Patterns of Alcoholism over Four Years

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SUMMARY. Follow-up studies of 758 men alcoholics at 18 months and 4 years after admission to treatment reveal that alcoholism is a chronic and unstable condition, that remission occurs as both long-term abstinence and nonproblem drinking, that only modest improvements in social adjustments are observed and that the risk of nonproblem drinking versus abstinence varies among subgroups.

UNDERSTANDING THE COURSE OF ALCOHOLISM is critical for the advancement of research and the formulation of public policy on alcoholism. Nevertheless, research has established few confirmed and generalizable propositions about alcoholic processes. In large part this reflects the dearth of systematic data about the long-term dynamics of alcoholism. In the scientific literature, for example, there is scant information on the long-term prognosis of alcoholics after treatment, and even less information on the natural history of the disorder in the absence of treatment (1).

By most traditional accounts, alcoholism should be viewed as a persistent and chronic disorder, difficult to treat, and apt to follow a dangerous course without strong intervention. Recent empirical evidence has somewhat mitigated this pessimistic view, suggesting that as many as two-thirds of treated alcoholics show subsequent improvements (2), and that many experience remission of their drinking problems for significant periods (3). However, the stability of remissions over the long term and the dynamics of the remission and relapse process remain virtually unknown.

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This article reports new findings on these topics from a longitudinal study of a large national cohort of men alcoholics. The cohort, representing patients admitted to treatment facilities funded by the National Institute on Alcohol Abuse and Alcoholism (NIAAA), was followed for a total of 4 years after admission to treatment. The study was carried out by a research group at the Rand Corporation, which recently published a comprehensive report of the research (4). Many facets of the material presented below are discussed in greater detail in that report.

The 4-year study addressed a large number of research questions, including both methodological issues and substantive issues about the nature of alcoholism. After considering the research background and methods, this paper presents results from three of the principal study areas, comprising the most important findings of the research. The first area is the status of the cohort at 4 years: that is, a broad assessment of alcohol-related conditions among our sample of alcoholics. This includes the types of drinking behavior found at the 4-year point, certain dynamic patterns of drinking behavior, and patterns of mortality between admission to treatment and the 4-year follow-up.

Second, this paper examines the over-all social and psychological adjustment of the cohort, apart from drinking behavior itself. The 4-year study collected a variety of psychosocial measurements to describe the subjects in terms of broad aspects of human functioning. The most important question here is one of rehabilitation: How much improvement in social characteristics can be observed at 4 years, compared with the debilitated conditions that are typically present when an alcoholic is admitted to treatment?

Third, this paper addresses patterns of relapse. The relapse process is highly relevant to both traditional and modern conceptions of alcoholism, and in the 4-year study we expended considerable effort in studying it over time. The discussion here will describe the patterns that appeared at 4 years and the models that were used to predict conditions under which relapse occurs.

BACKGROUND AND METHODS

The 4-year follow-up study grew out of a series of NIAAA-sponsored research efforts focused on a large national cohort of alcoholics. The same cohort formed the basis for a previous Rand report (5) and a book (3).
The alcoholics were initially treated at special Alcoholism Treatment Centers funded by NIAAA in 1973. These centers were originally established in the early 1970s as part of NIAAA's mission to demonstrate the concept of a comprehensive treatment center, where alcoholics could obtain all types of treatment within an integrated, professionally organized environment.

The treatment centers themselves conducted follow-ups of patients at 6 months after admission. In addition, NIAAA sponsored a special 18-month follow-up study of a random sample of patients in 1974 (6). The target sample for the 4-year follow-up was drawn from the same cohort as the 18-month study. The principal group was a sample of 758 male treatment admissions randomly selected from consecutive admissions to 8 Alcoholism Treatment Centers between January and April 1973. In addition to data collected at admission to treatment, quantitative data were recorded on many aspects of treatment over the next 4 years, such as the type of inpatient and outpatient services and the number of days, hours and visits of each. A companion sample of 164 persons not treated, designated "contact only" cases, was also included in the study, making a total of 922 subjects. However, the analyses presented in this paper deal exclusively with the 758 alcoholics formally admitted to treatment.

At admission, the cohort displayed many aspects of impairment and social maladjustment that are typical of most samples of alcoholics. Median alcohol consumption per drinking day was 8.7 oz of ethanol. On a 5-item index of alcohol dependence symptoms, 67% reported 11 or more symptoms during the 30-day period before admission, 18% reported 1 to 10 symptoms and only 8% reported no symptoms. Only 37% were employed at admission to treatment; annual family income was under $6000 in 56%; and 37% were divorced or separated. At admission, 42% reported they had previously been treated for alcoholism, and 32% reported being hospitalized for alcohol-related reasons in the past year. Their median age was 46 years, and only 9% were under age 30.

