria nondrug and CMHC continuous group ($p < .0001$).
[2] Significant intergroup difference between Soteria nondrug and CMHC unmaintained group ($p < .001$).
[3] Significant intergroup difference between CMHC unmaintained and CMHC continuous groups ($p < .0001$).

Figure 1. Life table: Program comparison



——— All Soteria subjects, $N = 32$.
– – – – All CMCH subjects, $N = 36$.

Figure 2. Life table: Program comparison by drug status



——— Soteria nondrug subjects, $N = 26$.
– – – CMCH continuous drug subjects, $N = 18$.
. . . . CMCH unmaintained subjects, $N = 18$.

Soteria subjects. Because of the progressively smaller number of cases (rehospitalized subjects and administrative terminations are no longer included in the analysis), the differences favoring Soteria are not significant at 18 and 24 months, although the magnitude remains similar (tables 3 and 4). These differences occurred despite the fact that 50 percent of the CMHC sample was maintained on neuroleptics up to the point of readmission or until 24 months postdischarge, whereas only 19 percent of the Soteria sample received any postdischarge neuroleptic drug treatment, with half of the 19 percent maintained continuously on neuroleptics.

Life Table: Program by Drug Status Comparisons. Figure 2 reveals the Soteria nondrug group to have the highest survival rate overall during the 24-month study period. However, the CMHC withdrawn group has a curve similar to that of Soteria, although, at about 8 through 14 months, approximately a 20 percent difference in interval specific probabilities favoring the Soteria sample is found. The CMHC continuous drug group, on the other hand, has the lowest survival rates at every time interval. Mantel chi-squares show the Soteria sample to have a significantly better chance of not having relapsed than the CMHC continuous group at 6, 12, 18, and 24 months (see table 4). Likewise, the CMHC withdrawn group has significantly higher cumulative probabilities than the continuous drug group at 6 and 12 months, with the differences at 18 and 24 months dropping to the $p \leqslant .10$ level of significance. No significant differences were found when comparing the Soteria nondrug and CMHC drug withdrawn samples.

Characteristics Associated With Relapse by Groupings of Relapsers. In table 5, the distribution of relapsed subjects across the three categories of time to relapse by both program affiliation and program by postdischarge drug status is presented. No significant differences were found. However, when the CMHC cases were divided into the withdrawn and continuous drug users groups as in the life table analysis, a significantly different pattern for relapsers by group was found, with the CMHC continuous group being overrepresented in the "3-month or less" category. To determine if differences existed among the three relapse groups differentially by program by drug status for each of the continuous variables in our pool of baseline variables, ANOVAs were run to test the significance of the interaction term between the relapse groups and the programs. No significant interactions were found for either the program or the program by drug status comparisons.

However, there were some significant main effect differences, i.e., regardless of program, among the three relapse groups as seen in table 6. The younger, less educated patients with lower occupational levels who stopped behaving at a comparable level to their peers at a younger age were more likely to relapse at 3 months or less. This group of relapsers was significantly different on these four characteristics from the group who survived past 17 months. The 4- to 16-month relapse group also had significantly higher occupational levels than the early relapsers. Patient occupation is defined here as highest occupational level attained, not present occupation. This relationship can be seen more clearly if patient occupation is redefined as blue collar (unskilled, semiskilled, and skilled labor) and white collar

jobs (clerical level to lesser professional/business manager level). As seen in table 7, the early relapse group is almost totally composed of blue collar workers and, as expected, these people have lower educational levels than white collar workers. (Of the white collar workers, 91.7 percent had attended at least some college, whereas only 37.5 percent of the blue collar workers reached the educational level of some college and none progressed beyond that point.) Overall, there is a .62 ($p < .001$) Pearson correlation between education and occupation in our sample.

No significant relationships were found between relapse groups and program, or for relapse groups alone, for any of the 35 categorical variables investigated.