Field data collection was carried out by an independent professional interviewing contractor, the Survey Research Unit of Johns Hopkins Uni-
versity. Attempts to locate and interview members of the target sample were made between May and December 1977; personal interviews were conducted with every subject who could be located within any of the 50 states. All interviews were carried out in private, with no one present except the interviewer and respondent (usually in the respondent’s home). The typical interview lasted 75 min, using the forms documented previously (4). Interviewed respondents also completed a self-administered psychological assessment form, and were given breath tests to determine blood alcohol concentration (95% consented). A random subsample was also asked to provide the name of a collateral who could give an independent report on the subject; collateral interviews were obtained from 86% of subjects asked. If a subject was reported as deceased, field personnel obtained official state death certificates, and if the certificate did not indicate a definite alcohol-related condition leading to the death, an interview with a local informant was carried out to ascertain specific circumstances surrounding the death (4).

At 4 years, the study team obtained “completions” (interviews or death reports with cause of death) on 645 (85%) of the target sample of 758. The 645 completions included 548 interviews with survivors and 115 death reports. Extensive analysis of the 15% on whom we could not obtain complete data at 4 years was conducted; the results (4) suggest that the findings of this study are unlikely to be affected by more than 2 percentage points because of nonresponse.

The 4-year follow-up also investigated the methodological issue of the validity of self-reports. Assessments by the collateral respondents and measurements of blood alcohol concentration were compared with self-reports in two separate substudies of validity (4). The collateral interviews revealed that, although collaterals were uncertain about some aspects of the subjects’ drinking behavior, evidence of subject underreporting could be found in fewer than 15% of the cases on each type of measure. The measurements of blood alcohol concentrations showed evidence of underreporting of consumption, but our analysis indicated that this did not substantially affect the basic research findings.

**Mortality and Drinking Status at Four Years**

*Mortality*

We determined mortality by obtaining official death certificates from the states. The first row of Table 1 shows the over-all mortality of the study sample. It indicates that 14.5% of the original cohort died between admission to treatment and the 4-year follow-up point.4

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4 This is the rate projected to the population of all patients admitted to the eight treatment facilities, after weighting for the different sampling fractions in the
TABLE 1.—Estimated Mortality in the Sample of Alcoholics and the U.S. Population, 1973–1977, in Per Cent

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>Alcoholics</th>
<th>U.S. Population</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deaths from all causes</td>
<td>14.5</td>
<td>5.9</td>
<td>2.5</td>
</tr>
<tr>
<td>Deaths from specific causes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcoholism</td>
<td>0.6</td>
<td>0.03</td>
<td>21.0</td>
</tr>
<tr>
<td>Suicide</td>
<td>2.3</td>
<td>0.11</td>
<td>20.9</td>
</tr>
<tr>
<td>Cirrhosis</td>
<td>1.6</td>
<td>0.2</td>
<td>8.0</td>
</tr>
<tr>
<td>Accident</td>
<td>2.0</td>
<td>0.4</td>
<td>5.0</td>
</tr>
<tr>
<td>Alcohol-related deaths</td>
<td>8.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a Percentage of all patients admitted to treatment (N = 758) who died between admission and the 4-year follow-up, weighted (4).
b Based on age- and race-specific mortality rates for males in the general U.S. population, standardized on the sample age and race distributions.
c Underlying causes coded according to the methods of the National Center for Health Statistics (7). The table shows only those causes whose sample rates are elevated compared with expected rates.
d This classification is independent of the NCHS classification of “specific causes,” and does not necessarily include all deaths from all specific causes listed above. Alcohol-related deaths include deaths for which alcoholism, alcohol toxicity, liver disease or gastrointestinal bleeding was listed as a cause or contributing factor on the official death certificate; or for which a collateral informant reported that the subject was drinking before death and that alcohol was a factor in the death. All other deaths were non-alcohol-related.

For comparison, Table 1 also shows the expected rate of mortality from general U.S. population life tables, after adjusting the general population to the age, race and sex distribution of the sample, which averaged 46 years of age and was 85% White. After adjustment, the expected mortality rate is 5.9%. Thus, the mortality rate is elevated by about 8 percentage points, which constitutes a ratio of 2.5 times as many deaths as would have been expected in a cohort of nonalcoholics.

We also looked carefully at the specific causes of death and other contributing factors, as recorded by medical examiners on the official death certificates. Table 1 shows that conditions that are classically prominent in mortality studies of alcoholics were also prominent here (8). For example, many certificates indicated the cause of death as “chronic alcoholism.” The rate of such deaths was 21 times

stratified sample design (4). Therefore, the projected rate is not precisely equal to the raw proportion of deaths in the sample. The mortality analyses are the only ones where weighting produced results appreciably different from unweighted results, and so all other statistics reported in this paper are unweighted for simplicity.
as high in this population as would be expected in the general population. There were also high rates of suicide, liver cirrhosis and accidents.

These findings are important, but in our view they do not delve far enough into the causes of alcoholic mortality since they are based on standard classification methods used by the World Health Organization and the National Center for Health Statistics. These methods reflect the "underlying cause of death," which is coded by a series of complex procedures related to causal linkages in the immediate circumstances of mortality. Although these standard procedures are useful for vital statistics purposes, from a research viewpoint they omit certain valuable information. For example, we found cases who died because of heart disease, but for whom "chronic alcoholism" was also recorded on the death certificate as a contributing factor. Because the official coding rules do not recognize a linkage of alcoholism with heart disease, the standard classification method did not classify such deaths into categories that are unambiguously related to alcohol.

For that reason, we developed our own method of classifying deaths according to a criterion determining whether or not they were "alcohol-related," taking into account all mentions on the death certificate of any alcohol-related problems. In addition, the method used information from informants in the community who knew the circumstances of death (usually a spouse, relative or friend) to determine whether, for example, an accident was related to alcohol or not. Under this method, 8% of the sample were classified as dying because of an "alcohol-related" cause. The rate of 8% closely matches the difference between the actual mortality rate and the expected rate, suggesting that the alcohol-related classification appears to account for the excess mortality.

**Drinking Status**

Determining alcohol-related problems among survivors is complicated by the numerous variations in types of problems, time frames and related factors. Our method of classifying the status of survivors was to determine the presence or absence of serious alcohol-related problems during the 6 months before the follow-up interview.
The measurements involved two different types of alcohol problems that represent divergent methods of assessing alcoholism (Chart 1).

The first method uses measures of alcohol dependence, or the "alcohol dependence syndrome"—represented by such symptoms as gross tremors because of alcohol withdrawal, morning drinking to forestall withdrawal, loss of control, blackouts and the like. Our procedure counted a subject as having a serious, continuing alcohol problem if he had an instance of one or more of these symptoms in the 30-day period before his last drink, provided he drank in the past 6 months.

A second assessment method frequently used—sometimes when a measurement of dependence symptoms is lacking—is to examine adverse consequences of drinking. The 4-year follow-up interview inquired into a variety of serious consequences of drinking that might have occurred during the 6-month period before the interview. The list included health problems, such as liver disease or hospitalization because of drinking; arrests, accidents and other law-enforcement incidents due to drinking; and work or interpersonal problems.

**Chart 1.—Classification of Alcohol Problems**

<table>
<thead>
<tr>
<th>Dependence Symptoms*</th>
<th>1 or more symptoms</th>
<th>(30 days before last drink)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tremors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morning drinking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackouts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing meals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous drinking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(12 hours or more)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Adverse Consequences b</th>
<th>1 or more events</th>
<th>(6 months before follow-up)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Law-enforcement incidents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work or interpersonal problems</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Tremors, morning drinking, loss of control, blackouts and missing meals were ascertained from a subject's report of the number of days, during the 30-day period before his last drink, on which each symptom occurred. Continuous drinking was ascertained from the subject's report of whether or not his longest period of continuous drinking was 12 hr or more during the same 30-day period.

b Health problems included liver disease, hospitalization because of drinking, receipt of medical advice to stop drinking and experience of any alcohol-related disease episodes (pancreatitis, bleeding or delirium tremens). Law-enforcement problems included any arrest for drinking and driving or any time in jail connected with drinking. Work or interpersonal problems included being currently unemployed because of a drinking problem, missing work on 2 or more days because of drinking in the 30 days before the last drink, or having "arguments or fights" while drinking on 2 or more days in the same 30-day period.
problems, such as being unemployed, frequently missing work or having frequent fights because of drinking. As shown in Chart 1, the study treated one or more of these events during the 6-month period as an indication of an alcohol problem at the time of the 4-year follow-up. In fact, few people in this sample experienced only one such problem—when alcohol-related problems occurred, they usually occurred in multiple instances.