Summary and Discussion

Data are reported from an ongoing study comparing the 2-year postdischarge probabilities of avoiding hospital readmissions for two similar groups of schizophrenics treated in two different clinical settings. When comparing the samples by program affiliation, we found Soteria-treated (experimental) subjects to have a lesser risk of subsequent readmissions than that of CMHC-treated (control) subjects. When the samples were further divided by postdischarge neuroleptic drug status, large differences in risk of relapse were found for the nondrug, withdrawn, and continuously maintained drug groups. The risk of relapse throughout 24 months was clearly lowest for the Soteria nondrug sample and highest for the CMHC patients maintained on drugs before their first relapse. The risk-of-relapse pattern for the CMHC withdrawn group was similar to that of the Soteria nondrug group. Our findings are consistent with the overwhelming evidence in the psychiatric literature that maintenance treatment with neuroleptics reduces the risk of relapse. Our results were quite the opposite: Persons on maintenance drugs relapsed fastest and had a consistently higher risk of relapse throughout 24 months postdischarge. In fact, the risk of relapse tends to be at least twice as great for the maintenance drug group as for the drug-free group.

Another interesting point to note is the difference found in the cumulative probability of remaining well for the Soteria sample as a whole and the Soteria sample in which subjects who received some neuroleptics

Table 3. Life table: Probability of remaining continuously well

Comparisons	6 months	12 months	18 months	24 months
Program comparisons				
Soteria ($N = 32$)	.7419	.7074	.5228	.4753
CMHC ($N = 36$)	.5833	.4167	.3889	.3889
Program by drug status comparisons				
Soteria nondrug ($N = 26$)	.8462	.8049	.5833	.5249
CMHC unmaintained ($N = 18$)	.8333	.5556	.5000	.5000
CMHC continuous ($N = 18$)	.3333	.2778	.2778	.2778

Table 4. Life table: Comparison of cumulative probabilities—Mantel chi-square

Comparisons	6 months	12 months	18 months	24 months
Program comparisons				
Soteria ($N = 32$) vs. CMHC ($N = 36$)	1.69	4.70 <.05	1.88	1.88
Program by drug status comparisons				
Soteria nondrug ($N = 26$) vs. CMHC continuous ($N = 18$)	12.13 <.001	13.16 <.001	7.29 <.01	6.36 <.02
Soteria nondrug ($N = 26$) vs. CMHC unmaintained ($N = 18$)	.06	1.75	.26	.09
CMHC continuous ($N = 18$) vs. CMHC unmaintained ($N = 18$)	7.92 <.01	4.12 <.05	3.34	3.34

Note—First line represents values for Mantel chi-square; numbers beneath represent probability levels.

Table 5. Distribution of relapse subjects

Comparisons	3 months or less	4–16 months	17 months or more
Program comparisons[1]			
Soteria	7	7	14
CMHC	13	9	14
Program by drug status (CMHC combined)[2]			
Soteria nondrug	3	7	13
CMHC	13	9	14
Program by drug status[3]			
Soteria nondrug	3	7	13
CMHC unmaintained	2	7	9
CMHC continuous	11	2	5

[1] χ^2 = 1.067, 2 *df*, $p \leq .59$.
[2] χ^2 = 3.86, 2 *df*, $p \leq .15$.
[3] χ^2 = 15.69, 4 *df*, $p \leq .004$.

Table 6. Characteristics associated with survival time: Program comparison (means)

Patient characteristics	Survival time		
	3 months or less	4–16 months	17 months or more
Age $F = 3.36$ (*df* 2/58) $p \leq .04$	20.90	21.13	23.11
Patient education[1] $F = 4.25$ (*df* 2/54) $p \leq .02$	4.89	4.60	4.04
Patient occupation[1] $F = 6.11$ (*df* 2/53) $p \leq .004$	6.59	5.07	5.04
Age up to which behavior comparable to peers $F = 4.27$ (*df* 2/47) $p \leq .02$	16.33	18.15	20.2

[1] High scores indicate lower attainment levels for education and occupation.

postdischarge were eliminated The six subjects who received drugs postdischarge had a pattern of relapse similar to that of the CMHC continuous sample. When these subjects were eliminated from the overall Soteria sample, the risk of relapse declined by 6-10 percent at 6, 12, 18, and 24 months.