The complexity in classifying drinking behavior arises principally from variability of the behavior over time. Even during a period as short as 6 months it is difficult to determine unambiguously an individual's proper classification as, for example, a drinker versus an abstainer. Our procedure was, first, to begin with people who at the time of the follow-up were either currently drinking or currently abstaining (Figure 1). For those drinking, of course, the classification of alcohol problems is simple; those people drinking without problems can be simply distinguished from those who reported one or more problems. For abstainers, the situation is a little more complicated because some people abstained for a short time during the 6-month period, but nonetheless had severe alcohol problems during their last drinking period. For these "short-term abstainers" (abstained 1–5 months) the interview obtained detailed information on drinking behavior during the 30-day period before their last drink, providing a classification as either having alcohol problems or being problem-free.

![Diagram of Drinking Status classification](image)

**Figure 1.**—Classification of Drinking Status at 4 Years
The addition of this information on short-term abstainers proved significant. In the 18-month follow-up study (3) no data were available on the drinking of short-term abstainers. At 4 years, the data revealed that when short-term abstainers last drank, the great majority had alcohol problems. Eighty-five per cent of the short-term abstainers had a serious alcohol problem at the time of the 4-year follow-up; in fact, the problem rate was higher among short-term abstainers than it was among current drinkers.

For general classification purposes, the 4-year follow-up study combined the various groups into a set of 3 major categories: long-term abstainers (6 or more months), nonproblem drinkers and problem drinkers (Figure 1). Of the 548 survivors at 4 years, 28% were long-term abstainers, 18% were nonproblem drinkers and 54% were problem drinkers. Thus, 46% of the survivors were in remission at the 4-year follow-up.

The stringent criteria that we used for assessing a drinking problem were based on conclusions from longitudinal analysis. Subjects were first classified into categories according to their drinking status at an early follow-up; then we calculated the percentage of each category who had an alcohol-related problem at a later point. For example, long-term and short-term abstainers were distinguished at 18 months. For each group, Table 2 shows the percentages who had one or more adverse consequences or dependence symptoms at 4

<table>
<thead>
<tr>
<th>Status at 18 months</th>
<th>N</th>
<th>Adverse Consequences</th>
<th>Dependence Symptoms</th>
<th>Alcohol-Related Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term abstainers</td>
<td>140</td>
<td>31</td>
<td>23</td>
<td>1</td>
</tr>
<tr>
<td>Short-term abstainers</td>
<td>124</td>
<td>52</td>
<td>43</td>
<td>9</td>
</tr>
<tr>
<td>Drank without symptoms</td>
<td>103</td>
<td>27</td>
<td>34</td>
<td>3</td>
</tr>
<tr>
<td>Drank with symptoms</td>
<td>223</td>
<td>61</td>
<td>71</td>
<td>9</td>
</tr>
</tbody>
</table>

*Adverse consequence = report of 1 or more consequences. Dependence symptoms = report of 1 or more symptoms. Deaths include those recorded between 18 months and 4 years.

*Number of cases interviewed at 18 months (the base N for the rate of alcohol-related deaths). The base N for the rate of consequences or symptoms in each row is the number of subjects interviewed at both 18 months and 4 years (115, 99, 85 and 175 in rows 1 through 4, respectively).
years and who died of an alcohol-related cause between the 18-month and 4-year follow-up. The long-term abstainers had a relatively good prognosis on all of these measures, whereas those who had previously been short-term abstainers were much more likely to experience later problems. In particular, short-term abstainers were nine times as likely to die of an alcohol-related cause.

The other finding in Table 2 is that dependence symptoms play a crucial role among drinkers. Symptomatic drinkers had very poor prognoses. In the comprehensive study report (4), we have shown a more detailed analysis of the level of symptomatology among the symptomatic drinkers, indicating that subjects who experienced even low levels of symptoms after treatment had very high rates of later problems. These results dictated the adoption of a stringent criterion for remission, which treated even a single symptom as an indication of a serious problem with an adverse prognosis.

**SOCIAL AND PSYCHOLOGICAL ADJUSTMENT**

The 4-year follow-up study examined the social and psychological characteristics of the cohort in order to map any changes in social adjustment that might have occurred since admission to treatment and to determine whether improvements in drinking behavior were related to possible improvements in social or psychological functioning. Table 3 shows a number of social adjustment characteristics at admission, 18 months and 4 years and comparative data from the general U.S. population. The alcoholics were much more maladjusted than the U.S. population on all of these measures at admission to treatment and at the time of the follow-ups. The data did show

<table>
<thead>
<tr>
<th></th>
<th>Alcoholics to Treatment</th>
<th>18-Month Follow-up</th>
<th>4-Year Follow-up</th>
<th>U.S. Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Divorced or separated</td>
<td>37</td>
<td>38</td>
<td>36</td>
<td>8</td>
</tr>
<tr>
<td>Earnings &lt; $500/month</td>
<td>70</td>
<td>64</td>
<td>60</td>
<td>14</td>
</tr>
<tr>
<td>Unemployed</td>
<td>24</td>
<td>19</td>
<td>14</td>
<td>3</td>
</tr>
</tbody>
</table>

* Patients interviewed at all three time points (N = 474).


* Constant 1977 dollars.
TABLE 4.—Percentages of Long-Term Abstainers, Nonproblem Drinkers and Problem Drinkers (at 4 Years), and of a General Population, with a High Frequency of Psychiatric Symptoms

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Depression</th>
<th>Tension and Stress</th>
<th>Anxiety</th>
<th>Cognitive Impairment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term abstainers</td>
<td>155</td>
<td>8</td>
<td>13</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Nonproblem drinkers</td>
<td>99</td>
<td>9</td>
<td>16</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Problem drinkers</td>
<td>291</td>
<td>26</td>
<td>33</td>
<td>27</td>
<td>18</td>
</tr>
<tr>
<td>General population</td>
<td>2235</td>
<td>2</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*a* Percentage reporting that “most or all of the time” in the 6 months before the 4-year follow-up they “felt downhearted, blue, or depressed”; “felt tense or high-strung”; “felt anxious, worried, or upset”; and were bothered by “memory problems” or “problems concentrating.”

*b* Subjects in Rand’s National Health Insurance Study, a general-population sample of Seattle, Washington. Data on anxiety and cognitive impairment not available.

minor improvements in employment and earnings over time (using constant-dollar earnings, with inflation controlled), but these are not large changes, especially in comparison with the general population rates.

The 4-year follow-up study also collected information about the psychological characteristics of the sample. Unfortunately, no psychological data were obtained at the earlier time points. Table 4 shows the percentages of long-term abstainers, nonproblem drinkers and problem drinkers who reported high frequencies of psychiatric symptoms at the 4-year follow-up. The results show, first of all, that the rates of psychiatric symptoms were much higher in all of the groups of alcoholics than they were in a general-population sample.

The second point about Table 4 is that the rates of psychiatric symptoms among the problem drinkers are much higher than among the long-term abstainers and nonproblem drinkers. On the other hand, the two remission groups are not distinguishable in the frequency with which they report psychiatric symptomatology. We do find, then, a correlation between remission of drinking problems and an absence of psychiatric problems. However, we cannot determine whether an alcoholic’s level of psychiatric symptoms is an effect or a cause of remission, because all of these data were collected at a single point in time.

Perhaps the most important aspect of Table 4 is the lack of differences in psychiatric symptomatology between long-term abstainers and nonproblem drinkers. The fact that these two categories are
equal with respect to mental health, in addition to being free of drinking problems, supports our interpretation that both groups should be considered as representing modes of remission.\footnote{A similar pattern was found on measures of personal income, employment and general life satisfaction: the abstainers and nonproblem drinkers did not differ substantially, but problem drinkers were much more impaired.}

A quite different pattern is seen in Table 5, which shows data on beliefs about alcoholism. We find a large difference between the nonproblem drinkers and the abstainers, but abstainers and problem drinkers have similar beliefs. Both the abstainers and the problem drinkers tend to accept traditional beliefs about alcoholism, such as "alcoholism is an irreversible disease." Not surprisingly, many of the nonproblem drinkers reject such statements.

The same pattern appears even more clearly from the alcoholics' self-concepts (Table 5). For example, they were asked, "Do you think of yourself as an alcoholic right now?" [at the time of the 4-year follow-up]; and, "Do you think that you will experience serious harm if you drink in the future?" Once again, the nonproblem drinkers tend to reject such notions, while the problem drinkers and abstainers are likely to accept them. Note that a high proportion of the problem drinkers accept the belief that they are alcoholics, and assert that they will be seriously harmed by future drinking; nonetheless, they continue to drink. This is one instance in which our data show commonalities between problem drinkers and abstainers in certain belief systems and behavior patterns. These findings offer further support for the common observation that, among alcoholics,