In an attempt to identify baseline variables associated with relapse, we pooled the Soteria and CMHC samples and divided them into three categories of relapsers: those who relapsed early (4 months), those who relapsed at some mid-point (between 4-16 months), and those who survived at least through 17 months postdischarge. We found persons who relapsed early to be young and have a lower occupational and educational level, whereas late relapsers were generally older, had higher occupational and educational levels, and stopped functioning at an older age as compared to others of their age and sex in their families and neighborhoods. Our survey of the literature generally revealed these variables to have little association with relapse (Gregory and Downie 1968; Lewinsohn 1967) and the number and duration of previous hospitalizations to be the best predictors of relapse (Buell and Anthony 1975; Rosenblatt and Meyer 1974; Strauss and Carpenter 1978) However, our findings are consistent with the general literature findings that an early onset and poor social competence are associated with poor outcomes (Strauss and Carpenter 1978). That is, in our sample, early relapsers were younger upon their admission to the study (i.e., early onset) and had lower educational and occupational levels, correlates of low social competence. As our criteria for sample selection excluded subjects with more than one previous hospitalization of greater than 2 weeks' duration, we cannot relate our data to the previous hospitalization findings reported in the literature. Also, because our experimental and control samples are relatively homogeneous (due to our sample selection procedures) and we have relatively small samples, we were not able to define differential predictors of relapse *between* the two programs.

The question can be raised about these data as to whether or not the significant difference in initial

Table 7. Distribution of relapsers by occupational type: Program comparison[1]

Occupational type	3 months or less	4–16 months	17 months or more
Blue collar	16	6	13
White collar	1	9	14

[1] $\chi^2 = 12.25$, 2 *df*, $p \leq .002$.

lengths of stay between the two programs accounts for the differences in relapse rates. That is, in the Soteria sample, discharge occurred about 5 months after admission whereas the CMHC subjects were discharged in less than a month. Therefore, the starting point for the life table analyses, discharge, varied substantially between Soteria and the CMHC in terms of length of time from admission to the study. In order to examine the relationship between length of stay and pattern of relapse, three analyses were performed: First, Pearson correlations of .21 for Soteria and −.09 for the CMHC samples were found (both nonsignificant) between length of time in original stay and number of months to relapse. Secondly, as shown in table 5, the *distribution* of relapsers according to our three groupings (early, middle, late or nonrelapsers) was similar for both programs. Third, ANOVAs run in the form of a 3 × 2 factorial model (3 groupings of relapsers by 2 treatment groups) with length of stay in the original treatment setting as the dependent variable yielded no significant interaction between the treatment programs and the number of months to relapse by groupings. Based on these results, it does not appear that the differences in initial lengths of stay account for the life table differences we report. We are, however, cognizant of the limitations of these analyses because of our relatively small sample sizes. Our contention is, however, that we are comparing two clinical programs for schizophrenia and that the varying lengths of stay are simply a component of their differing philosophies.

We recognize that the generalizability of our findings is limited in that our subjects are a highly selected, relatively homogeneous subset of all patients labeled schizophrenic; however, we feel our data support the conclusion, at least tentatively, that risk of relapse can be reduced by a neuroleptic-free regime during and after residential care in an intensive psychosocial milieu (Mosher 1974; Wendt et al., in press; Wilson 1977).

Although our data are insufficient to warrant a firm conclusion about the usefulness of maintenance drug treatment for this subgroup of patients, they are provocative enough to justify questioning its value when the decision to maintain patients on neuroleptics is a purely clinical one—as was the case in our comparison group.

Our data indicate that the young, relatively socially incompetent patients given maintenance neuroleptics by the CMHC program did not benefit (in terms of prevention of relapse) from their use as compared to the relapse rate for the experimental group. Ipso facto, it would not seem to justify exposing these patients to the drugs' known long-term toxicities (Crane 1973). This conclusion is similar to one reached by Leff and Wing (1971) and to some extent by Klein and Rosen (1973), but at variance with the current zeitgeist about the value of neuroleptic maintenance (Davis 1975).

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