\begin{table}
\centering
\caption{Respondents' Beliefs about Alcoholism and Self-Concepts, by Drinking Status at 4 Years, in Per Cent}
\begin{tabular}{|c|c|c|c|c|c|c|c|}
\hline
 & \multicolumn{3}{c|}{Long-Term} & \multicolumn{3}{c|}{Nonproblem} & \multicolumn{3}{c|}{Problem} \\
 & Abstainers & Nonproblem & Problem & Abstainers & Nonproblem & Problem & Abstainers & Nonproblem & Problem \\
(N = 155) & (N = 99) & (N = 291) & & & & & & & \\
\hline
Beliefs & & & & & & & & & \\
Alcoholism is an irreversible disease & 61 & 31 & 59 \\
Once an alcoholic always an alcoholic & 75 & 36 & 67 \\
Alcoholics cannot resume moderate drinking & 82 & 47 & 69 \\
\hline
Self-Concepts & & & & & & & & & \\
Alcoholic now & 69 & 21 & 65 \\
Serious harm from future drinking & 92 & 29 & 68 \\
Death from future drinking & 28 & 0 & 16 \\
\hline
\end{tabular}
\end{table}
the immediate rewards of drinking often overwhelm the deterrent force of its harmful long-term effects.

**Relapse Patterns**

Relapse is an important phenomenon in the study of alcoholism. Its importance stems, first, from its frequency. As will be shown below, relapse is common in this sample, and remissions are generally intermittent rather than stable. But relapse is also important because of its conceptual status. The empirical phenomena of relapse bear on fundamental theoretical issues in alcoholism. In fact, a number of different theories of alcoholism are directly related to conceptions of the relapse process. At least three of these conceptions are crucial, both to research and to public understanding of alcoholism.

The first conception of relapse represents an old and widely accepted theory of alcoholism. It holds that any drinking leads to immediate relapse. The theory is based on the classic proposition that alcoholics are unique in the crucial characteristic of loss of control: when they drink, they lose control of their drinking. As expressed by Jellinek in a widely cited article (9), this conception posits that the presence of any alcohol in the body of an alcoholic sets up a physical demand for more alcohol; therefore, the alcoholic proceeds uncontrollably from an initial drink to intoxication. Few scientists would state the proposition in such a determinate fashion today. Jellinek himself had suggested in earlier work that some early-stage alcoholics might drink to intoxication only on some occasions rather than invariably (10). The theory itself has been disconfirmed by numerous experiments which have shown that when alcoholics are given ethanol under controlled conditions they do not necessarily launch into immediate uncontrolled drinking (11). Nonetheless, popular accounts frequently represent loss of control as an inevitable outcome of any drinking by alcoholics (12), and that simple conception still seems dominant among the lay public.

The second conception represents a revision of the first. Because of experimental results and other observations of drinking among alcoholics, the hypothesis of immediate relapse clearly needs to be qualified. One such qualification is to conceptualize loss of control not as an inherent or inevitable process but as something that occurs with a certain probability during each drinking occasion (12).
That is, alcoholics cannot always control their drinking. This implies that, among alcoholics, any form of drinking, if prolonged, will eventually lead to relapse. Eventually, therefore, one should find high rates of relapse among alcoholics who engage in nonproblem drinking and low rates of relapse among alcoholics who abstain. A large differential relapse rate between the two groups is a crucial prediction of the theory.

A different conception is represented by a third formulation: namely, that the risk of nonproblem drinking varies among subgroups of alcoholics. This conception, although suggested by some recent observations (13), has not yet been fully formalized. It suggests that the notion that loss of control is universal throughout the alcoholic population may have been too simple. In fact, the population may be heterogeneous, and the risks of drinking, compared with the risks of abstinence, may vary with different characteristics of subgroups. For example, much recent research work on alcoholism has put more weight on the degree of alcohol dependence (14). This represents a trend toward thinking of dependence as a variable property which may range from zero to some very high value, rather than as a strictly categorical attribute (present or absent).

Our data bear directly on these three different conceptions of the relapse process. Both in the 18-month and 4-year study we examined relapse rates by defining four relapse analysis groups, identified by their drinking behavior at one point: long-term abstainers, short-term abstainers, nonproblem drinkers and problem drinkers. Each group's behavior was then examined at a later point to determine rates of relapse. In the 18-month study, subjects were classified into relapse groups according to their status at a 6-month follow-up; the analysis then calculated the proportion of each group that had relapsed at the 18-month point. The results (3, Table 18, p. 105) showed a high rate of continuing relapse for problem drinkers (43%), but no significant differences between the three other groups (17% for long-term abstainers, 19% for short-term abstainers, and 13% for normal drinkers, as defined in that study). This finding is the one that appeared to contravene traditional theories and, hence, received disproportionate attention in discussions of the 18-month study (3, Appendix B).

The 4-year follow-up presented an opportunity to reexamine this question with more complete data. Table 6 shows relapse rates
Table 6.—Patterns of Relapse at 4 Years

<table>
<thead>
<tr>
<th>Drinking Status at 18 Months</th>
<th>% Relapsing at 4 Years&lt;sup&gt;a&lt;/sup&gt;</th>
<th>% Alcohol-Related Deaths at 4 Years&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term abstainers</td>
<td>30</td>
<td>1</td>
</tr>
<tr>
<td>Short-term abstainers</td>
<td>53</td>
<td>9</td>
</tr>
<tr>
<td>Nonproblem drinkers</td>
<td>41</td>
<td>3</td>
</tr>
<tr>
<td>Problem drinkers</td>
<td>73</td>
<td>9</td>
</tr>
</tbody>
</table>

<sup>a</sup> Per cent problem drinkers at 4 years, among all survivors interviewed at 4 years. Ns for the four groups are 115, 99, 85 and 175, respectively. The difference between relapse rates for long-term abstainers and nonproblem drinkers (30 vs 41%) is not significant at the .10 level (X<sup>2</sup> = 2.03, with continuity correction).

<sup>b</sup> Per cent dying of an alcohol-related cause between 18 months and 4 years, among all alcoholics interviewed at 18 months. Ns for the four groups are 140, 124, 103 and 223, respectively.

among survivors at 4 years and rates of alcohol-related death. The first notable aspect of the data is that relapse rates are higher at 4 years than at 18 months, but this is a definitional change, reflecting our more stringent criteria in the 4-year study. Although the underlying patterns have not changed substantially, the new definitions indicate more relapses than we were able to observe in the earlier data.

The more important aspects of Table 6 are those represented by comparisons of relapse rates among the four groups at 4 years. The short-term abstainers are shown to have high rates of relapse; however, the crucial comparison is that between nonproblem drinkers and long-term abstainers. The results reveal a somewhat higher risk of relapse at 4 years among nonproblem drinkers than among long-term abstainers, although the difference is not statistically significant. This evidence provides little support for the second theory cited above, which predicts a substantial difference between the two groups. At best, the data could support a theory positing a slightly better prognosis for abstainers, but that leaves one question remaining: Are these patterns of relapse uniform throughout our sample of alcoholics?

This question is at the heart of the issue between the second and third conceptions of alcoholism cited above. The comprehensive study report (4) contains a considerable amount of multivariate analysis addressing the question of whether characteristics measured at admission to treatment affect the relative relapse rates of non-
problem drinkers and abstainers. The analysis revealed several variables that were important in affecting relapse rates: severity of dependence symptoms, age and marital status produced fairly complex, statistically significant interactions in a logit regression model. The results show that rates of relapse of drinkers and abstainers are not uniform, but are subject to great variations depending on an alcoholic's characteristics at admission to treatment.

Table 7 illustrates the model's predicted rates of relapse at the 4-year follow-up. The subjects are classified according to their characteristics at admission to treatment and their drinking status at 18 months. The critical comparisons are those involving long-term abstainers versus nonproblem drinkers, illustrating large interactions. For example, among subjects who had high levels of dependence symptoms and who were older at admission, relapse rates were higher among nonproblem drinkers than among abstainers. On the other hand, among subjects who had low levels of dependence and who were younger at admission, relapse rates were lower among nonproblem drinkers than among abstainers.

Somewhat more complex patterns are revealed for the other subgroups of Table 7. Among patients who had high levels of alcohol

<table>
<thead>
<tr>
<th>Age &lt; 40</th>
<th>Age 40 +</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-Term Abstainers</td>
<td>Nonproblem Drinkers</td>
</tr>
</tbody>
</table>
| High Dependence Symptoms  
  Married | 7 | 17 | 4 | 50 |
| Unmarried | 16 | 7 | 10 | 28 |
| Low Dependence Symptoms  
  Married | 16 | 7 | 11 | 28 |
| Unmarried | 32 | 3 | 22 | 13 |

Relapse rates at 4 years, based on predictions from a logit regression model fitted using the 200 cases who reported either 6 months of abstinence or nonproblem drinking at 18 months. The model, predicting relapse versus nonrelapse at 4 years, contained significant coefficients for two-way interactions of status at 18 months versus age, marital status and dependence level at admission (all dummy variables). None of the main effects for any variable in the model was significant, even at the .10 level (4).

High dependence level represents 11 or more episodes of dependence symptoms (tremors, morning drinking, blackouts, etc.) during the 30 days preceding admission to treatment. Low dependence level represents 1 to 10 such episodes.
dependence and who were younger at admission, and among those who had low levels of dependence and were older, relapse patterns are substantially affected by marital status: those who were married had a better prognosis with abstinence, while the unmarried had a better prognosis with nonproblem drinking.

The basic thread of these patterns implies that the third conception of the relapse process is the one most consistent with the data. In particular, the results suggest that the risks of nonproblem drinking may not be unqualified. Rather, they depend on the person's characteristics and environment at the time he enters treatment.

Table 8 shows that both remission and relapse are frequent in this population. The data tabulated here represent two methods of assessing the long-term stability of drinking patterns. In the left column is a first approximation, made by classifying a subject's status at the two follow-up points. For example, the "stable abstainers" had abstained for 6 or more months at both the 18-month and the 4-year points; such people constituted 13% of the sample. Nine per cent were classified as nonproblem drinkers at both follow-up points. An additional 6% had changed from one remission category to another. The remaining 72% had been problem drinkers at one or both of those times. In other words, only 28% of this sample were in stable remission, judging from their status at the two follow-up points.

Moreover, other changes could have occurred. As Table 8 shows, among the 13% classified as stable abstainers at both points, not all

| Stable abstainers  | 13  | 7  |
| Stable nonproblem drinkers | 9  | 7  |
| Abstaining/nonproblem drinking | 6  | 5  |
| Problem drinking | 72  | 81 |

* Stable abstainers = long-term abstinence (6 months or more) at both the 18-month and 4-year follow-ups. Stable nonproblem drinkers = nonproblem drinking at both follow-ups. Abstainers/nonproblem drinkers = long-term abstinence at one follow-up, nonproblem drinking at the other.

b Stable abstainers = abstention throughout the 4-year period from admission to follow-up. Stable nonproblem drinkers = nonproblem drinking at both the 18-month follow-up and the 4-year follow-up and no serious alcohol-related problems during the 4-year period. Abstaining/nonproblem drinking = long-term abstaining at one follow-up, nonproblem drinking at the other follow-up, and no serious alcohol-related incidents during the 4-year period.
abstained during the entire period between admission and the 4-year follow-up—in fact, only 7% of the sample abstained throughout that 4-year period. We also found that 7% of the sample were stable, continuous nonproblem drinkers, in the sense that they were classified as nonproblem drinkers at both follow-ups and they had not experienced serious alcohol incidents during any time in the 4-year period. In addition, there were some subjects, including 5% of the sample, who appeared to be switching back and forth between long-term abstinence and nonproblem drinking and who reported no serious alcohol problems at any other time. That leaves 81% of the sample who had serious drinking problems at one time or another during the 4-year period, documenting once again the pervasive instability of this sample.

CONCLUSIONS

The results of the 4-year follow-up study imply one fundamental fact about the disorder: alcoholism is a chronic, unstable condition. Among persons who come to formal treatment, alcoholism appears to be a continuing condition for the great majority. This is not to say that there is no improvement. On the contrary, our data show that remissions are frequent, but are generally intermittent rather than stable.

The data imply that remission occurs in two forms: both long-term abstinence and nonproblem drinking. We have found that these two groups have roughly equivalent levels of social adjustment, mental health and physical condition. Compared with other alcoholics, persons in either remission group have much lower rates of alcohol-related mortality and lower rates of relapse.

When areas of life other than drinking are examined, only modest improvements in social adjustment are found. The cohort in this study improved slightly in levels of earnings and unemployment, but did not change significantly on other measures of adjustment. Whether other methods of treatment or intervention could lead to greater changes is open to question. It is clear, however, that in this sample, social rehabilitation did not occur as frequently as remission of alcohol problems.

Finally, we found that the risk of nonproblem drinking varies substantially between different subgroups of alcoholics. In particular, among alcoholics who were highly dependent on alcohol and
who were aged 40 or over at admission to treatment, relapse rates were lower for long-term abstainers than for nonproblem drinkers. Yet among alcoholics who were less dependent and under age 40, the relationship was reversed. This is not consistent with conceptions of alcoholism holding that any form of drinking will eventually lead to relapse. However, the data are consistent with a view that treats alcohol dependence as a variable property of individuals. The level of dependence appears to make a substantial difference in the risks of drinking.

Alcoholics, then, do not appear to make up a unitary, homogeneous group. Rather, alcoholism occurs in a variety of forms and is arrayed along a number of different dimensions. It is clear that alcohol dependence is a dimension of preeminent importance, and that it plays an important role in the course of alcoholism. At lower levels of alcohol dependence or at earlier ages, nonproblem drinking may represent a feasible mode of adjustment, whereas with increasing age or dependence the risks of nonproblem drinking become proportionately greater. Beyond this, the processes that underlie remission and relapse remain incompletely understood. Further advances in prevention and treatment of alcoholism will depend on a better understanding of these processes, and on recognizing the heterogeneity within populations of alcoholics.

REFERENCES


